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James Doyle Sell Mining Collection

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PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows:
Trace (Tr), Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-61
Page 1 of 2 Pages
Collar Elev 2586.38 Final Depth 574.2
Coords N 36 243.0 E 17 864.6
Inclination VERT
Logged by SAA - CWH
Date: Start 12-2-61 Finish 12-15-61

	Depth From	Depth To	Int'vl	Elev	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	23.0	23.0						0																														Rock S.T
NX-11	23.0	30.0	7.0		.12				80	2.56	.08	.02	.02			Tr			Tr											Tr	Tr	Tr	Tr			Dp	23.0	?	Dp, wk bleached, wk Alt, wk chly, Tr Chlor, Tr Sers, Mod Lim, Tr Sulf
1875	30.0	38.6	8.6		.12				86	2.60	.08	.01	.03			Tr																							Dp, " " " " / Incr in Mafics, wk chly, Tr Lim, chlor,
	38.6	48.8	10.2		.20				93	2.57	.13	.01	.02			.04				Tr						Tr		5					Tr						Dp as above, cont in mafics and occur as frags, wk gtz veing, wk chly
	48.8	57.0	8.2		.30				96	2.56	.17	.02	.03			.08												SP			SP	SP							Dp, incr in Alt, Mod or Arg Frags (Alt?), wk Mod chly, Mod Lim, gtz veing
	57.0	65.3	8.3		.62 }		.45 }		93	2.58	.40	.02	.03			.17				Tr														Tr					Dp, as above, incr in Lim + Alt
	65.3	72.9	7.6		.12		.09		90	2.54	.07	Tr	.02			.03															SP								Dp, Mod Alt, bleached, bakes, decr in Mafics, Mod Feld, wk chly, Mod gtz veing
	72.9	81.8	8.9		.07				94	2.59	.04	Tr	.01			.02			SP												Tr		Tr						Dp, as above, last 2' of core Calc, leached, Mod bakes in Feld
	81.8	92.0	10.2		.06				96	2.56	.03		.01			.02																							Dp, leached, Alt, Mod-St Lim, Tr Sers, gtz veing, Tr chlor, wk chly
	92.0	99.0	7.0		.09				78	2.53	.05	.01	.01			.02															5			Tr					Dp, " " " " , Mod Feld, Sec?, wk chly, gtz veing, Tr chlor
	99.0	103.8	4.8		.12				93	2.57	.07	Tr	.02			.03			Tr	Tr											Tr								Dp, Bkn, leached, Alt, Mod Lim, Tr chlor, cont "Feld" gouge, " "
	103.8	113.2	9.4		.13				96	2.54	.07		.02			.04																							Dp, as above
	113.2	123.7	10.5		.23		.05		91	2.56	.04		.01			.18			SP												SP		SP						Dp, good core, leached, Mod Lim, gtz veing, Mod wk Feld, Tr chlor, wk chly
	123.7	131.3	7.6		.44 }		.38 }		100	2.54	.32	.02	.04			.06																							Dp, as above, incr in chly, Mod color
	131.3	139.7	8.4		.11		.04		94	2.55	.03	Tr	.01			.07																	Tr						Dp as above, " " "
	139.7	148.0	8.3		.15				92	2.56	.08	.01	.02			.04			Tr												Tr								Dp, Bkn, wk Alt, bleached, wk chly, decr in Feld, Tr chlor
	148.0	154.5	6.5		.16				92	2.56	.07	.01	.03			.05															SP								Dp, as above, Mod gtz veing, decr in chlor
	154.5	163.2	8.7		.14				97	2.54	.07	.01	.02			.04															Tr								Dp, Tr Mafics, wk gtz veing, Mod Feld, Tr chlor, Mod lim
	163.2	173.5	10.3		.13				96	2.57	.06	.02	.02			.03																							Dp, wk Alt, decr in leaching + lim, Tr Sulf (?), Tr chlor, gtz veing
	173.5	183.2	9.7		.14				99	2.58	.04	.01	.02			.07																Tr							Dp, as above, cont decr in lim, Mod SiO_2, wk Tr Sulf.
	183.2	189.4	6.2		.12				99	2.55	.03	Tr	.01			.08																							Dp, dense, Mod Alt, Mod SiO_2, wk lim, Tr chlor, wk gtz veing
	189.4	196.0	6.6		.08				95	2.54	.02	.01	.01			.04																							Dp, as above
	196.0	205.6	9.6		.13				95	2.60	.02	.02	.02			.07			Sp												Sp								Dp, dense, Mod Alt, Mod-St SiO_2, wk lim on shears, Tr cc, Mod mag
	205.6	212.1	6.5		.10				100	2.58	.02	.02	.02			.04																							Dp, as above, wk chly, gtz veing
	212.1	219.0	6.9		.11				100	2.58	.02	.02	.02			.05																							Dp, dense, Mod Alt, Mod SiO_2, lim on shears, Tr chlor, wk Sulf
	219.0	225.7	6.7		.10				86	2.61	.04	.01	.04			.01																	Tr						Dp, as above, incr in chly
	225.7	234.7	9.0		.06				97	2.59	.01	.01	.01			.03																							Dp, Alt, St SiO_2, wk chly, lim on shears, Tr Sulf, Tr chlor
	234.7	240.5	5.8		.06				95	2.57	.01	.01	.01			.03																							Dp, Bkn, incr in lim, Tr chly, Tr Sulf, Mod gtz veing
	240.5	249.0	8.5		.06				58	2.55	.01	.01	.01			.03																							Dp, as above
	249.0	258.5	9.5		.12				97	2.57	.03	.01	.02			.04	.02																						Dp, St SiO_2, wk lim on shears, Tr chly, Tr Sulf, gtz veing
	258.5	268.5	10.0		.15				88	2.59	.02	.01	.02			.05	.05		Tr																				Dp, " " " " , Tr chly, Bkn, wk, gtz veing
	268.5	277.5	9.0		.22				91	2.58	.04	Tr	.01			.10	.07																						Dp, as above, St SiO_2, Tr Sulf, Tr cc, Py, wk chly
	277.5	287.5	9.8		.11				100	2.58	.01					.03	.07																						Dp, Fresh, St SiO_2, wk-Mod Sulf, cc, Py, Tr gtz veing
	287.5	296.5	9.2		.22				94	2.57	.02		.01			.07	.12									Tr	Tr	Tr	10							Mz	294.9	294.9	99%	Dp, as above to 292.9', then Meta-sed (Ark?), St SiO_2, wk-Mod Sulf, Tr cc, Mod gtz veining, Tr chlor
	296.5	302.2	5.7		.33		.01		78	2.69							.33			Sp									45	5			80	Tr						Meta-Sed. Good incr in bra. por, Mst silica, Tr Ca SiO_3 mins, Sp Sulf
	302.2	310.0	7.8		.70 }	ms/c	.03 }	ms/c	85	2.79							.70												20	40			40			Tr	302.2		Gouge	Gouge incr enough to be true Tr. Still v/st s/l Sp $CaSO_3$ mins, wk Sulf
	310.0	319.7	9.7		.51 }	.59	.02 }	.03	97	2.87							.51			S									30				25							Tr, st bra. por, Mod $CaSO_3$, Mod gtz, Mod py, wk Mod Cpy, Tr py, Sphal
	319.7	329.5	9.8		.26				98	3.01							.26			Sp									25	55			20	Sp						Tr, incr $CaSO_3$, Sp wk sulf, Occ 1" gtz, moly in Sp, Sulf
	329.5	337.2	7.7		.09				78	2.93							.09			Tr									50	5			5	40	Tr					Tr, st bra por, st white gtz in "spaloing" patterns, Tr Sulf, occ.
	337.2	344.2	7.0		.21				75	3.15							.21			Sp									55	Sp							Bx			As above
	344.2	348.9	4.7		.23				98	2.98							.23											Tr	20		Tr	Sp	25	5						As above to 345.6 then incr $CaSO_3$ & chlor w/st chlor & cod. Sp Sulf
	348.9	356.4	7.5		.41		.03		96	2.81							.41												15	65			20	Sp						Tr w/st $CaSO_3$, gtz veing finer & more nom. Sl. incr in total Sulf. Sp Sulf
	356.4	363.3	6.9		.49		.02		76	2.80							.49												20	60										Tr, St Gouge, St gtz veing, Mod cpy as inclusions, St SiO_2, Tr calc veins
	363.3	371.9	8.6		.52		.04		99	2.56							.52												25	50			25							Tr, as above, Mod cpy, incr in calc, Tr Moly, chlor

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Toctite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-61
Page 2 of 2 Pages
Collar Elev. 2866.58 Final Depth 574.9
Coords. N 36,343.03 E 12,664.6
Inclination Vert
Logged by SAA - CWH
Date: Start 12-2-61 Finish 12-15-61

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Clays	Pitch	Black	Blue Green	Mn, Iron Carbonate	Cc	Gyp	Barn	Lim.	Py	Mag.	Hem.	Spec.	Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	Mn. oxide	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
371.9	380.6	8.7		.64		.01		100	2.71							.64			Sp					Tr	Tr	55	15		Tr	5	30	Tr					Tr, ST gar; ST pcts of white qtz; Mod cpy, Tr chlor, Moly, w calc
380.6	387.5	6.9		.35		.01		79	3.02					Tr		.35					Tr				Sp	65				Sp	20						Tr, as above, dark in qtz, rare in calc, Tr Hem, Tr Moly.
387.5	395.5	8.0		.31	7.6		7.6	85	2.96							.31					Sp					55	25										Tr, ST gar, ST qtz veing, w cpy, Sp Moly, Mod calc, Mod SiO2, Mod Hem
395.5	402.8	7.3		.30	1.43	.02	.02	95	2.90							.30										60	10						Tr				Tr, dark in gar, Mod qtz veing; Mod-ST calc veinlets, Mod cpy, Sp Hem
402.8	412.6	9.8		3.78		.02		84	2.74							3.78			5		Tr					75	5				15						Tr, Brkn, ST cpy; Mod qtz veins, Tr Moly, ST gar, Mod py, wk calc
412.6	422.8	10.2		3.77		.01		58	3.14							3.77										50	50								SX			Tr, massive gar, ST cpy, Mod py; Brkn, Tr chlor, w calc veins, Tr Moly
422.8	430.8	8.0		1.20		Nil		65	3.01							1.20			Sp							70	5				20	5					Tr, dark in gar, Mod cpy, py, ST qtz & calc veinlets, Sp Hem, Tr Moly
430.8	438.7	7.9		1.15		.04		88	3.04							1.15				Tr					5	50	25		5		15	Sp					Tr, ST, Brn gar, wk-Mod cpy, py; Mod qtz veinlets, wk calc veins, Tr chlor
438.7	448.5	9.8		.41		.03		100	2.86							.41									Sp	50	25	Tr	5		10	10					Tr, wk-Mod gar; patches Hf, Mod chlor, wk cpy; Mod SiO2, Tr Moly
448.5	458.2	9.7		.10		.01		99	2.94							.10					Tr					55	10		Sp		30	5					Tr, Mod gar; ST Patches white qtz, Mz with gar; Tr Moly, w calc
458.2	468.3	10.1		.37		.05		95	2.98							.37										50	10				35	5					Tr, as above wk-Mod Sulf, wk chlor, Tr Moly
468.3	473.0	4.7		.29		.01		100	2.91							.29										20	45				20	15					Tr, dark in gar; Mod Sulf; Mod chlor; Patches Hf & white qtz, Tr Moly
473.0	478.8	5.8		.57		.02		88	3.04							.57				Tr						10	25		10	5	45	5		Meta Sed	477.8	SSY	Tr, as above Tr 477.8' then highly siliceous Meta Sed(?) May be
478.8	487.6	8.8		.12				82	3.00							.12			Tr						Tr	Tr	30		10	10	50	Sp					silicified Mz. Texture obscure; wk sulf. Tr Moly
																																					Meta-Sed; Intense Silicification, patches gar, wk qtz veing, wk patches
																																					Feld's, wk cpy, py; Tr Moly, w Fe chlor, Tr Marble
Bx→ 487.6	498.1	10.5		.13				87	2.60							.13											10		5	15	50			Ig	488.4	Sed	Meta sed as above & sheet, grad change to purple text, sp Sile.
1.432 498.1	505.9	7.8		.15				96	2.61							.15									Tr		5		10	15	50						Ig, sh. Sil, mixed areas of purple text, t dark inclusions, sp cpy & Tr Moly
505.9	514.7	8.8		.05				82	2.57							.05											Sp		5	10	40						Ig, " " dark in purple text, patches Meta Sed; Tr Sulf, w moly
514.7	523.0	8.3		.05				93	2.60							.05													Sp	10	40	Tr					Ig-Meta-sed, grad changes to a Meta Sed; Tr, Sulf, purple text, wk sulf, Tr Moly
523.0	530.0	7.0		.36				91	2.61							.36					Tr			80	12	08			5	10	20			Ig-Bx	523.0	Brkn	Ig-Bx, Frags of Mz, Meta Sed, with cpy, py, Pb, in cement; this
																																					rock resembles Bx pipe; wk Feld.
530.0	539.6	9.6		.25				50	2.64							.25								04	2	04			5	5	20	S					Ig-Bx as above, dark in Sulf, & dark in "Bx Pipe" Texture.
539.6	548.1	8.5		.11				78	2.72							.11										Tr			Sp	5	25	Tr		Ig-Mz	541.8	Brkn	I-Bx " " To 548.1' then sh colored, Ig rock with Mz
		7.5																																Mz	545.2	Brkn	TEXT & high sulphides ~ (PY) Contact, appears to be contact phenom.
																																					Mz with wk-Mod Sulf From 545.2' To end of run.
548.1	557.7	9.6		.06				79	2.60							.06									Tr	Tr			Sp	Sp	30	Tr					Mz, ST SiO2, wk-Mod cpy, py, Tr Moly, Patches Meta Sed
557.7	566.7	9.0		.04				75	2.57							.04															25						Mz, as above, ST qtz veins, wk-Mod cpy, Tr Moly
566.7	574.9	8.2		.17				49	2.63							.17														Tr	30						Mz, Brkn, cont Patches Meta Sed, wk Sulf, Tr Py Moly

AVG Rec: 88%

END OF HOLE

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) = 5% Moderate (Mo) 5-50% Strong (St) + 50%

Note (3): Ts - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Dc - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undifferentiated

Hole No. UP 63
Page 1 of 2 Pages
Collar Elev. 5043.59 Final Depth 609.0
Coords. N 37,092.01 E 16,819.64
Inclination Vert
Logged by: SRA - CWH
Dates Start 12-16-61 Finish 12-30-61

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu(1) Chal	Peach	Black	Blue Green		Cc	Cov	Born	Fe(2) Lim	Py	Mag	Hem	Spec	Other(2) Gallery	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Un. Qtz	QUARTZ	CHLORITE	Yellow Fe	(3) Rock Type	Structures(4) Depth	True Dip	Remarks
M.C. →	0.0	5.0	5.0						Not Rec																														Rock Dr
2-100	5.0	14.2	9.2		.11				91	2.57	.08	.01	.02			.02	Tr		Sp	Tr		Tr							Tr	S	Tr		Tr		AK	5.0	8	AK; Mt, leached; St lim, Tr Sulf; Mod gtz veining, Tr Sp
	14.2	23.3	9.1		.16				88	2.53	.09	.01	.03			.03														Sp		Tr						AK; " " ; St lim, Tr Sulf; Tr chlor, St gtz veining, Tr Sp
	23.3	27.5	4.2		.11				100	2.51	.07	.01	.01			.02																						AK; " " ; dock in lim; Cont. St gtz veining, Tr Sp, Tr chlor
	27.5	30.7	3.2		.10				92	2.54	.06	.01	.01			.02														Tr		Tr		Tr				AK; as above, Tr Sp
	35.7	42.0	6.3		.09				94	2.66	.05	.01	.01			.02				Tr		Tr								Sp								AK; leached; Mt, Mod lim lim; Tr chlor, Mod gtz veining, Tr Sp, Tr Mt
	42.0	52.5	10.5		.05				96	2.49	.09	Tr	.01			Tr			Tr																			AK; " " ; dock in lim; Tr chlor, Cont gtz veining, Tr Sp
	52.5	60.8	8.3		.19				92	2.52	.13	.01	.02			.03				Tr		Tr								Tr								AK; " " ; Sp-Mod lim; dock in chlor; St gtz veining, Mod Sp, Tr Sp
	60.8	68.5	7.7		.14				65	2.53	.09	.01	.02			.02			Sp															Tr				AK; as above, dock in Sp
	68.5	76.5	8.0		.12				97	2.55	.08	.01	.02			.01			Tr																			AK; wk-Mod Alt, leached, Mod chlor, Mod gtz veining; Mod lim, Tr Sp
	76.5	88.7	10.2		.13				94	2.49	.09	.01	.01			.02				Tr		Tr											Tr	Tr				AK; wk-Mod Alt, leached; " " dock in gtz veing; Mod-St lim, Tr Sulf
	88.7	98.4	9.7		.39		.25		100	2.39	.19	.02	.04			.09			Sp																			AK; as above, dock in chlor; Mod gtz veing; Mod lim, Tr Sulf, Tr Mt
	98.4	102.5	4.1		.27		.18		98	2.44	.13	.01	.02			.09														Sp								AK; " " ; St lim; Mod chlor, St gtz veing, Tr Sulf, Tr Mt
	102.5	111.2	3.7		.31		.34		98	2.48	.28	.02	.04			.17				Tr																		AK; Brkn (Sz?); Prage Alt, Mt (?); St lim, St chlor, Tr Sulf, Tr chlor
	111.2	120.6	9.4		.25		.18		98	2.54	.14	.01	.03			.07														Tr				Tr				AK; Brkn; St lim, Mod chlor, gtz stained fields, Tr Sulf, St gtz veining
	120.6	130.8	10.2		.65		.57		96	2.54	.50	.02	.05			.08																						AK; as above; Incr. in chlor; Patches Alt (?), Mod gtz veining
	130.8	137.6	6.8		.40	.46	.14	.16	97	2.51	.11	.01	.02			.26				Tr														Tr				AK; Brkn, Mod-St lim, wk chlor, Tr gtz veining; Patches Alt, Tr Sulf
	137.6	144.4	6.8		.50	.8	.19	.2	95	2.45	.15	.01	.03			.11						Tr																AK; " " ; Leached; Alt, St lim; wk chlor; wk gtz veing, Tr Sulf
	144.4	154.4	10.0		.50	1.0	.17	.64	97	2.50	.14	.01	.02			.33																		Tr	Dp	144.0	32°	Dp; Alt, Leached, High Sio2; Mod-St chlor, Tr Sulf, St gtz veing
	154.4	164.4	10.0		1.89		.69		22	2.50	.45	.03	.20	.03		1.05	.13					Tr							Tr		Tr							Dp; Alt, Leached, St chlor, High Sio2; Alt (Kaol Elisey: Ser?) and clay, Tr Sulf, wk-Mod lim
NE →	164.4	172.2	7.8		2.65		2.11		81	2.34	1.64	.02	.05	.20		.54	Tr							Tr						S								Dp; Alt, Leached, Mod Alt (?); patches; Mod chlor, Tr Mod St lim, Tr Mon
1.879	172.2	180.7	8.5		.38		.24		23	2.0	.18	.01	.03	.02		.14						Tr								S								Dp; as above, Mod chlor, Alt Pr-ft (?), Mod gtz veing
	180.7	189.6	8.9		.15				74	2.58	.10	.01	.02			.02			Sp											S								Dp; Brkn, gg; Tr Hem, Mod lim; Tr chlor; Mod gtz veing; Tr Sulf
	189.6	199.6	10.0		.12				79	2.58	.06	.01	.02			.03			Tr										Tr	Sp								Dp; Alt, wk-Mod leached, Sp lim, Mod gtz veining; Sp chlor, Tr Mt, Sp
	199.6	209.0	9.4		.14				88	2.53	.10	Tr	.02			.02																		Tr				Dp; as above, Tr Sulf
	209.0	213.2	9.2		.49				95	2.58	.10	.01	.03			.05			Sp	Tr																		Dp; Brkn, Alt; leached, Tr chlor, Mod lim, Incr in Mafics
	213.2	222.1	8.9		.29				100	2.48	.10	.02	.04			.13																		Tr				Dp; Chlor; Intense Alt; St lim, Mod chlor, Tr Sulf, Mod lim; Mod Mafics
	222.1	231.3	9.2		.14				96	2.46	.07	.01	.02			.04																	Tr					Dp; St Alt; St lim; St gtz veing; Sp chlor, Tr Hem, Tr Sulf, Tr chlor
	231.3	241.4	10.1		.19				98	2.38	.07	.01	.02			.04						Tr																Dp; as above, Mod chlor, Incr in Hem, Mod lim
	241.4	250.5	9.1		.10				97	2.53	.05	Tr	.02			.03																						Dp; Alt, Leached; Silicified, Mod-St lim, Tr Sulf, wk chlor
	250.5	260.3	9.8		.11				75	2.58	.06	.01	.02			.02																						Dp; as above; St lim; Mod gtz veing; wk-Mod chlor
	260.3	269.4	9.1		.13				82	2.49	.08	Tr	.02			.03																						Dp; Brkn, Alt, Leached; St lim; St gtz veing, wk chlor
	269.4	279.2	9.8		.13				92	2.56	.06	.01	.02			.04						Tr																Dp; as above, Mod "like sect", wk chlor
	279.2	289.2	10.0		.10				100	2.56	.09	.01	.02			.03																		Tr				Dp; Brkn; Alt; Leached, dock in lim, Sp Hem, patches with "pop" Textures, Tr Sulf, wk chlor, Tr chlor.
	289.2	297.4	8.2		.13				88	2.53	.06	.01	.02			.04																		Tr				Dp, wk alt, leached, Mod Kaolinite, Tr cc.
	297.4	305.9	8.5		.15				94	2.50	.08	.01	.02			.04														Sp								Dp as above, cc more brkn; Sp Hem chlor.
	305.9	313.7	7.8		.12				96	2.55	.06	.01	.02			.03																						As above except for Dpc? fr 306.8-308.1
	313.7	320.0	6.3		.10				82	2.55	.09	.01	.02			.03																		Tr				Dp, wk alt, Mod-St lim, Tr chlor, Tr possible sulfs
	320.0	329.4	9.4		.12				98	2.53	.05	.01	.02			.04						Tr																Dp " " mod lim, Incr Sulf, chlor, Incr Hem, Tr Sulf, chlor
	329.4	338.1	8.7		.13				98	2.51	.03	.01	.01			.10	.04																					Dp as above to cc @ end.
	338.1	350.8	8.7		.06				88	2.52	.02	Tr	.01			.02	.01							Tr														Dp as above to " " " start. Better quantity in new ends
	350.8	358.4	7.6		.18				93	2.51	.03	.01	.01			.09	.04																	Tr				Dp; Mod Alt, Mod lim to 356.8' then Mod cc seen, Mod gtz veing, Tr Mt
	358.4	367.7	9.3		.61	.06			93	2.55	.52	Tr	.01			.50	.03																					Dp; Alt; wk lim; wk-Mod cc, Dpc; Tr chlor, Mod, wk gtz veing

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by sign of mineral
(2) Est. mineral %, or as follows: Trace (Tr) = Sparse (Sp) < 5%; Moderate (Mod) 5-60%; Strong (St) > 50%

Note (3): Tt - Tactite; Hf - Hornfels; Mbr - Marble; Qt - Quartzite; Bx - Breccia; Dc - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif. Igneous

Hole No. U-63
Page 2 of 4 Pages
Collar Elev. 5023.58 Final Depth 6001
Coords. N 37,092.01 E 18,814.66
Inclination Vert.
Logged by SAB - CWM
Dates: Start 12-18-61 Finish 12-30-61

Depth From	Depth To	Int'l	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov.	Sp. Gr.	Cu (1) Chalc.	Cu (1) Pitch.	Cu (1) Black	Cu (1) Blue-Green	Cu (1)	Cu (1)	Cu (1)	Fe (2) Lim.	Fe (2) Py	Fe (2) Mag.	Fe (2) Hem.	Fe (2) Spec.	Other (2) Galena	Other (2) Sphal.	Other (2) Molyb.	Other (2) Calcite	Other (2) Garnet	Other (2) Silicates	Other (2) Siderite	Other (2) Clay	Other (2) Sn. Oxe.	Other (2) QUARTZ	Other (2) CHLORITE	Other (2) Limonite	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
376.3	385.4	8.7		1.16		.55		89	2.51	.29	.02	.04			.70	.11		Tr	Sp					Tr				Tr	Sp	Sp	5	Tr	Tr				DP; Alt: wk-Mod ser, py, Mod chlor, Patches Meta-Sed, Mod qtz veng.
385.4	398.0	12.6		.95	.129	.19	.129	89	2.58	.12	.02	.05			.70	.06													Tr		Sp			Mz	388.6	?	DP, as above to 388.6. Then Mz; This Mz has a "chilled" zone.
					@		@																										DP	391.7	45°	dep. Mod ser, py; To Moly; continues to 394.2'. Then DP as above.
398.0	406.1	10.1		1.10	86	.13	15	52	2.60	.18	.01	.02			.90	.07												Sp				Tr					DP; Wk Alt, ggy; Mod-St Alt; Mod ser, py, cpy, Sp chlor; To Moly; Sp qtz veng.
406.1	413.3	7.2		.95		.25		98	2.59	.18	.02	.03			.65	.07												Tr									DP; " " " " Patches Mz, St Sil$_2$, Mod ser, py, " "
413.3	420.2	6.9		.89		.19		94	2.58	.16	.01	.02			.65	.05												Sp			5			Mz	413.3	30°	Mz; Alt, St Sil$_2$, Mod chlor, Sp-Mod ser, py, cpy, Tr Moly; To Vein (?)
420.2	426.5	6.3		.87		.28		86	2.59	.19	.04	.04			.55	.07		Tr													15			DP	420.2	"	DP; Alt, St veng; Tr ser in silicification, Sp qtz veng; Deco. in Mafics.
426.5	436.2	9.7		.75		.06		95	2.63	Tr					.70	.05												Tr			15						DP, St, Sil$_2$, wk-Sp ser, py, cpy, Moly, Mod qtz veng, To Sp.
436.2	446.3	10.1		.50		.11		90	2.61						.50	.20															20						DP, Alt, St. Sil$_2$; Wk St. Sil$_2$; Wk. py, cpy, Moly, Mod qtz veng.
446.3	456.0	9.7		.25		.01		84	2.59						.15	.10															20						DP; St Alt, intense silica, "Red growth" This may be Metased, wk Sil.
456.0	461.2	5.2		.36				55	2.61						.20	.16															25						DP? (pseudo) This strongly resembles Meta-Sed; wk Sil; St. Silica.
461.2	468.7	7.5		.20				49	2.61						.05	.15			Tr												25			Meta-Sed?	461.2	3rd	Meta-Sed?; St Sil$_2$; Mod qtz veng, To chlor, Sp Sul, Ex. Cpy, To Moly
468.7	476.2	7.5		.13				69	2.59						.03	.10															20	Tr					Meta-Sed?; intense Sil$_2$, Tr Sul, Mod qtz veng, To chlor, To Cpy, To Moly
476.2	482.3	6.6		.14				75	2.58							.14															15	Sp		Alt?	483.5	Bxn	Meta-Sed?; as above; Bxn, cont Sil$_2$; wk Sul, Moly.
482.3	491.1	8.3		.17				85	2.72	.03	Tr	.01			.10	.03														Tr	5	Tr					Meta-Sed as above to 483.3'. Then Alt(?); Physical Appr. of Meta-Sed wk St calc veining & Altered?; wk Sul, To 483.5'. Then Alt. Mz?
491.1	500.9	9.8		.26				81	2.63						.06	.20												Sp	5		5	Sp					Mz; intense Alt, St Sil$_2$ & Ser, wk Sul, To Moly, Tr chlor,
500.9	510.4	9.5		.18				97	2.60						.02	.16												Tr	Sp		5						Mz, as above, deco. in Alt. wk Sul.
510.4	519.2	8.8		.12				100	2.59							.12													Tr		10	Tr					Mz; Alt; St-Sil$_2$; Mod. qtz veining; Tr Ser; Mod Sulfides; wk Sul.
519.2	530.2	11.0		.14				97	2.61							.14															15						Mz; Silicified; wk Sul, To Moly; Mod. qtz veining; Sp chlor.
530.2	539.8	9.6		.24				100	2.59							.24														Sp	20						Mz, as above, incr. in Felds.
539.8	548.5	8.7		.30				92	2.60							.30														Tr	15						Mz; silicified; wk Sul; To Moly, Sp qtz veining; To chlor
548.5	558.3	9.8		.36				99	2.60							.36													Sp		20						Mz; as above.
558.3	563.3	5.0		.33				84	2.61							.33								Tr					10	Sp	20						Mz; Bxn, ggy; wk Sul, silicified, To Moly, To chlor
563.3	572.6	9.3		.27				98	2.57							.27													Sp		15	Sp					Mz; as above, To Ser; wk-Sp Sul, Sp chlor, To Moly
572.6	580.2	7.6		.12				83	2.58							.12													Tr		40	Tr					Mz; intense silicification; lack almost pure Sil$_2$; wk Sul; Fe.
580.2	589.9	9.7		.29				91	2.60							.29															35						Mz; as above, incr. in Mafics; Mod Py; Mod Ser; Sp chlor.
589.9	600.3	10.4		.28				92	2.67							.28												Tr			30						Mz; Fe.; wk. St. Silicification; Sp Py-Sp, To Moly; To Sp. chlor
600.3	607.1	6.8		.16				78	2.61							.16															30						Mz, as above
							Avg Rec.	88%																													
			End	of	Hole																																

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparse (Sp) < 3%; Moderate (Mod) 3-50%; Strong (St) > 50%

Note (3)
Tf - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-62
Page 1 of 2 Pages
Collar Elev. 2906.83 Final Depth 654.5
Coords N 36,651.12 E 17,327.93
Inclination Vert
Logged by: SAA - CWH
Date: Start 12-15-61 Finish 1-3-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys	Cu (1) Pitch	Cu (1) Black	Cu (1) Blue Green	Cu (1)	Cu (1) Cu	Cu (1) Cpy	Cu (1) Born	Fe (2) Lim	Fe (2) Py	Fe (2) Mag	Fe (2) Hem	Fe (2) Spec	Other (2) Galena	Other (2) Sphal.	Other (2) Moly	Other (2) Calcite	Other (2) Garnet	Other (2) Silicates	Other (2) Sericite	Other (2) Clay	Other (2) Mn Ox	Other (2) QUARTZ	Other (2) CHLORITE	Other (2) Jarosite	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
0.0	20.0	20.0																																				Rock Bit
20.0	30.0	10.0		.38				98	2.52	.22	.02	.05			.03			Tr										Tr	Tr	Tr					Mz	20.0	?	Mz; leached, Alt, wkly lim, Sp chry, fresh Bot; Tr Sulf, Gra Stg Fol'd Sec
30.0	37.0	7.0		.24				93	2.57	.16	.02	.03			.03				Tr																			Mz; Alt; wk leaching, fresh Bot, Gen Stg Fol'd; wk lim; Sp gtz veining; Sp
37.0	46.4	9.4		.19				96	2.51	.12	.02	.03			.02																Tr	Tr						Mz; as above, incr in lim, cont Sp chry
46.4	55.7	9.5		.22				97	2.52	.13	.02	.03			.04						Tr																	Mz, Bakn; leached; St lim; Tr chry, Fresh Mafics, wk gtz veing
55.7	65.3	9.6		.15				92	2.57	.08	.01	.02			.03																							Mz; as above; mod gtz veing; Mod Fresh Mafics, Tr Sulf.
65.3	74.8	9.5		.31				91	2.48	.22	.02	.04			.06																							Mz, Alt, leached, Mod Frags + Sil inclusions of Alt Sed; cont
74.8	83.2	8.4		.23				94	2.53	.15	.01	.03			.04																		Tr	DP	71.1	27°		Tr chry + fresh Mafics To 78.5' then DP, Alt, leached wk Mz Co. DP, Alt; Mod leach; Mod gtz veing; wk chry + Mafics, Tr Sulf, Tr Sericite Sp
83.2	92.1	8.9		.20				96	2.56	.14	.01	.02			.03	Tr			Tr																			Patches with Tr st Mafics resembles Mz fresh Bot. DP; Alt; leached; cont inclusions + patches of Mz, Tr Sulf, Tr Co, Tr Cpy
92.1	102.8	10.7		.21				92	2.59	.11	.01	.03			.05	.01															Tr							DP; as above; cont Tr chry + Sulf, wk Patches St Mafics, Tr Sulf
102.8	109.7	6.9		.25				90	2.54	.18	.01	.02			.04	Tr					Tr																	DP, Alt, Mod leached, Tr chry + Sulf, St patches Mz Text, Tr Sericite
109.7	120.0	10.3		.23				94	2.54	.17	.01	.02			.03																				AND	115.6'	60°	DP; St Alt, wk leached; Tr chry, Tr sulf, Sericite and dike at 115.6'
																																			SP	116.1'	?	dike has St Perch. Text (Sericite?), Mod Alt, leached DP, Tr chry
120.0	128.5	8.5		.18				100	2.55	.12	.01	.02			.03																Tr							DP, Alt; leached; patches Mz Text; Patch Aug Porp + Cond Text Text, wk lim, Tr Sulf; Tr Sericite, Tr chry, Mod gtz veing
128.5	137.8	9.3		.27				96	2.57	.17	.01	.04			.05	Tr					Tr																	DP; Alt, wk leached, Aug inclusions of Alt Sed + or Aug Sil
137.8	142.6	4.8		.23				96	2.59	.17	.01	.03			.04																		Tr					DP; Dike, Alt, leached, Mod lim, Tr chry + Sulf, St gtz veing
142.6	151.1	8.5		.18				97	2.51	.13	.01	.02			.02																Tr							DP; as above, wk St. gtz veing, wk Sulf, Sericite, Tr chry
151.1	158.9	7.8		.29				91	2.52	.20	.01	.04			.04				Tr																			DP, Alt, Silicified, patches Mz, Mod to Aug Porp, Tr chry, Sericite
158.9	167.8	8.9		.17				100	2.54	.10	.01	.03			.03																							DP; Alt, Mod leached, Tr lim, Tr chry, Mod Silic; Mod gtz veing
167.8	176.3	8.5		.20				100	2.57	.14	.01	.03			.06																	Tr						DP; Alt, wk leached, wk lim, Excess veins, Tr chry, Mod Silic, Mod gtz veing
176.3	185.4	9.1		.17				100	2.56	.07	.01	.03			.04	.02								Tr														DP; as above; good core; Tr Moly, Tr Sulf.
185.4	194.8	9.4		.20				100	2.57	.10	.01	.03			.05	.01																Tr	Tr					DP; as above, incr in Sulf (pyrite)
194.8	202.7	7.9		.22				90	2.57	.14	Tr	.02			.06	Tr																						DP, Bakn, Alt, leached, dk Aug Frags - May have been Sil'd, Tr chry, Sulf wk - Mod Sericite; Mod gtz veing, Sp lim; Tr Sulfide
202.7	210.7	8.0		.16				95	2.58	.09	Tr	.02			.05	Tr																						DP, Alt, wk leaching, Mod Sil, + gtz veing, Sp Sulf, Tr chry, Mod lim
210.7	220.4	9.7		.13				99	2.40	.06	.01	.02			.04																Tr							DP; as above; Mod Bik Sulf on Stgrs, Tr Sulf, Tr chry
220.4	228.9	8.5		.60	.40 Q	.21	.30' Q	91	2.46	.15	.01	.05			.38	.01									Tr	Tr	Tr	20		Tr								DP, Bakn, ggy; Patches of intensely Alt DP + inclusions, St grey slay with Mod-St Sil + Py-cpy; gtz veing, Sp lim
228.9	235.3	6.4		.35	.05	.05	.46	89	2.57	.04	Tr	.01			.28	.02												15				Tr						DP, Bakn, Mod St Alt, wk patches dk inclusions, Tr Sulf, Tr lim
235.3	242.2	6.9		.35		.17		93	2.31	.12	.01	.04			.17	.01												50										DP, Bakn, ggy; Alt, St Frags of Alt Seds, Sericite, Sulf; Mod Sulf.
242.2	251.4	9.2		.47		.28		96	2.54	.19	.01	.03			.20	.09																						DP, Alt; wk leached, wk-Sil Sulf, wk chry, Tr lim, Mod gtz veing, Tr Sulf
251.4	260.8	9.4		.14				90	2.60	.02					.08	.04			Sp																			DP; Alt + leached To 255.8' then Fresh; St Silicification Tr Cpy, Py
260.8	269.7	8.9		.08				93	2.60						.07	.05															Tr							DP, Alt; Silicified, Sp Ser, Tr chlor; Mod Py, Tr Cpy, Tr Moly, Sp gtz veing
269.7	279.3	9.6		.08				92	2.59						.08	.05															15							DP; as above; wk Bands of Mz Text, Sp Py-cpy
279.3	289.9	10.6		.08				90	2.59						.04	.04															30	Tr						DP; Intense silicification, Sp Py-cpy; Sp-Mod introduction of secondary Feldsp; large patches of E "pseudo DP"; Tr chlor, gtz veing
289.9	298.2	8.3		.09				93	2.58						.04	.05															30							DP, as above, incr in chlor; incr in Feldsparness in Sediments
298.2	309.0	10.8		.11				93	2.59						.04	.08															30							DP, dk in areas of pink feldsp. Some bio, hard. Sp Sulf.
309.0	317.4	8.4		.10				99	2.59						.02	.08															25					M22	316.7	Sed	DP as above incr bio to St then bio St change to other Mz
317.4	327.6	10.2		.10				97	2.61						.02	.08															25							M22 AK dk hard, med pr, mod dk bio, platy (Secondary bio?) Mz or Sediments changes to first a bio rich DP.
327.6	336.4	8.8		.08				95	2.60							.08												Tr				30				DP	336.4	Mod.	Mz or Sed (?) to 332.5 where dk bio mod prev. a gtz veined and of an above etc. dark. Such changes back to DP.

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5% Moderate (Md) 5-50% Strong (St) > 50%

PRELIMINARY GEOLOGIC LOG -
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Docite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif Igneous

Hole No. D-68
Page 2 of 2 Pages

Collar Elev. 2906.83 Final Depth 654.5
Coords N 36,631.13 E 12,397.98
Inclination Vert
Logged by SAA - CWH
Date: Start 12-13-61 Finish 1-3-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chryc	Pitch	Black	Blue Green		Cc	Cpy	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Jn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
336.9	343.4	7.0		.07				93	260							.07			Sp						Tr	Tr			Tr	Sp	Sp	25			Dp			Dp, st gtz @ start, Sho deca Sc, wk Sulf, Lithon, wk bro. Sp Sulf
343.4	351.1	7.7		.09				94	259							.09																30	Tr					Dp mast gtz (3:1:2) becomes fine a pseudo-Dp Bed
351.1	360.9	9.8		.10				95	258							.10																30						Pseudo Dp; increase Sulf; resembles Meta-Sed, wk veins (Qz, Calc)
360.9	367.7	6.8		.17				97	258							.17																35						Dp, (pseudo), st Sio2, good change, Dp wk Sect, Tr Py, Sed ?
367.7	378.0	10.3		.12				96	260							.12													Tr	Tr		20			Meta Sed ?	367.7	?	Meta Sed; St Sio2; Feld growth, St Alt; Tr Chlor, Tr Sep, wk Sulf
378.0	382.4	4.4		.15				95	257							.15														Sp		25			Dp ?	378.0	Grad	Dp? (pseudo) St silicification; Mod Alt, Tr Alt, Mod gtz veing, wk Sulf
382.4	398.0	15.6		.18				96	260							.18																30						Dp? (pseudo) as above; wk veinlets of Qz, Calc, Sio2
398.0	406.9	8.9		.10				94	261							.10														Tr		35			Meta-Sed	398.0	grad	Meta-Sed, increase Sio2; St cap veins; Tr Moly, St Py, Mod gtz veing, Feld "growths", Sp chlor & Sec.
406.9	416.4	9.5		.11				100	259							.11																40						Meta-Sed; increase Sio2, Sp cpy, Py, Moly; Mod gtz veing, Mod Feld growth, Tr Chlor
416.4	426.5	10.1		.12				98	261							.12																35						Meta-Sed; " " as above, Mod Sec, Py; cont Feld, Sp chlor
426.5	434.0	7.5		.07				94	257							.07			Tr													30						Meta-Sed, as above, St Sio2, wk veins
434.0	441.0	7.0		.10				100	260							.10																15						Meta-Sed?, Vr St Sio2, wk Sulf, Mod gtz veing, Mod Alt, Tr Chlor
441.0	450.6	9.6		.11				100	259							.11														Sp		20			Mz	441.0	Grad	Mz; increase silica, Sp Py, Cpy, Tr Moly; Mod Mod Alt, Sp chlor Shaded.
450.6	460.4	9.8		.15				100	259							.15													Tr	Tr		10						Mz; Alt, F.G.; St Sio2; Sp cpy, Py, Tr Moly; Sp Mod gtz veins
460.4	470.1	9.7		.13				100	261							.13																15						Mz; Alt as above, Sp Sio2
470.1	476.6	6.5		.07				100	259							.07																10						Mz, Alt, F.G., Tr Sec; Sp cpy, Py, Patches Meta-Sed?, St gtz
476.6	485.7	9.1		.05				88	260							.05													Tr			20						Mz, as above
485.7	494.5	8.5		.07				98	258							.07																15						Mz, Fine grained, St silicas; wk Sulf; Tr Moly, Tr chlor, Tr Sec?
494.2	504.4	10.2		.08				97	259							.08								Tr	Tr	Tr						20						Mz, as above
504.4	513.0	8.6		.10				92	258							.10																15						Mz, Alt, F.G., Sp-Mod Sulf, St Feld zone, Sp Py? Tr Sio2?, Tr Py, wk Mod gtz veing, Mod-St Sio2; Tr chlor, Tr Moly.
513.0	521.2	8.2		.09				100	263							.09													Tr		S	20	Tr					Mz; F.G., St Silicification; Alt, Tr chlor, Sp Sec; Sp Sulf, Tr Moly
521.2	525.4	4.2		.05				100	261							.05															Sp	15						Mz, As above; Tr Feld "Shadows"
525.4	533.7	8.3		.07				91	259							.07																15	Sp					Mz, F.G; Alt; decr in Mafics; "Feld shadows"; Tr Meta Sed Inc. Sp chlor; wk cpy-Py; Tr Moly; wk gtz veing
533.7	543.1	9.4		.07				91	260							.07															S	25	Tr					Mz, as above, cont St Sio2, incr in Alt.
543.1	551.2	8.1		.05				96	258							.05													Tr		Sp	20						Mz; Alt, Silicified; Tr Sec, Tr chlor, wk Sulf, wk gtz veing;
551.2	559.8	8.6		.07				95	258							.07																25						Mz, as above, Patches of F.G. (Mafic?), Feld Frag.
559.8	564.6	4.8		.06				87	258							.06																25						Mz Sp F.G., Silicified; wk Sulf; Tr Sec & Chlor; Sp gtz veing
564.6	571.1	6.5		.11				99	260							.11																20	Sp					Meta Sed, as above, cont wk Sulf, incr in chlor
571.1	580.9	9.8		.09				85	257							.09															Tr	15	Tr		Aplite Meta-Sed	571.1	Brk	Aplite dike, Fg, wk Sulf (571.1 to 572.8') Then Meta-Sed, St Feld "ghosts", Mod chlor; wk Porph Text; Sp Sulf, wk gtz veing, St Sio2
																																			Meta-Sed	572.9	30°	
580.9	590.7	9.8		.10		.01		92	260							.10													Tr	Tr		25						Meta-Sed, St Sio2, Mod chlor, Sp cpy, Py; cont Porph Text, wk gtz veing
590.7	597.4	6.7		.58		.01		99	292							.58								Tr		10	5	65				20	Sp		HF	590.7	Brk	HF, wk Bx; Mod cpy, Py, Mod coloring; Mod chlor; Mod Sio2
597.4	606.5	9.1		.36	.46	.01	.02	95	295							.36										5	10	60				25						HF, Sk-Bx; dense, incr in Sio2; Mod gtz; Sp-Mod Sulf; Mod chlor
606.5	618.0	9.5		.32	.0	.01	.0	100	283							.32										5	20	50				25						HF-Tr (wk Bx) incr in Sio2, dense, Mod Sulf, Tr Moly, Sp chlor
618.0	620.8	2.8		.40	.50	.01	.01	99	277							.40										10	20	50				20	Tr					HF-Tr, as above; Mod Sulf, Tr Moly, dense
620.8	629.6	8.8		.14				98	258							.14								Tr	Tr		Tr	5	5			70			Tr	620.8	Grad	Tr, increase Silica, Sp Sulf, Tr Moly; Mod gtz veing; Tr Porph
629.6	637.2	7.6		.70		.02		99	261							.70			Sp									10	10				80						Tr, " " white Silica; Mod Feld; Mod cpy-Py; Sp Py, Tr Moly
637.2	647.0	9.8		.25		.05		81	257							.25			Tr									5	5			50			Mz	643.0	Brk	Tr, as above to 646.8' Then Mz, St Alt, St Sio2, wk Sulf
647.0	654.5	7.5		.08		.03		87	261							.08														Sp								Mz, Frsh Mafics; Mod Sio2; Tr Sulf, Tr chlor; Tr Moly
								Ave Rec =	95%																													

End of Hole

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. U-89
Page 1 of 2 Pages
Collar Elev 2910.11 Final Depth 588.4
Coords N 36,648.65 E 18,203.58
Inclination VERT
Logged by SAA - CWH
Date: Start 12-18-61 Finish 1-2-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N$	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Red	Cc	Cpx	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	43.0	43.0						83.7																														
NX → 43.0	58.0	5.0		.86	16.4 (?)	.65	4.1 (?)	93	2.60	.48	.05	.12	Tr		.21			SP	Tr							TH		Tr	Tr	SP	Tr	Tr	Tr	SP	Dp?	43.0	?	Dp, intensely alt Dp w/ tr, vare clay patches (Mz phenocrysts?) ST. patches Mz, ST Mafics, Med gtz veing, Med lim, Mod clay
1.875																																						
58.0	58.4	.4		1.59	1.21	1.17	.92	100	2.58	.82	.05	.10	.20		.37			10												30		SP						Dp(?), as above; intense Alt ST vare (Mz?) clay, ST lim, Mod BS, SiO
58.4	67.1	8.7		.33		.22		83	2.59	.14	.03	.05	Tr		.11			SP												5		Tr		Tr	Mz	58.8	99%	Dp(?) intense lim. qz + clay To 58.8' Then Mz; leached, Alt, ST SiO
67.1	78.2	11		.29				89	2.61	.19	.01	.03			.06			Tr												SP								Mz; Alt. wk leached, Med chry, Tr Ser; Tr chlor, Tr SiO, wk-Med lim
78.2	88.2	9.0		.22				93	2.60	.13	.01	.03			.05																							Mz; as above; deer in chrs; Med gtz veing
88.2	98.2	10		.21				89	2.61	.13	.01	.02			.05																							Mz; Alt, wk leached; Med SiO, wk chry; Tr lim, wk gtz veing
98.2	98.7	.5		.6				92	2.63	.09	.01	.02			.04																							Mz; as above
98.7	108.8	10.1		.69	1.42 (?)	.52	1.23 (?)	71	2.63	.33	.03	.08		.10	.17			(5)												20		Tr	Tr					Mz; ST Alt, ST lim, patches ST Hem, Py, Cc; Med chlor, ST qtz, Tr clay
108.8	118.8	9.2		.59	.54	.25	.31	100	2.40	.14	.03	.08			.13			SP												15								Mz; Jr ST Alt; ST Mafics, Hem(?), Mod Cc, Py, Bx Cc, ST lim, Tr Ser.
118.8	128.4	10.4		.19				91	2.60	.10	.01	.03			.05				Tr											SP								Mz; as above; ST clay, ST Mafics (secondary?) ST Hem; Med lim
128.4	138.7	2.3		.15				98	2.63	.08	.01	.02			.04																	Tr	Tr					Mz; ST Alt, Leached, ST Mafics; Med chry, Bx Cc, Tr clay, Tr gtz veing
138.7	143.0	4.3		.13				81	2.79	.06	.01	.02			.04																Tr							Mz; Alt; leached; Sp lim; Sp chry; Tr Bx Cc; Tr Ser
143.0	150.1	7.1		.13		.06		98	2.61	.03	.01	.02			.07			Tr																				Mz, as above
150.1	159.8	9.7		.44		.28		96	2.65	.22	.02	.09			.16			S												20		Tr	Tr		Dp	168.7	?	Mz, as above To 168.7' Then, Dp leached, Bxx, ST lim, Bx Cc
																																						x Med chry; Tr chlor;
159.8	169.7	10		1.40		1.18		83	2.60	1.08	.02	.08	.02		.28			SP	Tr											10			Tr					Dp; Bxx; qtz; ST clay, Frags Mz; ST chlor; ST lim, Mod chry, Tr Mz
169.7	178.0	8.1		.80	.59	.69	.59	74	2.61	.50	.03	.07	.04		.16											TH		SP		30								Dp HF Bx; Bxx; qtz; clay; Med chry; Tr chry, Tr Sulf
178.0	186.2	8.2		.39	.3	.31	.3	65	2.69	.23	.02	.05	Tr		.08			20												40								Dp HF Bx; " " " Intense lim, ABxx, Med Sulf
186.2	190.9	4.7		.88	.71	.27	.52	95	2.80	.70	.02	.05			.05	Tr		SP	Tr								TH			SP					HF	189.2	99%	HF, Leached, Alt, Med lim, Tr qtz, Med Sulf, Sp chry + Mal
190.9	195.5	4.6		.59		.38		90	2.60	.26	.02	.08	.02		.06	.10		Tr		Tr						5	15	75			5	Tr			Tt	194.6	Good	HF intense qtz to 194.6' Bx leached w/ wk pyrite, Bx w/ 1 inch qtz veins, Sulf
195.5	205.0	9.5		.45		.07		89	3.01	.01	.01	.02			.02	.36										5	30	60			5							Tt m and Co, SiO2, Zone leaching, mostly Sulf, wk qtz, wk chlor, pockets with
205.0	208.2	3.2		.28				98	2.61	.11	.02	.03	Tr		.02	.10		SP								5	20	65			10							Tt m wk Color to 208.6 where qtz veins leaches to end. Tt zone from
208.2	217.5	9.3		.29				78	2.46	.10	.01	.04	Tr		.10	.04		S								10	15	50		S	15							Qtz as above to 208.6 then Bx (Tt zone?) w/ Tt & St Chlor, leached Sp
																																						wk Cu, no visible Sulf. End of core badly broken.
217.5	227.7	10.2		.14				88	2.94	.02		Tr			.04	.08		SP	SP	TH	Tr					10	5	70		SP	10	5			Tt	219.4	Good	Tt leached, to ST. Then ST to SiO2 w patches per 1 zone Chlor access.
																																						HF contains spark sulf. Patches Mb
227.7	238.0	10.3		.23		.12		49	2.67	.04	.01	.03	.02		.01	.14		Tr								20	SP	70			SP	5						HF w ST leached per w/ pockets Chlor w/ Med Co, ST qtz
238.0	242.9	4.9		.75		.10		97	2.04	.05	.01	.03	.01		Tr	.65										15	5	60			5	5						HF w to leaching, mainly co w/ ST, ST sulf w/ col-clr w/ Tt & chlor
242.9	251.0	8.1		.79		.07		100	2.56							.79										15	5	65			5	10						HF to lim @ start & end. ST sulf, Med ST chlor w/ wk qtz, Sulf mostly disp.
251.0	260.6	9.6		.56		.06		100	2.64	.02						.54		Tr								10	5	65		Tr	10	10						HF, " " " " Mica as above
260.6	265.6	5.0		.38	.33	.05	.33	95	2.65							.38										15	5	60			10	10						HF, as lim, Mica as above.
265.6	275.2	9.6		.67	.0	.14	.0	94	2.58	.10	.01	.02	.01			.53		Tr								10	10	65			10	5						HF, ST SiO2, wk qtz; wk-Med Sulf, Med chlor, last 2' leached
275.2	282.4	7.2		2.62	1.05	1.33	.27	88	2.95	1.75	.02	.08	.05		1.19	.50										10	10	60			10	10						HF, Mb wk-Med leaching; wk-Med chlor & Mal, Med chlor & Cc, wk qtz
282.4	292.4	10.0		1.45		.03		100	2.71							1.45					Tr					10	5	60			15	10						HF, Bx Bx, ST qtz, Med chlor; ST calc veing, Tr leaching To Bx
292.4	302.2	9.8		1.04		.06		100	2.87							1.04										15	5	65			10	5						HF Bx; ST calc veing; wk-Med Sulf; Med chlor, Tr decay, Sp gar.
302.2	311.9	9.7		.98		.07		100	2.68							.98										10	10	60		SP	15	5						HF Bx, as above, Sp Med Silica, wk-Med Sulf.
311.9	317.0	5.1		.28		.17		63	2.62	.12	Tr	.02	.03		.07	.10		Tr	Tr							10	15	60			10	5			Tr	311.9	Good	Tr, ST gar, wk leached, wk Sulf, wk Bx To 312.9' Then HF Tt - Sed or
																																		Sed	312.2	Bxx	Tt Bx w/ Dp? with wk chry + Mal, ST Silica, Tr chlor
317.0	326.3	9.3		.08				92	2.76	.02	Tr	.02	.01		.02	.02										10	30	55			5	SP			Tt	318.0	"	Tt, Bxx, leached, patches HF + Sed; ST gar, Med Sulf, Sp chlor
326.3	334.6	8.3		.59				96	2.75	.14	.01	.02	.03		.06	.13		SP	Tt							10	20	60			5	5						Tt, Intro in calc veing; Sp-Med HF, Med Sulf, Med chlor
334.6	344.0	9.4		.69				98	2.82	.02	Tr	.01	.01		.04	.01		Tr								10	20	50		5	15	SP			HF	339.3	Good	Tt as above To 339.3' Then HF, Med chlor, Sp gar, wk-Med Sulf, Intro
344.0	353.1	9.1		.13		.07		100	2.66	.04	Tr	.02	.01		.05	.01										5	15	55		5	15	5						HF, Bx; leached; Sp Bx Cc, Wk gar; Med chlor, Sp Med Sulf, Med calc
353.1	360.7	7.6		.75	.71	.09	.71	100	2.65	.05	.01	.02	.01		.02	.69			S							10	10	60		SP	10	5				Bx		HF, Bx, wk leached; Med Sulf, Med Chlor, Sp gar, gtz veing, Med calc
360.7	372.9	10.2		.15	.10	.02	.02	98	3.03							.15			S	Tr						5	20	50		TH	15	5						HF-Tt, Bx; Med Tt, Sp-Med Sulf, Med Chlor; ST calc; Tr Py Bx, strong

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) +50 %

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Brueccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-64
Page 2 of 2 Pages
Collar Elev 2910.11 Final Depth 588.4
Coords N 36,048.65 E 18,802.58
Inclination VERT
Logged by SAA - CWH
Date: Start 12-18-61 Finish 1-2-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chryc	Purch	Bleach	Blue Green		Cc	Cov	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sil Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
372.9	379.8	6.9		.21				100	2.88							.21										5	15	60		5	Tr	15	SP				HF, wk-Bx, Md cpy, py, St gr banding, Md chlor, Md gar, lots' veined
379.8	389.8	10.0		.15				90	2.75	.05	.01	.02	.01		.02	.04										10	10	50		15		10	5	Tt	379.8	Grad	Tt, St brn gar, wk-Md sulf, Bx, St, gray calc veing, patches gray Tt
389.8	399.6	9.8		.20				99	2.79							.20										10	10	60		20	SP	20	SP	Hf	399.5	"	Tt, as above to 394.5' then Hf, Md cpy-py, St chlor, calc veins.
399.6	409.9	10.3		.09				72	2.74							.09										20	5	50		5	Tr	10	10				Hf, wk Bx; Md St cpy-py; patches gar; gray Calc veins, Md chlor; Tr Hem
409.9	418.8	8.9		.22				65	2.82							.22		Tr			Tr					20	10	45		10		10	5				Hf, wk Bx, as above, decr in sqy. Md Hem
418.8	428.3	9.5		.38		.11		100	2.72	.05	.08	.03	.02		.02	.25										60	5	55		5		Tr		Mb	419.0	32°	Hf - St calc to 418.0. Then Mb, Sp crackled; Tr Bol, chry, wk calc, Tr Hem
428.3	438.6	10.3		.45		.01		99	2.71							.45			Tr							Tr	5	25		Tr							Mb; Sp sulf; Tr patches; Tr limy; Tr Hf; St, Tr Hem
438.6	448.4	9.8		.26	37.5 @	.02	37.5 @	100	2.73							.26										10	15	25									Mb; Sp sulf, cpy, py; Calc St patches Tr; Sp white gtz, Tr Hem
448.4	457.8	9.4		.53	43	.01	.02	100	2.73							.53		Tr								50	30	20				5	5		Tr	453.3	Grad	Mb, as above to 453.3, then Tr, St brn gar, Sp-Md sulf, calc veins
457.8	467.8	10.0		.49		.03		74	2.85							.49										40	40	20		Sp		Tr					Tr, St brn gar; patches Mb; Sp sulf; Md calc veins St gray patches
467.8	478.7	10.9		.03		.02		32	3.51							.03										20	40	30		10							Tr, Pure gar, Tr sulf, wk calc veins, Rare
478.7	489.4	10.7		.09		.01		62	2.71							.09										20	40	30		10							Tr; St brn gar; Sp sulf, patches Hf & calc, lots' veins, Sp calc
489.4	498.0	8.6		.36				66	2.96							.36					Tr					Tr	15	10	60		Sp			Sp	Tt-Hf	489.4	Grad	Tt-Hf, wk Bx; Sp-Md sulf, Md calc veins; Sp Md chlor, Tr Mag, Tr gtz
498.0	505.9	7.9		.61		.02		83	2.77							.61										40	5	55					Th	Mb	501.0'	60°	Tt-Hf Bx as above to 501.0'. Then Mb, Sp sulf, wk Bx; Tr gar to calc.
505.9	512.9	7.0		.82	53.2 @	.03	53.2 @	73	2.53							.82										20	10	65		5			Sp	Hf	505.9	Grad	Hf, Bx; St patches gar; wk-St cpy-py, Tr Mag, Md chlor, Md calc
512.9	520.9	8.0		.17	47	.02	47	56	2.67							.17										25	5	55		5		5	5				Hf-Bx; cont St patches gar, wk-Sp sulf; Md lots in silica & calc, calc
520.9	526.0	5.1		.43		.05	.03	60	2.50							.43				Tr						10	10	60		Sp		10	5				Hf-Bx, as above, less in gar.
526.0	534.2	8.2		.28		.09		8	3.08							.28										5	5	40				Sp	Tr	Tt	526.0	Grad	Tt-Bx, Poor rec. St gar, wk-Md sulf, Sp calc, Tr gtz
534.2	543.6	9.4		.69		.03		76	2.88							.69										5	40	5						Dike	534.7	Grad	Tt as above to 534.7' then Aplite dike; St Mag, Tr calc
543.6	546.7	3.1		.06		.03		45	2.60							.06										Tr	50	50		5		Tr					Aplite, No visible sulf, Tr kale as veins, Tr 534.7 to 546.7 Metased?
																																					534; Tr chlor, wk sulf, wk gtz veing, Tr Hem.
546.7	554.1	5.4		.10				33	3.59							.10										Tr				Sp		15		Dp(?) (Pseudo)	546.7	32°	Dp(?) (Pseudo), St, Tr Mag; Tr Dp; Sp sulf, Md gtz veing, Tr chlor; Tr sulf; Structure position of Dp (Pseudo?) not, may be Meta-sed.
554.1	562.1	8.0		.06				29	3.41							.06																20					Dp(?) as above, St SiO2, Tr sulf
562.1	570.3	8.2		.09				62	2.59							.09										Tr				10							Dp(?) Bxd, 30% Aplite, Md SiO2, Md chlor, Sp sulf, Md gtz veing
570.3	580.5	10.2		.09				11	2.55							.09												5									Dp(Pseudo) as above; patches of Meta-sed?, Sp sulf
580.5	588.4	7.9		.07				23	2.92							.07									Sp		25	10		5		5					Dp " " " Sent patches Meta-sed, Sp. sulf
					Avg	Avg		72.7																													

End of Hole

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) + 50 %

Note (3): Tr - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Dc - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-65
Page 1 of 2 Pages
Collar Elev. 2909.11 Final Depth 500.0
Coords N 37,249.79 E 16,600.00
Inclination VERT
Logged by SAA - CWH
Date: Start 12-30-81 Finish 1-16-82

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cc	Cpy	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Calcite	Sphal	Molyb	Calcite	Garnet	Silicified	Sericite	Clay	Sh. Clay	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	18.0	18.0		—		—		Rock Bit																														Rock Bit
18.0	28.1	10.1		1.23	.07	0.95	1.07	94	2.55	.15	Tr	.10	Tr		.38			Sp			Tr							Tr	Sp	Sp				Dp	18.0	?	Dp; Alt, Leached; Md Lim, Md-St Chry; Md gTr veining Tr Bikuna
28.1	37.7	9.6		.37	.21	.27	.52	91	2.54	.22	Tr	.05	Tr		.10																							Dp, as above, Rock in gTr veing; Md "Live Lim"; Md Chry.
37.7	47.0	9.3		.14		.04		82	2.52	.12		Tr			.07																							Dp; Alt; Leached; Brkn+ggy; Md "Live Lim"; Sp Chry & Bikuna.
47.0	56.3	9.3		.10				73	2.53	.05		.02			.03																							Dp; as above, Md Lim w/ N.S. Cu.
56.3	66.7	10.4		.10				63	2.50	.02		.06			.02																							Dp; Alt; Leached; Brkn-ggy; Dec in Lim & Chry; Tr Sph
66.7	73.1	6.4		.08				84	2.52	Tr		.07			.01																							Dp; Alt, " " " ; Md "Live Lim"; Tr Sph, Md gTr veining
73.1	82.8	9.7		.09				96	2.51	.01		.07			.01																							Dp, Alt; Leached, Md Sph; Md Lim; Sp gTr veing w/ Chrys & Bikuna
82.8	89.1	6.3		.09				24	2.52	Tr		.07			.02																							Dp, as above
89.1	97.4	10.3		.11				94	2.51	.01		.07			.03																			Mz	94.8	Brkn	Dp; Alt, Leached, Md Lim & gTr veing To 94.5' Then Mz; Alt Leached
																																		Dp	97.8	45	SR Mzbes (Alt) Md Lim, Tr Chry To 97.8' Then Dp as above
97.4	110.0	10.6		.09				58	2.55	.05	Tr	.01			.03						Tr										Tr							Dp; Alt, Leached; Md Lim; Sp gTr veing, Patches Mz, Sp Chry.
110.0	120.6	10.6		.10				97	2.55	.04	.01	.02			.03																							Dp; as above, F.G. Md SiO2 & Tr Sulf
120.6	128.2	7.6		.05				90	2.52	.03	Tr	Tr			.02																	Tr						Dp; Alt; Leached; Md Lim; Md gTr veing, Tr Chry & Bikuna, Tr Sulf
128.2	137.7	9.5		.05				89	2.53	.02	Tr	.01			.02														S									Dp; Brkn-ggy, Alt, Leached; Md Lim & gTr veing, Sp S.S. Cu, Tr Sulf
137.7	145.9	5.7		.09				92	2.52	.03	.01	.02			.03						Tr								Sp				Tr					Dp; Alt, Leached, Patches Mz Text; Sp Chry, Md gTr veing, Tr Sulf Patches
145.9	152.7	6.3		.09				98	2.53	.04	.01	.02			.02															Tr	Tr							Dp; as above, Sp Chry, Sp Bikuna, Tr Sulf.
152.7	158.6	9.9		.12				96	2.18	.04	.01	.02			.04				Tr																			Dp, Sp alt, leached, almost shear; some Fe stained Calc. Tr. Bikuna
158.6	168.3	10.3		.09				97	2.55	.03	.01	.03			.03																							As above.
168.3	178.1	10.2		.15				95	2.55	.06	.01	.03			.05														S				Tr					As above plus a few more sulfide bearing areas.
178.1	188.8	9.7		.11				97	2.56	.05	Tr	.02			.04														Sp									Dp, becoming more silic. still leached but sp Cc present.
188.8	198.4	9.6		.12				95	2.56	.04	.01	.02			.05														Tr	Sp					Mz	197.9	30°	Dp, no alt, st silic. "chilled border" & 25° Mz bx, leached, w/ Kaolin
198.4	210.9	12.5		.13				97	2.54	.05	.01	.02			.05															20			Tr		Dp	199.9'	Bx	Mz like bx above to 201.0' or 2 cm sand size pieces. Dp st silicified
																																						201.0' Brkn dec. Dp now bx small sub2" frags.
210.9	222.5	11.6		.07				100	2.55	.03	Tr	.01			.03														Sp									Dp w more frags. Sp alt, leached, no vis. sulf.
222.5	230.6	8.1		.10				99	2.51	.05	.01	.02			.02																							Dp; Sp Alt, Leached, Tr Sulf, Tr Chry; Md gTr veing, Tr frags.
230.6	240.0	9.4		.08				91	2.53	.04	.01	.01			.02																							Dp, as above; Md Leached, Md Lim, Tr Jaro, Tr Chry
240.0	251.3	11.3		.08				95	2.52	.04	.01	.01			.02																							Dp, Md Alt, Leached; Md Lim, Md gTr veing, Tr Chry; Tr Sulf
251.3	259.0	7.7		.14				89	2.53	.06	.01	.02			.05																	Tr						Dp, as above, Tr Chlor; Sp Mzbes; Tr Chry, Tr Sulf
259.0	268.8	9.8		.15				98	2.53	.04	.01	.03			.07														Tr	Tr								Dp, Alt, Sp Leached, Cont Chlor; w/ Lim; Tr Chry, Bikuna & Sulf.
268.8	277.1	8.3		.19				95	2.52	.05	.01	.03			.11																	Tr						Dp, as above, Patches Mz; Md Lim; Tr Jaro, Sp Md Silicified
277.1	283.2	6.1		.11				86	2.53	.05	.01	.02			.05																							Dp, Brkn; ggy; Md Lim, Dec in Sulf & Chry, Md gTr veing
283.2	292.7	9.5		.11				85	2.55	.03	.01	.02			.03															10			Tr					Dp as above, Tr Jaro
292.7	300.0	7.3		.14				97	2.63	.06	.01	.02			.05															10								Dp, Brkn, ggy; Leached; Sp Chry & Bikuna; Tr Sulf, Tr Jaro, Bellu
300.0	311.3	11.3		.31		.08		99	2.54	.05	.01	.02			.20	.03													Sp	10								Dp, Alt & Leach ST silicified to 306.0' Leached & Brkn To 309.0'
311.3	321.5	10.2		.29	.30	.07	.04	96	2.57	.04	.01	.02			.40	.02						Tr							Tr	Sp	S							Dp, Alt, w/ Leached w/ Sulf, Md Sph - Sg - Cpy, Cpy as veinlets
																																						Feldsp; St gTr veing, Sp Moly as veinlets;
321.5	329.3	7.8		.37	.49	.11	.14	91	2.58	.07	.01	.03			.26	Tr													Tr		Tr	Sp						Dp as above, Dec in Sulf, Cont Cc & Moly, St gTr veins
329.3	337.5	8.2		.31		.08		89	2.56	.05	.01	.02			.23																Tr							Dp, Alt, Md SiO2, w/ Lim; Sp Cc & Tr Sph, Sp; Md gTr veing Tr Moly
337.5	347.5	10.0		.31		.02		86	2.78						.30	.01																						Dp, St Alt, Mod Mzbes, Tr Mz Patches with Mz Text, Sp Sulf,
																																						w/ Lim & Mz Tr Bx, Md gTr veing Tr Moly
347.5	356.8	9.3		.36		.02		100	3.55						.30	.06																						Dp, as above, Cont Patches of what appears to be F.G. Mz.
356.8	365.2	8.4		.41		.02		88	2.59						.35	.06														Sp			Tr					Dp, Alt, St SiO2, Brkn, Bold "ghosts"; Sp Sulf, Tr Lim; gTr veing
365.2	373.8	8.6		.28		.03		78	2.59						.25	.03																						St Alt & Silicified Dp, Md Mzbes with Feldspars Tr; rock may be
																																						Brecciated Dp, St Silicified Mz, F.G.; Sp Sulf & gTr veing
373.8	382.4	8.6		.19		.01		88	2.62						.15	.04																						Dp as above, Brkn; St SiO2; Sp Chlor, Tr Sulf

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Mod) 5-50 %; Strong (St) + 50 %

Note (3)
Tf - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-63
Page 1 of 1 Pages
Collar Elev 2909.11 Final Depth 600.0
Coords. N 37,249.79 E 16,606.00
Inclination VERT
Logged by SAB - CWH
Date: Start 12-30-61 Finish 1-18-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg.	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Bnit.	Black	Blue Green		Cu	Cu	Barn	Fe (2) Lim.	Py	Mag.	Hem.	Sdpc	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Sericite	Clay	Sn. Qtz.	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
382.9	392.8	10.4		.20				100	2.58						.20	.05			Tr					Tr				Tr		SP	SP	Tr				Dp, Bxtd, ST silicification, D pyrite, Fe gladk frags, Sp chlor, Tr Mo
392.8	402.6	9.8		.22				95	2.57						.24	.03																	Mz	392.8	50°	Mz, Bxtd, " " ; Patches with Dp Tcot, Mod sericite, Sp Sulf.
402.4	410.6	8.0		.18				91	2.57						.10	.08														Tr		Tr				Mz; ST silica; F.G.; cont. patches Dp; Sp Sulf; Mod Mb;
410.6	418.9	8.3		.43		.03		98	2.59						.30	.13			SP										SP			SP	DP	410.6	Bxtd	Dp, Bxtd, intense silica; patches of low grade Sed ore; [illegible]
418.9	428.8	9.1		.33		.04		83	2.55						.20	.13				Tr					Tr	SP	Tr			SP		Tr				Dp, as above, Patch of gar + Mala Sulf; Mod rep. chert Sulf
428.8	438.0	8.0		.11				95	2.55						.09	.07			Tr											Tr		SP				Dp; as above, intense silica gtz veining; cont. frags of Sed. Sulf
438.0	448.0	8.2		.12				98	2.57						.02	.10																				Dp; as above; Sp chlor, Tr-Sp Mala, Sp cpy & py.
448.2	458.4	8.4		.20				98	2.56						.05	.15												Tr			Tr					Dp, Bxtd. Alt; ST silica gtz veining; Sp Ek frags; Sp sulf, Tr Mala
458.4	468.2	10.2		.10				95	2.58						.02	.08															10					Dp(?) pseudo, Rock outlines many dk "ghosts" & Sp Sulf, [illegible]
																																				This may have been a Sed. Cot, where sig. silicate [illegible]
468.2	478.4	10.2		.13				89	2.57							.13															20	Tr				Dp(?) intense silicification & veining; Sp sulf, py, Mala, Tr Bxtd
478.4	488.0	9.6		.06				93	2.56							.06															25					Dp (pseudo)?; as above, Sp Mala; intense sil.
488.0	497.9	9.5		.15				91	2.57							.15															30		Mz	488.4	Bxtd	Mz, ST Alt & silicified, St gtz veining, Sp sericite, Tr Mala, Bx.
497.9	508.5	9.6		.18				99	2.58							.19															20					Mz; as above, F.G.; incr in Mala; ST SiO_2, Sp cpy, py, Tr Mala
508.5	525.3	8.0		.22				98	2.55							.22															25					Mz; silicified; St. Mafics; Sp cpy, py, Tr Mala, Mod Alt
525.3	536.8	11.0		.20				98	2.56							.20															30					Mz; as above.
536.8	543.3	6.5		.31				80	2.55							.31															20					Mz; Bxtd, ST SiO_2; Mod gtz veining; Sp cpy, py, Tr Mala, Mod Alt
543.8	551.8	7.1		.19				77	2.55							.19												Tr			20					Mz, " " silicified, " " Alt, Sp sulf;
551.9	560.0	8.1		.08				83	2.56							.08													SP		35					Mz, as above; intense silicification; Tr sp, py, Mala
560.0	567.6	7.6		.21				38	2.59							.21								SP	30				10		10		Tr	534.8	99V	Mz, Bxtd; 99V; ST SiO_2 To 534.8, then Tr, Massive bar gal. Sp Sulf; Mod chert, Sp gtz veining, Tr Cale
567.6	574.4	6.4		–				no	core																											No core
574.4	584.4	9.4		.59	.33	.01	.33	10	2.29							.59								S	S	S				SP	S					Tr, Poor Rec, Massive gal, Sp Mod Sulf; Tr Cale, Tr gtz veining
584.4	593.3	7.9		.101	.03	.07	.05	5	2.19							.101								10	10	20		S			S					Tr, poor Rec, " as above
593.3	602.0	9.7		.33		.05		41	2.50							.33								Tr	2	30		10			SP		Mz	593.1	39V	Tr, Par. Bxtd 39V, Sp Sulf To 593.1, then Mz, St silica, Sp Sulf
602.0	612.5	10.5		.15		.06		78	2.59							.15								Tr				S			Tr					Mz; Vr St silicification; F.G.; Wk gtz veining, Wk cpy, py, Tr Mala
612.5	622.8	10.3		.18		.02		92	2.59							.18												Tr								Mz, deep in silica; Fresh Mz; Tr cpy, py, Mala, Wk gtz veins
622.8	629.7	7.9		.21		.02		86	2.58							.21													SP							Mz, as above, Fresh Mafics.
629.7	640.0	9.3		.20				94	2.60							.20																				Mz, Sp Mod silica, Sp cpy, py; Tr Mala, Fresh Mafics, Tr gtz veins

AVG. Rec = 83%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5%, Moderate (Md) 5-60 %, Strong (St) + 60 %

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Dc - Dacite, Ms - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. O-66
Page 1 of 2 Pages
Collar Elev. 2908.83 Final Depth 568.6
Coords. N 86,198.30 E 18,203.72
Inclination Vert
Logged by SAA - CWH
Date: Start 1-3-62 Finish 1-13-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Yn. Clay	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	18.0	18.0		—		—		Rx	2.84																												Rock Bit
NX-7 18.0	26.6	8.6		2.74		0.53		87	2.45	.33	.10	.13			.23			Sp		Tr									Tr	Sp	Sp		Tr	Dp	18.0	?	Dp, Alt, Leached; Md Dk Aug Frags; Md chlor, patches Mb; Sp chry + Blk ox; Md qtz veing, Md lim
1.875																																					
26.6	36.1	9.5		.66		.50		73	2.53	.30	.05	.15			.16																						Dp; Brkn, ggy, cont Aug Frags as above, Sp ns cu, Md qtz ma
36.1	42.8	6.7		.90		.58		67	2.46	.53	.20	.15			.22															5							Dp, dk gy-gry; cont Frags, Md chlor; Brkn, Tr sulf, Sp chry & Blk ox
42.8	49.9	7.1		.65		.94		90	2.57	.19	.10	.15			.21															Sp							Dp; Alt, Leached; Brkn, ggy; Md lim; Md chlor; Tr chry & Blk ox
49.9	57.9	8.0		.15		.83		100	2.52	.67	.06	.10			.32			S	Tr										Tr	10	Tr	Tr	Sp				Dp; Brkn, ggy; Leached; patches Alt Hf; Md chlor & Blk ox, Tr sulf
57.9	66.4	8.5		.65		.43		95	2.60	.31	.04	.08			.22			S											Sp	15							Dp; as above; cont patches Hf, Hf ox; Tr sulf, Sp ggy
66.4	75.5	9.1		.52	91.5 @ 68	.38	91.5 @	95	2.77	.26	.03	.05	.05		.18	.04		Sp	Sp	Tr	Tr					10	5	80		S	Sp				Hf	66.8	33+	Dp; as above to 68' then Hf, wk leached, Sp sulf, Md chlor & Blk ox; Tr Mal; Sp lim, Tr Jaro; Md chlor, Tr Mag
75.5	84.5	9.0		.43	62	.21	.38	89	2.72	.12	.01	.03	.05		.10	.12			S							10	10	70		Sp		10						Hf, wk leached, Sp-Md sulf; Sp chlor; Tr Mag, Md ox, Md chlor veing
84.5	90.0	5.5		.42		.09		85	2.55	.06	.01	.02	Tr		.15	.18		Tr	Sp							10	15	65				10					Hf; as above, Md leached, wk Bx, Tr sulf
90.0	99.9	9.9		.38		.11		90	2.60	.05	.01	.03	.02		.12	.15										5	10	80				5				Rx	Hf Bx, leached, Alt, Sp ns cu; Sp cpy-py; Tr Mag, Md chlor
99.9	109.3	9.4		.44		.09		100	2.66	.04	.01	.03	.01			.35										10	15	60		Tr		10	S				Hf, wk Bx; as above; Md chlor, Sp cpy, Md Py, Md qtz & qtz
109.3	118.9	9.6		.36		.15		93	2.94	.09	.01	.03	.02		.01	.28					Tr					5	20	65		Sp		10	Sp	Tt	109.3	good	Tt Bx, leached, patches Hf; Md-St sulf; Sp-Md chlor, Md Mal, Sp Sil & ox
118.9	128.8	9.9		.21		.03		92	2.91							.21				Tr			Tr	Tr		5	15	60				15	S	Hf	120.1	"	Tt Bx, leached to 120.1' then Hf with patches qtz, Sp-Md sulf; Md chlor, Tr Hem; Md Sil, Tr Mal; Sp calc veing
128.8	136.2	7.4		.35	21.5 @ 68	.03	21.5 @	96	2.95							.35							29	Sp		10	10	60		S		10	Sp				Hf-Tt Bx; Md sulf, Py, Po-Mal; Md Sil; Sp calc veing, patches
136.2	145.5	9.3		.60		.03		100	2.77							.60		Tr					Tr	Tr		10	15	70		Sp		5					Hf-Tt Bx; as above, lack ox Sil, Md qtz veing; Sp chlor
145.5	150.3	4.8		.36	46	.02	.03	95	3.01							.36										10	25	55				10		Tt	145.5	good	Tt, Bx; St brec, gouge; Sp-Md sulf, Md qtz veing, Sp chlor
150.3	151.9	1.6		.31				93	3.15							.31										5	25	55				15					Tt, Bx; as above, Md sulf, Tr Mal, Md Sil, Sp chlor
151.9	155.1	3.2		.21												.21				Tr						10	25	50				10	S				As above
155.1	160.1	5.0						0								—																					No recovery
160.1	169.7	9.6		.36	22.7 @ 66	.03	22.7 @	84	2.97							.36										10	20	60		Tr		10	Sp				Tt as Qt Sil; wk bx, wk sulf, mostly finely brec'd Tt, Tr Py, Sp chlor
169.7	178.7	9.0		.78		.05		98	2.71							.78				Tr			Tr	Tr	Tr	10	15	55		Sp		15	S				As above
178.7	183.8	5.1		.103	.66	.08	.05	87	2.72	.03	Tr	.01			.29	.70		Tr								5	20	60				10	S	Dp	182.9	60-65	Tt bx as above to mod chlor & Hf, 0.8 Dp dense basalt in mod Hf ox
183.8	193.9	10.1		.14		.09		56	2.61	.05	.01	.03			.02	.03				Tr												Tr	Tr				Dp, lt colored, dense, Sil, Qt dense (Frags?), Sp Hf ox & Hf
193.9	202.0	8.1		.11				95	2.53	.03	.01	.03			.01	Tr																					Dp becoming more alt, bottom half less Hf ox, less closed
202.0	209.2	7.2		.13				89	2.52	.04	.01	.02			.05	.03														S							Dp less alt, denser, less Bx except for last 1.3' Bx with dense dark Dp
209.2	215.7	6.5		.10				99	2.59	.03	.01	.02			.04															20							Dp? one dk clay zone, a few broken sil'd pieces, Sp chlor & end
215.7	225.2	9.5		.10				87	2.54	.02					.03	.05									Tr	Tr	Tr		Sp		40				215.9	Bx	Dp to 215.9, MS, pebble sil breccia, RK strongly alt, Blks to 219.9 where rk becomes lighter w patches of purple dark Sp Hf ox, Tr Cpy
225.2	235.1	9.9		.09				87	2.59	.03		.01			.03	.02										Tr						50					Meta-Sed; Alt, High Sil, wk Purple Text, Tr sulf Sp, Tr Lim
235.1	245.7	10.6		.09				77	2.58	.02		.01			.04	.02																		Dp	235.1	30+	Dp (?) altered, Bx, ggy; Md lim shbx, Md Fold & Sil, Sp Hf ox, Md Mal, wk-Md Sp & Blk ox, wk qtz veing, Tr sulf
245.7	254.9	9.2		.50		.41		85	2.56	.35	.01	.02	.03		.04	.05		Sp								10	5	60		15		5	10				Dp (?) as above to 246.6' then Bx (?) ggy, alt, altered, Md chlor & Blk ox; Tr 252.4' then Dp, altered, Md frags
254.9	264.3	9.4		.75	46.5 @ 70	.26	46.5 @ 18	92	2.70	.20	.01	.02	.03		.09	.40		Tr	Sp							10	5	75		Sp		10	Sp	Hf	254.1	80+	Dp, leached Hf, Tr 258.8' then Hf, dense, Sil, wk leaching, Sp sulf
264.3	272.9	8.6		1.06		.11		100	2.78	.86	.01	.03	.02		.01	.94				Tr						5	5	70				15	S				Hf, dense, High Silica, Md brn-gray; Sp-Md sulf, Sp chlor, Sp calc veing
272.9	282.7	9.8		.76		.05		100	2.85							.76										5	5	55				20	S				Hf Bx, Md chlor, Md sulf, Sp calc veing, Md qtz
282.7	292.2	9.5		.46		.06		91	3.18							.46										10	25	50				10	S			Tr	Hf Bx, Md-St chlor, Md Sil; Md calc veing, Sp-Md sulf, Sp-Md qtz
292.2	302.0	9.8		.37		.06		96	2.88							.37										5	20	60				10	S	Tt	292.2	60+	Tt Bx, Md Sil, Md cpy-py; patches Hf, Sp qtz & calc veing
302.0	310.2	8.2		.33		.05		100	2.84							.33										10	25	55			S	10	S				Tt, wk Bx, dense, Md Sil, Sp sulf, Md calc, patches Hf
310.2	320.0	9.8		.26		.06		94	2.77							.26										Sp	100				S	S	Sp				Tt, as above, Tr-Sp Sil; then Pot Ark and Blk, Blks chlor, Sp sulf
320.0	329.5	9.5		.31		.06		97	2.50							.31									Tr	5	0	65			S	S		Hf	329.0	60+	Hf, Pot Ark, Hf, Md chlor, veins, Sp calc, Tr 334.0' then Hf
329.5	339.2	9.7		.55		.05		77	2.79							.55				Tr					Tr	10	5	60			S	S	10				Hf A, Sp chlor, Md Sil & Pot Ark, St Qtz, Tr Cpy, Sp Mal

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. Q-66
Page 2 of 2 Pages
Collar Elev 2908.83 Final Depth 563.6
Coords N 36,198.50 E 18,203.72
Inclination Vert
Logged by SAA - CWH
Date: Start 1-3-62 Finish 1-13-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1): Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2): Lim.	Py.	Mag.	Hem.	Spec.	Other (2): Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vis. Qtz.	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
339.2	346.3	7.1		.79	.41	.05	.41	75	2.53							.79			SP					Tr	S	S	10		Tr	S	20	Tr	Meta-Sed.	339.2	grad	Meta-Sed, ST Chlor; Mod-ST. cpy-py, Sp Moly, ST calc. Mod qtz.
346.3	355.7	9.4		.73	@ .87	.06	@ .03	88	2.77							.73									S	10	40			S	30						Meta-Sed, as above; ST SiO2 To 350.8, then HF, Mod sulf, Mod gar.
																																	HF	350.8	grad	Sp calc, cpy as veins, patches, white qtz.
355.7	363.8	8.1		.44		.05		98	2.60							.44									S	10	65			S	10	S				HF, Alt, Mod silic, Sp SiO2, Mod calc as veins, Mod gar, Sp chlor
363.8	373.6	9.8		1.71		.06		89	2.53							1.71									10	10	55			S	15	S				HF, ST cpy, as veins; Mod gar; Sp chlor, Mod calc; To Moly
373.6	383.8	10.2		.11				96	2.59							.11			Tr							SP	Tr	Tr			10	40	Tr	Meta-Sed	373.6	grad	Meta-Sed, Trace silicification, ST qtz veing; chlor; Sp Mod sulf. To Moly, Rk resembles a Meta sheared quartzite
383.8	395.3	9.5		.12				94	2.60							.12										Tr		20			15	55	Tr				Meta-Sed; as above; continuous SiO2, Vague Feld patches, Sp Sulf
395.3	402.0	8.7		.09				99	2.62							.09											SP	15			15	70					Meta-Sed, as above, Vague patches of gar in Silica, Mod Sulf
402.0	410.8	8.8		.07				95	2.60							.07												SP			10	60					Meta-Sed; (Tuff) intensely Alt & Silicified To, ST qtz veing, Sp chlor To Ser, SP Feldspathization, Sp cpy as veins, To Moly
410.8	418.5	7.7		.05				95	2.61							.05											SP	SP			10	50	SP				Meta-Sed; as above,
418.5	427.3	8.8		.02				97	2.66							.02															SP	5	Tr	Ant. Meta Sed	421.6	45°	Meta-Sed, as above To 421.6' Then Post Min Ant Dike, Sp calc veins To 426.0 Then, Meta Sed To end.
427.3	435.8	8.5		.07				100	2.55							.07								Tr			SP	SP			10	60			426.0	60°	Meta-Sed, ST silicification; ET, Feldspathization, Tr Cpy, Py
435.8	443.7	7.9		.05				53	2.58							.05														S	S	50	10	Ant D	442.6	Bnk	Meta-Sed, as above; Mod Sulf To 442.6' Then Post Min Andesite
443.7	454.3	10.6		.05				78	2.59							.05														SP	10	40	S	Meta-Sed	448.0	Blk	Ant; Post Min, Mod calc veins To 448.0' Then Meta Seds with ST Silica & Feld, Mod Sulf.
454.3	460.8	6.5		.05				88	2.61							.05										Tr	Tr	Tr		S		S	SP				Meta-Sed; Intense Alt; ST SiO2 & feldspathization, Mod chlor. Mod ST Sulf; Tr of Tr; Mod qtz veing
460.8	471.6	10.8		.08				62	2.60							.08			Tr	Tr							SP	10		Tr	SP	50	S				Meta-Sed, as above, cont. Mod sil, cpy, py, Tr gar
471.6	480.0	8.4		.04				99	2.60							.04							Tr				10	10		S		40	S				Meta-Sed; Intense Alt, Mod chlor; Mod Silica, Mod Hem.; Mod ST Sulf
480.0	489.0	9.0		.05				82	2.60							.05											5	10		S		10	SP	AND	484.8	Blk	Intense Hem. & chlor with Mod Sulf. To 484.8' Then AND Dike Post Min, Mod calc veins;
489.0	499.8	10.8		.06				74	2.72							.06									Tr	S	10	60		SP		10	S	Meta-Sed	497.0	Blk	AND; as above To 497.0' Then Meta Seds; ST Alt, Mod chlor ST SiO2; Mod qtz veing; Sp-Mod cpy; cc, Py; Sp Feld.
Bx → 499.8	509.1	9.3		.51		.03		84	3.16							.51			Tr	Tr		Tr	Tr	Tr	Tr	Tr						5	SP	Mz	499.8	Blk	Mz, Intense Alt, Mod-ST silica; Mod py, Trcpy, Mod Feldspathic
1.432	520.1	11.2		.08		.03		95	2.64							.08														Tr		5					Mz, as above; intense Alt, Mod qtz veing, Sp Sulf; Tr Hem
520.1	529.9	9.8		.07				85	2.88							.07																					Mz, as above; To Moly
529.9	540.3	10.4		.08				59	2.65							.08														10			Tr				Mz, Less Alt, Fresh But, ST SiO2, Mod qtz veing; Sp cpy, py, To Moly Last FC of iron ggy clay; To chlor
540.3	548.5	8.2		.09				59	2.70							.09										Tr				Tr		Tr	Tr	AND	540.3	Blk	AND, Fresh, Post Min, Mod calc veins To 540.3' Then Mz, ST SiO2
																																		Mz	544.2	ggy	Sp-cpx, py; Sp chlor; Mod qtz veing,
548.5	557.8	9.3		.17				58	2.89							.17															Tr			AND	553.5	75°	Mz; Bnk, ST SiO2, Mod Sp Sulf, To chlor To 553.5' Then AND dike, Post Min, steep dip (75°±)
557.8	563.6	5.8		.12				98	2.60							.17																					AND, Fresh, Post Min; Steep dipping (80°), Mod calc qtz veing. This AND Marks a Single Steep dipping dike that has been penetrated several times. The dike marks offset By faults or simply have so variable strike & dip.
						NS Ex		539																													
			End of Hole																																		

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by sooty mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Mod) 5 - 50 %; Strong (St) + 50 %

Note (3)
Ts - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 11-02
Page 1 of 36 Pages
Collar Elev. 2892.67 Final Depth 1595.3
Coords. N 36,353.44 E 17,883.36
Inclination Vert
Logged by [illegible]
Date: Start 1-8-82 Finish 1-18-82

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cu	Cpy	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Mn Ox	Quartz	Dolomite	Jarosite	Barite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	18.0	18.0																																				Rock Dump
NX →	18.0	27.7	9.7		.26				97	2.55	.16	.02	.04			.09			Tr	Tr									Tr	Tr	Tr	Mn	Tr	Tr		Mz	18.0	?	Mz, leached, Alt, ST Mafics; Tr chrys, Bk Lim, Tr gtz veing.
1-8-82	27.7	37.2	9.5		.51				98	2.45	.32	.02	.05			.12			Sp			Tr										Tr							Mz; as above, Tr Sec; Tr Vers.
	37.2	46.6	9.4		.26				95	2.47	.14	.02	.06			.05																							Mz; Bxkn; ss; leached; Mod Lim; Tr chrys & Blk Chrys, Tr Sec
	46.6	57.0	10.4		.17				91	2.48	.08	.02	.03			.04			Tr												Sp		Tr						Mz; as above, Tr chrys & Blk Chrys, rare Tr Sec, Tr gtz veing
	57.0	66.8	9.8		.22				87	2.55	.13	.01	.03			.05																							Mz; as above, Sp gtz; ST Mafics; (Secondary Qtz?)
	66.8	75.6	8.8		.19				81	2.51	.10	.01	.02			.06			Sp												5								Mz; Bxkn; ss; Alt; Leached, Sp chrys & Blk Chrys, Tr Sec, Mod Lim.
	75.6	79.8	9.2		.12		.09		73	2.46	.05	.01	.03			.08				Tr											Sp								Mz; Intense Alt; Mod Sec, Mod Secondary (?) Biotite, Wk chrys
	79.8	89.5	9.7		.41		.17		66	2.49	.11	.02	.04			.24			Tr			Tr																	Mz; as above, Bxkn, ss; Wk chrys, Tr Sulfs.
	89.5	98.5	9.0		.23				72	2.49	.05	.01	.04			.13															10			Sp					Mz, br, wk-mod alt, [illegible], Leached and lim [illegible]
	98.5	107.7	9.2		.27				83	2.54	.08	.01	.03			.15															Sp				Tr				Mz as above
	107.2	116.1	8.4		.20				93	2.53	.08	.01	.03			.08																		Tr					Mz, wk alt, not so br, bio at Rock abundant, Mod lim.
	116.1	123.6	7.5		.26				73	2.53	.10	.02	.04			.10																							As above
	123.6	132.0	9.4		.31				58	2.54						.14																Tr							Mz as above, a few vuggy gtz veins.
	132.0	142.7	9.7		.24				94	2.47	.12	.01	.03			.08															15								Mz as above to 140.9 where alt incr, last foot st clays
	142.7	151.5	8.8		.31				87	2.42	.12	.01	.03			.15															20								Mz, mod alt, mod st lim & lim, Sc, soft areas with clays, br
	151.5	158.6	7.1		.16				98	2.57	.05	.01	.02			.08															Sp						Dp	154.1	?	Mz as above, ST indistinct, marked by lim alt & limonite [illegible]
	158.6	167.1	8.5		.13				93	2.54	.04	.01	.03			.05															Tr								Dp, lt colors so dark gests of frags; Wk lim, no Mz rels, br
	167.1	175.1	8.0		.19				79	2.57	.07	.01	.03			.08															5		Sp						Dp as above, Core quite br.
	175.1	182.7	7.6		.20		.19		96	2.55	.13	.02	.04			.01															Sp								Dp; Alt, leached, cont "ghosts" of frags, sp lim, sp chrys, Tr [illegible]
	182.7	191.1	8.4		.23		.21		100	2.59	.16	.01	.04			.02																							Dp; Alt, leached, Mod SiO2, frags at Hf; Sp Mod chrys, Tr cc, Stringers
	191.1	200.0	8.9		.65	1.17 Cu	.53	1.17 Cu	98	2.57	.46	.02	.05			.10	.02														Tr								Dp; as above; cont Hf frags; Sp st [illegible] Mod chrys, Sp lim, Tr [illegible]
	200.0	207.8	7.8		.69	.67	.36	.45	67	2.80						.10	.23				Tr				Tr	10	5	15				10					HF	202.4	70°	Dp as above To 202.4' then HF Bx; Qtz & Bad SiO2 + chlor, Sp-Mod Sp, Mod calc veing; Tr Mag; Sp-Mod gas.
	207.8	217.1	9.3		.70		.09		100	2.79							.70									10	10	60				5	5			Tr		209.9	Sub	HF-Bx; as above To 209.8' then Tr; ST gas, Mod white gtz, Sp-Mod Sulfs
	217.1	225.0	7.9		.98		.56		92	2.66	.42	.04	.10			.12	.30			SP							5	20	60		5		10	SP					Tr-Bx; leached, ST silicification; Patches ST Feox, Pods' [illegible]
	225.0	234.8	9.8		.52		.14		87	2.69	.09	.02	.03			.08	.30			Tr							5	30	50		Sp		15					Bx		Tr-Bx; dense; ST SiO_2; contracted Feox & [illegible] "pods", w chlor & calc.
	234.8	239.5	4.7		.84		.05		93	3.66							.84										5	30	45				20							Tr-Bx; as above; ST SiO_2 & patches "white" gtz, Sp Sulfs
	239.5	249.3	9.8		1.27		.04		78	2.90							1.00	.27						Tr	Tr		5	25	50		Tr		20				HF	239.5	Sub	HF-Bx; Alt, Mod gas, Mod calc; Sp chlor, Sp [illegible] cpy; Bxkn & Pyritized
	249.3	259.2	9.9		1.07		.07		91	2.84							.77	.30			Tr						5	15	60				20							HF Bx; as above, Mod chlor, Sp gtz veing; Mod gas; Cont Sp cpy & Bxkn.
	259.2	268.8	9.6		.45		.15		99	2.96	.11	.01	.03			.05	.20	.05	Tr								10	5	30		S		10	Tr			Dp	263.1	Bxkn	HF Bx, leached, Sp chrys, Tr Bal; Sp chrys, Tr Bxkn; Bxkn To 263.1' then
																																					HF	266.4	35°	leached Bxkn Dp with HF cc To 266.4' then HF To end.
	268.8	278.6	9.8		1.19		.09		92	3.02							.99	.20		SP							5	60	30		SP		5				Tr			Tr-Bx, ST gas + white gtz; Sp Tenod cpy + bon; Sp calc & gtz veing.
	278.6	287.1	8.5		.52		.05		86	3.09							.50	.02									5	70	25		Tr		SP							Tr, Solid Massive brn gas; Sp Sulfs; Tr gtz veing
	287.1	297.3	10.2		1.73		.04		82	3.22																													Tr, as above, Sp-Mod cpy & Bon; Tr gtz veing; Mod white gtz but [illegible]
	297.3	307.9	10.6		1.22		.04		72	3.14							1.00	.73									65	SP	75	25	SP	SP								Tr, Massive; Mod patches white gtz, Mod SP; Sp Poly; Tr Born; wk calc
	307.9	311.3	3.4		1.51		.06		88	3.12							.71	.80										5	80	15										Tr; as above; incr in white gtz; Mod cpy; Tr Born; Sp gtz veing
	311.3	319.2	7.9		.96	1.72	.05	1.22	70	3.10							.56	.40				Tr						5	70	20				5						Tr; Massive, Sp white gtz; Sp-Mod cpy, wk gtz veing; Tr chlor & calc
	319.2	326.6	7.4		.60	.74	.05	.19	90	3.08							.35	.25										5	75	10			Tr	10						Tr; as above, Mod-St cpy; Tr Poly, Mod gtz, Mod chlor
	326.6	336.3	9.7		.90		.12		99	3.02							.60	.30										5	60	25				5	5					Tr; ST gas, Mod chlor, Sp gtz veing; Mod white gtz; Sp calc veins. Mod cpy - py, Tr Born; Tr Poly, Tr Mag
	336.3	343.2	6.9		1.59		.11		90	3.62							1.40	.19										10	40	50			Sp	5	10						Tr-Bx; dense in gas, Mod Hf, Mod chlor; Sp Sulfs, Mod calc veins
	343.2	353.0	9.8		.59		.08		75	3.38							.39	Tr				Tr	Tr					5	40	40		Tr		5	10	SP					Tr-Bx as above, Inc white gtz; Sp Sp; Tr Born & Poly
	353.0	362.5	9.5		.42		.04		90	2.91							.40	.02										5	95	30				5	10	5					Tr-Bx, ST bon gas; Mod white gtz; Mod gtz veing; Patches Hf; Mod Sulfs
	362.5	372.2	9.7		.61		.05		99	2.92							.55	.06										5	40					5	10	Sp			BX		Tr-Bx; as above, Tr Poly, Mod chlor

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral % or, as follows: Trace (Tr); Sparce (Sp) < 3%, Moderate (Mo) 3-50%, Strong (St) > 50%

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Do - Docite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-67
Page 2 of 2 Pages
Collar Elev. 2593.67 Final Depth 552.3
Coords N 86,353.94 E [illegible] 403.56
Inclination Vert
Logged by S.A.A. - C.L.N.
Date: Start 1-3-62 Finish 1-15-62

Depth From	Depth To	Int'l	Elev.	% Cu Total	% Cu Ave	% Cu NS	% Cu Ave	% Core Recov	Sp Gr	Cu (1) Chrys	Pitch	Black	Blue Green		Cu	Cpy	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sh Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
377.2	377.0	7.8	/	.56		.04		91	277							.50	.06		Sp	Tr	Tr	Tr			Tr	Sp	60	25		Tr	5	10	Tr				Tt Bx, St Bar gar, Mod white qtz "pods", Mod spx-py, Tr Mag, Sp calc vns
377.0	387.0	8.0		.55		.02		100	283							.55	Tr						Tr	Tr		5	40	35		Sp	5	10	5		BX		Tt Hf Bx; St gar, Mod Hf, St calc, Mod cpy-py, Mod calc vns, Tr Mag
387.0	395.5	8.5		.52		.00		99	290							.52										Sp	50	30			10	10	Sp				Tt-Hf Bx, as above, more in qtz, Mod calc vns, Sp-Mod Sulf
395.5	405.0	9.7		.50		.02		94	292							.40	.10									5	40	35			10	10					Tt Bx; St gar, Mod qtz, Mod qtz vns, Sp sulf, Mod Bante?
405.0	414.6	9.6		.23		.03		95	294							.20	.03			Tr						5	35	35		Tr	10	15					Tt Bx; St gar, Mod qtz, Sp sulf; Sp - Mod Bante?; Fresh
414.6	424.3	9.7		.28				94	291							.20	.08									5	30	45			5	15					Tt Bx, St. gar, as above, Sp calc, Mod Bante?, [illegible]
424.3	433.7	9.4		.21				100	288							.15	.06									5	40	30			10	10	5				Tt Bx; as above, Mk cpx-py, Mod qtz vns, Sp calc
433.7	436.3	2.6		.22		.04		93	290							.10	.02						Tr	Tr		5	30	35			10	15	5				Tt-Bx; St. gar, Mod qtz, Mod calc; Sp sulf, Sp calc, Tr Bante?
436.3	443.8	7.5		.73		.05		95	321							.70	.03			Tr			2	3		5	30	40		5	5	10	Sp				Tt-Bx; St gar, Mod St calc; qtz vns, Mk St cpx & Py as vns & disc; Sp Hem, Tr Mag;
					221		229																														
443.8	452.6	8.8		.53	@	.04	@	50	300							.53	Sp				Tr		Sp	Sp		5	35	35		10	5	10					Tt Bx, Mt; St Hem, Mod calc, Mod-St cpy-py as veinlets
452.6	458.2	5.6		.85	.68	.05	.03	60	325							.85										10	20	40		10	5	10	5				Tt Bx, as above; Mod cpy, Sp Hem; Mod calc vns, Mag
458.2	464.6	6.0		.68		.04		95	279							.68										10	20	55		10	Sp	5	Sp		Hf	458.2	grac	Hf-Bx, Mt, Mod calc vns, Sp Hem, V-cpy-py, Tr Mag
464.6	474.3	10.1		.35				79	259							.35	Tr									Tr	Tr	Sp		Sp		20	Tr		Mz	464.6	38°	Hf-Tt Bx; as above to 464.6, then dense silicified Mz, w/ sulf
474.3	482.7	8.4		.10				63	259							.10														Tr		20	Sp				Mz, dense, Silicified, St qtz vns, Sp cpy, py, Mag
482.7	491.4	8.7		.13				95	261							.13										Tr						25					Mz, as above, cont. St. SiO_2
491.4	497.1	5.7		.08				88	264							.08																25					Mz, Fr. Silicified, St qtz vns, Sp cpy-py, Tr Mag
497.1	505.1	8.0		.17				87	258							.17																25	Tr				Mz, as above, Mod-St silic
505.1	515.6	10.5		.07				95	258							.07																25					Mz, St silic; Alt, Mod qtz vns, Fr, Sp sulf, Mt becomes coarser grained at intrusion.
515.6	525.3	9.7		.17				99	262							.17															Tr	10					Mz, Coarse grained, Fresh Biot, Mod Mafics, Mod SiO_2 qtz vns
525.3	531.7	6.4		.12				95	260							.12																10					Mz, as above, Tr Sulf
531.7	540.8	9.1		.26				99	261							.26															Sp	5					Mz, as above, Fresh, Mod Silic, Tr Sulf
540.8	547.6	6.8		.18				93	258							.18																10	Sp				Mz, as above
547.6	552.3	4.7		.13				85	260							.13															Tr	5					Mz, Fresh, Mod Silic, Tr Sulf, Sp qtz vns, Tr Mag

AVG Rec = 89%

END OF HOLE

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 0-68
Page 1 of 3 Pages
Collar Elev. 2700.29 Final Depth 581.0
Coords N 36,198.33 E 18,399.01
Inclination VERT
Logged by SAA - CWM
Date: Start 1-13-62 Finish 1-25-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	16.0	16.0						RB																														Rock BIT
NX →	16.0	25.4	9.4		.34	.37	.46	.45	71	2.57	.35	.04	.07			.08			Sp											Tr	Tr	Sp		Tr	Dp	16.0	?	Dp; Leached, Alt, Brku, Mod Lim, Sp chlor, Tr Sulf, Sp chry
1875	25.4	35.5	10.1		.40	.46	.29	.37	79	2.52	.23	.02	.09			.11				Tr							Tr				S								Dp; as above; patches Mz; Alt Frags with Sul vns, Mod chry
	35.5	43.6	8.1		.09				89	2.60	.04	.01	.02			.02															Sp		Tr						Dp; Leached; Alt; Sp lim; gte veing; Sp chry, Tr Sulf, Tr Sph
	43.6	53.0	9.4		.10				94	2.60	.05	Tr	.02			.03															Tr								Dp; Leached; Alt; dk Aug Frags (Alt or Sil?); Tr chry; Tr Sulf; gte vns
	53.0	61.2	8.2		.14				89	2.59	.07	.01	.02			.04																	10						Dp; Leached on Shears; Sp lim; cont dk Aug Frags; Tr chry; Tr Sulf; Tr chlor
	61.2	69.3	8.1		.51		.09		89	2.64	.06	.01	.02			.40	.02																10		Tr				Dp, Sil?, Leached, Sp lim; Tr Sulf; Tr as veins; dk gry Fg, Aug Frags
	69.3	79.8	10.5		.08				89	2.60	.03	Tr	.02			.03															Sp		Sp						Dp, as above, Tr chry; Tr Sulf;
	79.8	87.5	7.7		.10				94	2.59	.03	Tr	.04			.07																							Dp; wk leached; St silica; Mod lim, Mod gte veing; Tr chry, Tr Sulf.
	87.5	97.3	9.8		.11				94	2.58	.03	Tr	.05			.03																	Sp						Dp; as above; occasional dk aug Frags Tr Sulf
	97.3	104.2	6.9		.23				93	2.59	.10	Tr	.07			.08																							Dp, Brku, wk leached, Sp lim; Mod silica; Tr chry; Sp Sulf
	104.2	109.6	5.4		.12				95	2.56	.05	Tr	.05			.02																							Dp, as above
	109.6	119.9	10.3		.10				76	2.58	.02	Tr	.05			.03																							Dp; Brku, wk leached, Sp lim, Mod Sio2; Tr Alt Cpy, Tr chry, Tr Sulf
	119.9	128.4	8.5		.09				61	2.60	.03	Tr	.04			.02																							Dp; as above
	128.4	136.6	8.2		.15				100	2.57	.05	Tr	.05			.05																							Dp, as above; Sp-Mod Frags of Sulf, Alt, Sp lim
	136.6	145.0	8.4		.37	.23	.34	.23	89	2.49	.14	Tr	.20			.23																							Dp, Alt, Leached, Brku; cont Sed Frags; Sp Tr lim; Mod chlor & Sulf
	145.0	153.7	8.7		.15	.10	.08	.15	89	2.59	.03	Tr	.05			.07						Tr									S			Sp					Dp, Alt, wk leached, incr in Sio2; Tr chry; Sp Sulf; Sp gte veing
	153.7	162.9	9.2		1.16		.05		78	4.07	.03		.02			.02	1.09		Tr	S	30					Tr		40		S		Sp	20		Mag-Sfr Ca?	155.5	Brku	Dp; Brku, ggy, Alt To 155.5' Then Massive Mag, Mod chlor, Mod calc veing; St chlor, Tr Hem, Tr C.S;
	162.9	167.7	4.8		.20		.06		96	2.59	.01		.05			.14	Tr		Sp	Tr	Tr										Sp					Dp	162.9	98?	Dp, Brku, Alt, Leached; Mod Sio2; Tr chry; Tr Sulf, Sp chlor
	167.7	176.9	9.2		.27				89	2.62	.01		.03			.20	.03		Tr										Tr			Tr	Tr						Dp; as above; Sp sulf; Mod chlor
	176.9	187.0	10.1		.30				79	2.59	.02		.01			.20	.07														Tr								Dp; Tr leach, Tr lim; Sp cpy, py; Mod gte veing, Sp chlor
	187.0	196.3	9.3		.08				91	2.59							.08																						Dp; Alt; Tr lim; Tr-Sp cpy, py, Mod chlor & gte veing
	196.3	203.3	7.0		.83		.04		78	2.85							.83				Tr						10	20	Sp		S		S	10		Tr HF Bx	196.3	Brku	Tr HF (wk Bx) St brn gar; Mod HF & calc veing, St chlor, Tr Mag, Tr Hem; Mod sp & py; Alt, Sp gte, Tr gte veing
	203.3	212.9	9.6		.73		.04		96	2.89							.73											5	20	50	Sp		10	10					Tr HF (wk Bx) cont St gar; St chlor; Mod HF, Sp - Mod cpy & py, calc vns
	212.9	222.2	9.3		2.37		.05		99	2.92							2.30	.07		Sp				Tr	Tr			5	20	50			10	10					Tr HF, Bx, as above, St chlor, Last 2' Massive sp & py, Mod calc
	222.2	231.9	9.7		3.74	4.22	.04	.04	93	2.86							3.74	Tr				Tr						10	10	55	S		S	15		HF	222.2	Grad	HF; Bx, St calc veing, St - Massive Sulf; Mod - St chlor, Tr Mag
	231.9	241.3	9.4		2.73	2.78	.08	.08	79	3.21							2.73											15	10	60	Sp		Sp	5					HF, Bx; " " ; Mod - St Sulf; St chlor, Tr Mag
	241.3	251.2	9.9		1.32		.05		91	2.95							1.32											10	15	65	Tr	Tr		10					HF, Bx, St calc; Mod chlor; Mod - St cpy, Tr Mag; Alt & gte vns
	251.2	260.3	9.1		2.06		.05		95	3.00							2.06			S								5	20	55				15					HF, Bx, as above, Mod cpy
	260.3	266.8	6.5		2.67		.06		94	3.10							2.67			Sp								5	15	60	S	Sp		10					HF, Bx, St calc; somewhat Sericite; Mod cpy - py; Mod chlor, Sp gte
	266.8	276.0	7.8		.56		.04		87	2.83							.56											10	15	65	Sp			10					HF, Bx, St lime, dense, s'id, barren fr. 268.0 - 270.8, wk - Mod Sp
	276.0	282.7	8.7		.43		.02		72	2.84							.43											5	10	75				10					" " " " , Sp gar, wk chlor, Mod sulf, mostly py, Tr Moly
	282.7	301.3	18.6		.09		.04		69	2.64							.09											Tr	Sp	50			5	5					HF, Bx gar, decr. sulf, incr silica, last 1' like silicified. Then Pseudo
	301.3	310.1	8.8		.04				100	2.58							.04														Tr	Sp				Pseudo Dp?	287.5	Bx	Dp, dk, fresh, Sp gte veing, Tr cpy, py, Tr Moly; Mod Mafics
	310.1	319.4	9.3		.05				91	2.59							.05																						Dp (Pseudo?), St Silica, Mod gte veing, Mod biot & Hblend; Vague ghosts of Sed Frags + Feld x's, This may be a Meta-Sed, Text resub Dp
	319.4	328.3	8.9		.07				92	2.56							.07																						Dp (pseudo) as above; cont St Mafics; Tr Sp, py; Tr Moly
	328.3	339.0	10.7		.06				100	2.60							.06																						Dp " "; St Silicification; Tr Sulf; Mod gte veing; This run has Mo Text.
	339.0	348.6	9.6		.05				88	2.59							.05			Tr																			Dp (pseudo) Meta-Sed, St Sio_2, St Mafics; cont "ghosts", Tr Sulf, Mod gte vns
	348.6	356.5	7.9		.03				79	2.62							.03																						Dp (" ") " ; St Sio_2; large Mod of Sed?; Sp sulf, cont Mafics, Tr Moly
	356.5	366.2	9.7		.06				79	2.61							.06																	Tr					Dp " " as above; Tr sulf, Mod gte veing; Tr chlor, Tr Sph?
	366.2	375.8	9.6		.66				87	2.59							.06															Tr							Dp (pseudo?) St Sio_2, Tr cpy-py, Tr Moly; Tr chlor; St Mafics, Mod gte veing
																																							Dp (" ") as above

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Note (3)
Tt - Toctite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
ig - Undif igneous

Hole No. 17-68
Page 2 of 2 Pages
Collar Elev. 2700.29 Final Depth 581.0
Coords. N 36,178.33 E 18,379.01
Inclination VERT
Logged by SAA - CWM
Date: Start 1-13-62 Finish 1-25-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	May.	Hem	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sn Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
375.8	384.9	9.1		.07				90	3.03							.07			Tr						Tr				Tr	Tr	Tr	Tr	Tr				Dp, (pseudo), Alt, Mod Silic, Fracture, Sp cpy, Tr Py, Tr Mo's
384.9	391.1	6.2		.08				91	2.63							.08																					Dp, as above
391.1	399.1	8.0		.06				95	2.59							.06														Sp	Sp	Tr					Dp, Alt, Mod Silic, Mod Feldspathization, Tr cpy, Tr Mo's
399.1	409.1	10.0		.07				75	2.55							.07															10						Dp as above, S.Hn
409.1	413.4	4.3		.05				95	2.60							.05													Sp		25						Dp (Pseudo?) Mod Alt, St Silic, Sp Py/Hs, Tr Py, Tr Cpy, Tr Mo's
413.4	423.4	10.0		.07				94	2.61							.07															20						Dp(?) pseudo) Alt, St Silicification, Tr Sulfs, Tr Sulfs, Mod Cu Mo's
423.4	434.0	10.6		.14				72	2.60							.14															10						Dp(?) as above, Sepus to resemble Mz, rest. Sp Sulfs
434.0	441.4	7.4		.06				97	2.59							.06													Tr	Tr	Sp	Tr		Mz?	434.0	30°	Mz?, St Silicification, appears to be Dike, Mod Mz, St Mo's, Tr 2" vein, Mod Feldspathization, Sp Py cpy, Tr Mo's
441.4	451.3	9.9		.09				91	2.60							.09																					Mz? as above, rest Mz, Test Mo's
451.3	460.9	9.6		.16				77	2.55							.16															10						Mz?, St Silica, Mod qtz veing, Hornfelt, Tr cpy, py, Mo's
460.9	471.8	10.9		.22				51	2.60							.22												Tr	Tr	Tr	Sp	5		Dp?	460.9	90°	Dp, (pseudo?), Born, gy py, St Alt, Silicified, Tr cpy, py, Born
471.8	480.9	9.1		.14				59	2.60							.14															5						Dp? " ", Born, St Alt, Patch of St. feldsp, Sp Sulfs, Mod qtz veins, Sc
480.9	490.3	9.4		.12				37	2.61							.12															10						Dp? " " as above, Areas of St Mo's, resemble Mz
490.3	498.5	8.2		.12				68	2.63							.12															20						Dp (Pseudo?) St silica, St Mo's, Mod Feldspathization, Sp Sulfs
498.5	509.0	10.5		.11				95	2.63							.11												Tr	Tr	Tr	20						Dp " ", St silica, cont St Mo's, Mz Test, Mod Feld, qtz, Tr Sulfs
509.0	519.7	10.7		.12				76	2.59							.12														Tr	25						Dp " " as above, Born, Tr Ser, Tr Sulfs
519.7	529.8	10.1		.15				89	2.58							.15															10						Dp? St Silica, Mod Ser, Sp cpy-py, Tr Mo's, Mod chlor
529.8	539.0	9.2		.15				89	2.61							.15															10						Dp, (pseudo) as above, St Ser, Mod Feldsp, Sp Sulfs
539.0	548.9	9.9		.08				99	2.59							.08									Tr								AND	539.0	30°	AND, Post Min dike, Sp Calc, Tr chlor, Tr qtz veing
548.9	559.0	10.1		.21				74	2.60							.21			Tr						Tr			Tr			15		Mz	548.9	99°	Mz, Silicified, wk Sulf, Tr Mo's, Fresh biot, wk qtz veins
559.0	569.5	10.5		.37				90	2.61							.37															20						Mz, as above, Fresh, Mod silica, Tr cpy-py-Mo's
569.5	581.0	11.5		.17				64	2.63							.17												Tr			10						Mz, Silicified, Tr ser, Mod qtz veing, Tr cpy py Mo's
						Avg Rec =		85%																													
				End of Hole																																	

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) +50 %

Note (3)
Tt - Tactite
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V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 17-69
Page 1 of 1 Pages
Collar Elev. 2847.89 Final Depth 6000
Coords N 36,500.90 E 17,600.67
Inclination Vert
Logged by SAA - CWH
Date: Start 1-15-62 Finish 1-30-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	23.0	23.0						Rock	BIT																													Rock BIT
* Mc. → 2400	23.0	32.9	9.9		.76		.69		74	2.51	.60		.09			.07			Sp											Sp	Sp.				Dp	31.0	?	Dp; ALT; Weak leached; Mod qtz veing, Modest Sp Bixbyite
																																			Mz	33.2	Brkn	To 33.; Then Mz weak leached + ALT, cont Sp qtz veing.
	32.9	44.9	9.0		.17		.13		85	2.50	.10		.03			.04													Tr						Dp	40.9	"	Dp; Leached, Brkn, ALT, Mod limo; Mod clay, Sp Bixb, To Ser, Sp Qtz veing
Mz → 1975	44.9	48.3	3.4		.17				100	2.55	.10		.03			.04																							Dp, as above, Sp chlor.
	48.3	49.0	3.7		.14				63	2.52	.05		.04			.05																							Dp, St. ALT, leached; Mod limo, Sp Mod Ser; Spotty, Mod qtz veing
	49.0	57.0	8.0		.26				89	2.54	.15		.06			.05																							Dp; as above, occasional, Fresh frags of SiO2, Sp chlor
	57.0	67.2	10.2		.16				89	2.54	.07		.06			.03																							Dp, ALT, leached, Patches with Red Mist resembles Fe Mz, Sp chlor To Sils
	67.2	74.4	7.2		.11				97	2.56	.03		.05			.03																							Dp, as above, Mod qtz veing; cont Hematite, To sils + chlor
	74.4	84.9	10.5		.09				87	2.35	.04		.02			.03														Tr		Tr	Tr						Dp, as above Sp Ser, To chlor, Tr Sils
	84.9	94.4	9.5		.05				66	2.54	.03		.01			.01																							Dp; Brkn; Mod ALT; Leached; Mod qtz veing, To chlor, To Sils
	94.4	103.7	9.3		.23				82	2.54	.03		.01			.19			Tr	Tr					Tr					S									Dp; St. SiO_2, ALT. Mod. ggy clay, Sp Sils; St. Feld spar altered, Mod Mz Text, Mod qtz veing, Sp chlor
	103.7	112.6	8.9		.17				92	2.61	.03		.01			.13														Sp					Dp (Pseudo); St. Feld; St qtz; Mod Mafics; Stry resembles Fe Mz.	95.0-105	103.7	grad	
	112.6	121.3	8.7		.21				45	2.56	.04		.02			.15																							Dp, (pseudo) as above, Sp chlor; To ss, To cpy, Mod Dp, cont Mz ss
	121.3	131.3	10.0		.12				77	2.61	.02					.10																							Dp, (" ") ALT; Spot; To chlor; Sp Sils, Mod qtz veing; Mod Sils
	131.3	136.1	4.8		.21				84	2.58						.16	.05																			Mz ?, Rock resembles Mz in Text, but may be facies of Dp;		131.3	grad	
																																							Sp Sils; To chlor, Sp qtz veing, Mod SiO_2
	136.1	146.6	10.5		.17				91	2.55						.02	.15														Tr								As above, w med-st. pink Felds To MoS.
	146.6	152.9	6.3		.23		.01		92 L	2.30							.23																			Hf	152.6	Brn	Mz, as above to ct of vague Hf, silica, To cpy.
	152.9	160.1	7.2		1.43 } 1.2		.05 } .02		90 L	2.72							1.43			Sp	Tr				S 10 80					Sp			S						Hf, m med-st chlor, wk-med qtz. Cpy med & short dcr to wk. To Mz
	160.1	164.1	4.0		2.34 } 2.76		.04 } .06		97 L	2.69							2.34								S 10 75								0						Hf as above m incr qtz, more dense. Cpy wk-med decr.
	164.1	175.6	11.5		.26		.02		94	2.59							.26			Tr					Tr			Tr					20	Tr		Mz	164.7	Brn	Hf dense m to cpy to ct. Mz gen tr, wk-med pink felds. To Sils
	175.6	186.3	10.7		.22				94	2.59							.22																25						Mz, fresh, w patches of med alt m grey-mottled felds. To Sils
	186.3	196.7	10.4		.22				100	2.55							.22																25						Mz as above w more gra felds plus st. mafic areas.
	196.7	204.7	8.0		.23		.02		93	2.60							.23																20						Mz w alternating fresh and alt, light & dk areas. To Sils.
	204.7	215.1	10.4		.23				91	2.61							.23														Tr	Sp	10						Mz; Mod ALT; Mod silicification; fresh Mafics, Sp qtz veing To Sils
	215.1	224.0	8.9		.28				98	2.57							.28																10						Mz, as above
	224.0	234.9	10.9		.23				96	2.59							.23																15						Mz, " "
	234.9	242.0	7.1		.15				97	2.61							.15																20						Mz, ALT, Mod- St. silicification; Mod qtz veing, To Ser, To Sils
	242.0	253.4	11.4		.22				62	2.56							.22																10						Mz; as above
	253.4	258.4	5.0		.27				92	2.58							.27																15						Mz; ALT, silicified; St. Fresh Mafics, To Feldspathization, To Sils
	258.4	265.0	6.6		.21				95	2.59							.21								Tr			Tr					10	Tr					Mz; as above, To Ser + Chlor
	265.0	272.4	7.4		.28				95	2.60							.28																15						Mz; ALT, silicified; fresh Mafics; Mod Felds, Sp Sils
	272.4	281.0	8.6		.28				95	2.54							.28																20						Mz; " " , Mod-St. Felds; Sp Sils; Sp chlor, To Moly
	281.0	291.3	10.3		.26				90	2.56							.26																10						Mz; ALT, Mod silica; St. Felds; fresh Mafics; Sp cpy, To Moly
	291.3	301.3	10.0		.30				92	2.61							.30																10						Mz; ALT, " " ; ggy m part, Mod Felds; Sp qtz veing
	301.3	307.6	6.3		.22				100	2.58							.22								Tr								10						Mz; as above
	307.6	315.8	8.2		.21				94	2.56							.21																5						Mz, wk ALT, Mod qtz veing; Sp-Mod silica, Mod Felds, Sp Sils
	315.8	325.3	9.5		.22				100	2.59							.22																5	Tr					Mz; Fresh, as above, Sp Sils
	325.3	334.5	9.2		.22				96	2.57							.22														Tr		20						Mz, ALT, St. silica; St qtz veing, Mod Felds, Fresh Biot, To Sils
	334.5	342.0	7.5		.16				94	2.60							.16												Tr				15						Mz; as above; incr in Feldspathization
	342.0	350.9	8.9		.23		.02		97	2.56							.23			Sp													10						Mz; Mod ALT, Sp cpy-py; incr in qtz veing; cont Field, some Sericite
	350.9	358.7	7.8		.46		.02		91	2.62							.46																5	Tr					Mz; ALT; incr in cpy-py, To Moly; Frags of Hf (?), To Ser
	358.7	369.5	10.8		.27		.02		92	2.57							.27			Tr													10	SP					Mz, St ALT; Mod Sils, To Ser, Mod chlor; Sp Hf frags, St Fe Mineralization, Mod qtz veing.

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows:
Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-69
Page 2 of 2 Pages
Collar Elev. 2847.29 Final Depth 6000
Coords. N 36,500.90 E 12,600.67
Inclination VERT
Logged by SAA - CWN
Date: Start 1-15-62 Finish 1-30-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1): Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2): Lim.	Py	Mag.	Hem.	Spec	Other (2): Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
369.5	379.4	9.9		.64		.03		58	2.55							.64			Tr						Tr	Tr	Tr	SP		S	Tr	Tr	SP					Mz, Mod-St Alt; Sp Sch, Sent Hf-Tt Frags, Tr Hem, Tr Chlor, sp Sus
379.4	389.0	9.6		.42		.02		73	3.22							.42			SP	Tr						SP	SP	20		S						Tr	382.2	62°	Mz, as above To 382.2'. Then Tt, Massive brn gar, sp-Mod spy Mod gtz veing; Tr chlor, last 2' Hf-Tt Mix
389.0	395.4	6.4		.21	781 @ 1.47	.02	781 @ .03	88	2.23							.21			Tr							SP	30	55		SP		10	5			Hf	389.0	Grad	Hf Bx, dense, Mod chlor; Sp-Mod Silica; Mod gtz veing; Sp Suls
395.4	402.5	7.1		.20		.02		100	2.37							.20			SP	Tr							S	50	38		S		Tr	Tr			Tr			Tt, (wk Bx), St brn gar; Mod-St cpy, Tr Moly. patches of Hf + Mz; Sp gtz veing, sp chlor
402.5	412.0	9.5		4.27		.03		70	3.03							4.27			S	Tr			Tr	Tr	Tr	S	40	22		S		10	S						Tt, ggx, Tr chlor, intense sulphides, py-cpy, Brn gar, Tr Bx
412.0	420.0	8.0		5.35		.03		67	3.16							5.35			S				Tr		Tr	SP	40	30		10		S	10						Tt Bx, Wk ggx; St chlor, St brn gar, St sp-py. Tr Moly, Tr chlor
420.0	429.0	9.0		.51		.04		86	3.00							.51			SP							10	20	55		S		S	S						Tt, wk Bx, dense, St SiO2; sp chlor, Mod gtz veins, Mod calc, dense sus
429.0	435.6	6.6		.07				88	2.82							.07			Tr							SP	Tr	Tr		S	SP	30	Tr			Meta-Seds	429.0	ggx	Meta-Seds; Vr St-Silicification, Tr Mafics, sp Felds, sp Suls
435.6	442.8	7.2		.05				90	2.63							.05										Tr				S		30							Meta-Sed ? (pseudo Dp?), St Silica, Mod Felds, Sp-cpy-py-Moly
442.8	452.7	9.9		.09				96	2.63							.09										Tr					SP	10				Dp?	442.8		Dp; (pseudo?) Alt, sp chlor, Mod Felds; St Silica, sp Suls, Tr Moly
452.7	461.5	8.8		.12				96	2.56							.12																15							Dp; (" " ") as above, wk to gtz veing
461.5	471.4	9.9		.16				93	2.59							.16																20				Dp?			Dp - Pseudo with Mz. Tot in part, Mod Mafics, Sericitized Felds, Mod gtz veing, wk resembles a Meta Bx in Part with Secondary Biot + gtz. Tr Moly, cpy-py, Mod Felds
471.4	479.5	8.1		.08				92	2.59							.08														Tr		10	Tr			Mz	471.4	Brkn	Mz, Silicified Alt, Mod Mafics, Sp chlor, Mod gtz veing, Sp Sul's
479.5	490.3	10.8		.11				90	2.62							.11													Tr			15							Mz, Mod Silica, Sp Ser, Sp py cpy, Tr Moly + Tr chlor, Mod gtz veins
490.3	500.6	10.3		.12				92	2.54							.12																10							Mz, as above, less in Fresh Mafics, sp Suls
500.6	510.8	10.2		.19				98	2.54							.19															Tr	SP							Mz, Fresh Biot, sp gtz veing, Tr chlor, sp Suls.
510.8	521.6	10.8		.18				92	2.58							.18																							Mz, as above
521.6	530.5	8.9		.13				91	2.55							.13													Tr		SP	10							Mz, wk Alt, Tr Ser, sp silica, Tr other oxygen stain on Felds
530.5	540.4	9.9		.17				88	2.58							.17																10							Mz, Mod Alt, sp gtz veing; Tr cpy, Tr Moly, cont oxygen stain
540.4	543.3	2.9		.13				94	2.59							.13																Tr							Mz, as above, sp Suls
543.3	553.2	9.9		.15				33	2.86							.15																							Mz, Alt, ggx; poor rec; Fresh Biot, sp hornfelsed; Tr Suls, Tr gen Stain
553.2	560.0	6.8		.15				100	2.64							.15																							Mz, Alt, sp cpy py, Fresh biot, gen Stained Felds, wk gtz vns
560.0	570.0	10.0		.08				95	2.47							.08																							Mz; as above, cont Stained Felds, Fresh Biot (Secondary ?) sp Suls
570.0	580.0	10.0		.06				89	2.51							.06																							Mz; wk Alt; Fresh biot; Tr gtz vns; Tr Sul's; Wk gen Stain Felds
580.0	587.4	7.4		.07				93	2.60							.07																							Mz; as above, Mod Feldspathization Tr Suls
587.4	595.6	8.2		.07				93	2.63							.07													Tr			5	Tr							Mz; as above; " " " " , Mod Silicification, Tr Suls
595.6	600.0	4.4		.09				95	2.61							.09																10							Mz; Mod Alt, Tr Ser, Fresh Biot (?), gen Stain Felds, Tr Suls

Avg Rec = 88%

END OF Hole

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tc - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif Igneous

Hole No. D-70
Page 1 of 2 Pages
Collar Elev. 2975.46 Final Depth 600.0
Coords. N 36,955.38 E 16,647.64
Inclination VERT
Logged by SAA - CWH
Date Start 1-17-62 Finish 2-1-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chys.	Pitch	Black	Blue Green	Cuprite	Cc	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	20.0	20.0		—		—		Rock	BIT																													Rock BIT
DC# 2,400	20.0	25.7	5.7		0.21				82	2.47	.05		.11			.05			Sp											Sp	Sp				Mz	20.0	?	Mz, ST. Alt., Leached; Brkn; ST "live lim" ggy, Mod Ser, Sp chry, Tr flow
	25.7	29.1	3.4		.10				89	2.42	.03		.05			.02													Tr		Tr								Mz; Alt; Leached, cont "live lim", Sp chry; Tr Ser + chlor, Sp gtz veing.
	29.1	32.0	2.9		.17				94	2.50	.08	.01	.03			.05						Tr											Tr			Ak	293	Brkn	Mz; as above To 293 Then Ak; Leached, ST Alt; Tr chry, Mod "live lim"
	32.0	41.6	9.6		.09				98	2.54	.03	.01	.02			.03														Tr									Ak; Leached, ST Alt, "live lim"; Tr chry, Tr Alkues; Tr Mod. Gtz, Tr flow
	41.6	50.2	8.6		.07				91	2.64	.03	Tr	.01			.03																							Ak; as above, Mod lim, Tr Sulf; Sp chry
	50.2	58.9	8.7		.05				85	2.47	.02	Tr	.01			.02						Tr																	Ak; Alt, Leached; ST "live lim"; Mod gtz veing; Mod Ser, Tr chry
	58.9	67.8	8.9		.06				92	2.59	.03		.01			.02														Sp		Tr							Ak; as above
	67.8	75.0	7.2		.04				95	2.51	.02	Tr	.01			.01																							Ak, Leached; Alt, live lim; Mod gtz veing; Tr chry, Sp Ser.
	75.0	82.3	7.3		.05				100	2.51	.03		Tr			.02														Tr									Ak; as above, cont ST. Alt.
	82.3	95.0	12.7		.12				91	2.39	.07	Tr	.02			.03				Tr									Sp	10		Tr	Tr						Ak, leached, wk alt, moderate ist alt & chlorite seams.
	95.0	102.1	7.1		.07				96	2.48	.02	.01	.02			.02														5									Ak, leached, wk alt. Sp gtz veing.
	102.1	111.6	9.5		.06				94	2.49	.03	Tr	.02			.01														5									As above
	111.6	119.0	7.4		.06				95	2.52	.03		.01			.02				Tr										Sp									As above, core more solid.
	119.0	129.1	10.1		.06				95	2.50	Tr.		.04			.02													Tr									Ak; Leached, Mod Alt, Mod lim, Tr gtz veing, Tr chry, Tr Ser.
	129.1	137.0	7.9		.08				96	2.51	.01		.04			.03																							Ak; as above
	137.0	148.2	11.2		.07				95	2.50	.02		.03			.02																							Ak; as above, Tr Sulf, cc, Py, Sp chry
	148.2	158.4	10.4		.14				85	2.50	.09		.03			.02														5									Ak; Leached; Alt, Mod lim; Tr chry silicates; Tr Ser, gtz veing, Nar.
	158.4	168.6	10.2		.10				87	2.49	.03		.04			.03				Tr									Tr	Sp									Ak, as above
	168.6	185.4	16.8		.10				80	2.51	.04		.03			.03																							Ak; Brkn, Leached, Alt; Sp "live lim"; Mod chry - Ser; Tr chry
	185.4	189.5	8.3		.06				99	2.51	.01		.02			.03																							Ak; Alt, decr in lim; Sp Kaolin + Ser; Tr chry, Tr Sul, Tr Jar.
	189.5	193.3	8.8		.08				86	2.52	.01		.04			.03																							Ak, as above
	193.3	203.7	10.4		.08				92	2.52	.03		.02			.03																							Ak, Alt, Leached; Mod lim, Tr clay Tr Ser, wk chry, Tr gtz veing
	203.7	213.5	9.8		.07				91	2.53	.03	Tr	.02			.02																							Ak; as above, Tr Blk cuex; Tr Sulf, Tr Jar.
	213.5	223.6	10.1		.08				78	2.55	.02	.01	.02			.03																							Ak; St Alt, decr in lim; Mod Kaolin; Sp chry, Mod gtz veing.
	223.6	231.1	7.5		.17		.08		91	2.54	.05	.01	.02			.09				Tr												Sp	Tr						Ak; as above; incr in chry.
	231.1	237.6	6.5		5.56	.55	3.81	4.5	92	2.62	1.16	.05	.10		2.50	1.75			Tr											Tr	Sp	15				Dp	231.1	Brkn	Dp; ST Alt, intense chry, wk ST cuprite as veins; Mod gtz veing spec
	237.6	246.6	9.0		2.65	3.83	1.43	2.13	91	2.62	.95	.03	.05		.90	1.22																10							Dp; " " " " ; ST cuprite, spec; Tr py; " " Tr blue
	246.6	256.8	10.2		.29		.11		65	2.53	.07	.01	.03			.18						Tr									Sp	5	10	Tr					Dp; Intense Alt, ST chro gg + clay; Sp - Mod cc; Tr chry, Tr blue
	256.8	263.7	6.9		.66		.11		92	2.71	.07	.01	.03			.50	.05			S											S	Tr	5	10					Dp; as above, ST chlor, cont Sp sulf; Sp mag, Tr blue
	263.7	272.9	9.2		.64		.09		88	2.70	.05	.01	.03			.54	.01			Sp				Tr					Tr	Sp		10	Sp						Dp; Alt; wk Leached; Mod Jaro gg, ST Sulf; Sp gtz vns, Tr chlor
	272.9	283.4	10.5		.55		.08		88	2.74	.04	.01	.03			.47	Tr														S		10	S					Dp; Alt, " " , decr in Sulf; Sp gtz vns; Tr chlor, Tr blue
	283.4	288.9	5.5		.50		.20		86	2.72	.13	.02	.05			.30														Sp		10	S					Dp Alt, Leached; Mod lim, Sp-Mod Sulf; Mod chry, wk gtz vns
	288.9	298.3	9.4		1.38		.25		82	2.75	.15	.04	.06			1.00	.13													S		S	10					Dp; " " , Patches St lim gg, Mod chry, Lasta' Str. cc, py
	298.3	306.4	8.1		1.09		.06		96	2.83						.50	.56			S										Sp		10	15					Dp; Alt, Tr lim; Mod chlor + gtz veing, Sp-St. cc, py, Tr Molv
	306.4	313.2	6.8		.67		.03		91	2.70						.40	.27			Sp												5	10	Tr					Dp; as above
	313.2	322.0	8.8		.36		.01		54	2.63						.20	.16															10	5						Dp, Brkn, ggy, Leached; Tr lim, Sp chlor, Mod gtz veing Mod Sulf
	322.0	332.2	10.2		.25	1.30	.01	1.30	90	2.41						.10	.15														10	15	5						Dp, Brkn; ggy, ST chlor, Mod ST cc, py, Tr Molv, Hf (2) Frags
	332.2	342.1	9.9		.69	.88	.03	.06	67	2.30						.19	.50														20	10	10			Dp Hf Bx	332.2	SST	Dp - Hf Bx, Brkn; ggy; ST chlor, ST py; Sp py - cc Mod gtz
	342.1	350.0	7.9		.95		.04		74	2.65						.26	.60														15	5	10						Dp Hf; Bx ggy; St chlor, Hf. inclusions; Mod sulf, Mod gtz
	350.0	359.5	9.5		1.02		.04		58	2.49						.12	.90														15	10	10						Dp Hf Bx, " " " " ST py, Sp Cpy - cc; Hf Frags, Spec
	359.5	369.5	10.2		.78		.03		71	2.67							.78								S	SP	50		30		5	10			Hf	359.5	Brkn	Hf-Bx; ST Alt, ST clay; Mod Sulf; ST calc, ST chlor, Sp gtz veing
	369.5	380.0	10.5		1.08		.11		74	2.54							.08			S					15		68		10		Tr	10						Hf-Bx; " " ; Mod-St cpy-py-cc(?), St chlor, ST calc, Mod gtz vns
	380.0	383.4	3.4		1.56		.1		75	2.54							1.50			10					20	6	30		20			15					Bx		Hf-Bx; " " , Mod ST cpy-py; St chlor; Sp gar, Tr Hem, Mod calc
	383.4	390.8	7.4		1.17		.02		100	2.75							1.17			Sp					5	10	70		5		10	Sp							Hf-Tr Bx; Alt, Mod clay, patches brn gar; Mod-St sulf, Tr Hem, chlor

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D70
Page 2 of 2 Pages
Collar Elev. 2975.46 Final Depth 600.0
Coords N 36,969.32 E 16,647.64
Inclination Vert
Logged by SPA - CWH
Date: Start 1-17-62 Finish 2-1-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sh. Qz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
390.8	400.0	9.2		.48	.28 e	.02	.28 e	98	2.59							.48			Sp	Tr				Tr	Sp	20	65		Tr	5	5	5					HF - Tr; Bx; Mod gte vn wg, Mod cpx-py; Sp calc; Md chlor, Tr Mag
400.0	409.7	9.7		.49	.49	.04	.03	95	2.68							.49									5	20	55			5	10	5				Bx		HF - Tr; Bx; as above; Md py - Sp cpy, Sp chlor, St SiO2 gtvns
409.7	419.4	9.7		.51		.02		92	2.82							.51									10	10	70			5	5	Tr						HF; wk Bx; dense, St py - Sp cpy, Md chlor, Md gte wg, Tr Hem
419.4	429.1	9.7		.35		.02		67	2.69							.35									15	5	55			5	20							HF, " " , St. silica, Sp pyrite cpy, Tr chlor; wk Mag, Md gte vns
429.1	438.6	9.5		.26				79	2.69							.26								Tr	Tr	Tr	25			5	70			SITST	429.1	grad	SITST, dense, Fine Grnd, gray grn, rock, appears to be 95% SiO2 Tr cpy-py; Tr moly; Tr chlor, wk gte vns; May be strongly silicified HF?
438.6	447.4	8.8		.27				82	2.66							.27								Tr	Sp		20			10	70							SITST; cont dense St silica as above, Sp cpy as vnlts, Tr Moly
447.4	454.2	6.8		.26				91	2.64							.26											20			10	70							SITST; as above; Bx kn, Mod gte vning, Sp sulf
454.2	464.2	10.0		.22				88	2.59							.22				Tr							25			5	70							SITST; Bx kn, St silicous, dk gry, Mod gte vning; Sp Sulf, Tr Moly
464.2	474.5	10.3		.30				69	2.70							.30											20			10	70							SITST; " " as above, Sp sulf as vnlts, cont St sil
474.5	482.5	8.0		.29		.03		88	2.67							.29									Tr		35			5	60							SITST; " " " " , patches Meta pseudo Dp, Sp sulf
482.5	489.2	6.7		.43		.03		94	2.61							.43											35			Sp	65							SITST as above
489.2	498.2	9.0		.18		.03		92	2.63							.18											35			5	60							SITST, St silicification, begins to resemble pseudo dp. Sp sulf
498.2	505.4	7.2		.26				92	2.61							.26			5								30			5	65	Tr						SITST; as above, St SiO2. Mod py. Tr chlor
505.4	515.4	10.0		.33				88	2.80							.33			Sp								35			5	60							SITST; Ve St. silicification, Sp py, Tr cpy, Tr Moly; Tr chlor
515.4	523.2	7.8		.29				94	2.66							.29										Tr	45			5	50			Meta Sed	515.4	grad	Meta-Sed, Intense Silica; Tr gra; patches SITST, Tr Sulf
523.2	532.5	9.3		.33				93	2.64							.33			Tr						5	5	45			5	40							Meta-Sed; " " St gte vning; Tr gra, patches SITST, Sp Sulf
532.5	541.6	9.1		.19				93	2.72							.19			Sp						Sp	Tr	50			5	45							Meta-Sed; as above, vague patches Pebble pattern
541.6	550.2	8.6		.23				92	2.66							.23									Tr		55			5	40			SITST	541.6	grad	SITST, dense; wk, ve St. SiO2, Mod gte vning, Tr S. vs, Tr moly
550.2	560.0	9.8		.31				66	2.71							.31								Tr			40			Sp	60							SITST, " " , slightly banded, St Silicified, Mod gte vning, Tr Py, Moly
560.0	569.7	9.7		.34				87	2.69							.39									Tr?							Tr						SITST, as above, Sp calc vnlts; Patches Meta Sed?, Tr sulf
569.7	579.2	9.5		.39				78	2.56							.39									Tr		60				40							SITST, Pale grey green; Mod SiO2, Mod gte vn wg, Tr Meta Sed?? Tr sulf
579.2	590.0	10.8		.30				92	2.73							.30								Tr	Tr?		70		Sp		30							SITST; " " ; Mod Silica, Sp cpy-py, Tr calc vns; Tr Meta Sed?
590.0	592.2	2.2		.23				93	2.66							.23											50		Tr		50							SITST " " " as above, Inch in py, & gte vning
592.2	600.0	7.8		.35				90	2.59							.35											60				40							SITST; dk gry, dense, high SiO2, Sp Sulf, St gte vn wg

Ave Rec = 86%

End of Hole

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Do - Docite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-71
Page 1 of 2 Pages
Collar Elev 2881.36 Final Depth 450.3
Coords N 36,048.17 E 18,401.74
Inclination VERT
Logged by SAA - CWY
Date: Start 1-26-62 Finish 2-5-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	20.0	20.0						Rock	BIT																													Rock BIT
20.0	26.3	6.3		.65		.42		63	2.66	.27	.10	.05			.23			Sp										30	Sp	Sp	60	Tr		Bxp?	20.0	?	Md-Hf, Bx; Dark Md-Hf-SIFST, Bx; Dense, Mod Silica, Md gte vning Sp lim; Sp-Mod chlor; Tr Sulfs
26.3	31.5	5.2		.51		.30		71	2.64	.15	.10	.05			.21																							Bxp, Dark dense; Mod silica, ST patches, of Hf + SIFST, Sp chlor
31.5	41.4	9.9		.58		.26		86	2.53	.06	.15	.05			.32													20			50							Bxp, Dark dense, Mod silica, ST patches Black SIFST, Tr chlor; Sp lim
41.4	51.4	10.0		.43		.30		66	2.65	.05	.20	.05			.13														Tr		80			SIFST	41.4	99x	SIFST; Blk, Mod silica, wk Bx; patches Dp, Tr chlor, Sp lim, Tr calc
51.4	62.5	11.1		.26	996 @	.13	996 @	49	2.52	.02	.08	.03			.13												10				70			Dp	51.4	" "	Dp, Brkn, 99x; Sp lim, Tr chlor Tr 54.5' then Tr, ST silica
																																		Tr	54.5	Brkn	wk Sulfs; Tr gte vning; Tr chlor, Tr Blk Cuox
62.5	69.3	6.8		.45	.50	.25	.31	79	2.65	.15	.02	.10			.20												30	50	Sp		20							Tr; Dense, ST silicification, Tr calc, Sp cov, as sulf, Sp chlor
69.3	77.9	8.6		.31		.22		58	3.12	.12	.02	.10			.08	.01			Tr																			Tr; Alt; ST brn gas; patches Hf, Mod chlor, Sp cov, Sp py, Tr chlor
77.9	88.1	10.2		.54		.36		74	2.95	.15	.06	.15			.15	.03											50	40										Tr, as above, Alt; To 82.7' then Dp, Brkn, Alt leached, ST
																																		Dp	82.7	Brkn	gte vning; Tr chlor, Tr Blk cuox, Sp lim
88.1	93.5	5.4		.21		.18		66	2.60	.05	Tr	.15			.03																							Dp; Brkn; Alt, Leached; ST silica, Tr chlor + Blk cuox, Sp lim
93.5	99.4	5.9		.20				52	2.60	.05		.12			.03																							Dp, as above; inch in clay
99.4	109.4	10.0		1.16		.89		39	2.62	.04	.05	.80	Tr		.27													5		10								Dp, Brkn, 99x, Leached, Sp lim, Sp chlor; cont Hf frags
109.4	119.6	10.2		.44		.26		81	2.63	.11	.05	.10	Tr		.13	.05			Tr							Tr		25				25	Tr	HF	114.0	99x	Dp as above, ST lim 99 To 114.0' then Hf, Leached, Sp sulf, chlor
119.6	129.1	9.5		.18		.04		100	2.53							1.18			Sp	Sp				Tr		10	Tr	70			Tr	10	Sp					Hf, wk Bx, Alt; Sp cpy, py; Mod calc inc; Mod chlor, Tr Sp, wk gte
129.1	138.8	9.7		.62		.05		100	2.57							.62										15		70				5						Hf, wk Bx, dense, ST calc, patches Mb; Mod chlor, desp in cpy
138.8	148.4	9.6		.63		.07		100	2.60							.63										20						Sp						Hf, " " , Tr calc vning, ST Mb; Sp Sulf; Tr Hem, Mag, Mod chlor
148.4	158.1	9.7		.49		.05		96	2.63							.49										45		20		30		Tr	S		Mb	148.4	grad	Mb, " " ; patches Hf, Sp sulf, To 158.2 then ST chlor 99
																																						with frags of Hf-Mb; wk Sul To end of run
158.1	167.5	9.4		.45		.06		100	2.41							1.15										40		50		5								Mb-Hf Bx, ST calc; ST chlor; wk-Sp Sulf, Tr gte vns, Tr Hem
167.5	174.0	6.5		.71		.05		87	3.20							.71										30		62							HF	167.5	grad	Hf Bx, Mod calc, St chlor, patches Mb, Sp cpy, Tr Mag, hem, gte
174.0	184.3	10.3		.76	1020 @	.04	1020 @	100	2.53							.76																						Hf, Bx; St calc, Mod chlor, " " " Sp py " " "
184.3	193.9	9.6		.83		.05		99	2.74							.83										25		65				Sp						Hf, Bx; Mod patches of Mb + Tr, Sp-Mod cpy, St calc, Tr Mag
193.9	203.6	9.7		.59	602	.02	.04	100	2.58							.59											5	65		Sp								Hf, Bx; dense, Sp-Mod cpy-py; Sp chlor, Mod calc, Tr Mag
203.6	213.0	9.4		.94		.04		100	2.54							.94												60		5								Hf, Bx " " St calc vning; inch in cpy-py, Mod calc, Tr Tr
213.0	222.8	9.8		.72		.04		97	2.66							.72																						Hf, Bx, dense, inch in SiO_2, Sp-Mod cpy-py, St calc, Mod chlor,
222.8	231.1	8.3		.72		.02		100	2.56							.72										20		65								Bx		Hf, Bx, St calc vning, Sp-Mod cpy-py; Mod chlor, Tr Mag, Tr SiO_2
231.1	240.5	9.4		.69		.02		95	2.76							.69										30		60				Tr						Hf, Bx, as above inch in cpy; St chlor, patches Mb
240.5	249.7	9.2		.66		.02		91	3.09							.66																						Hf-Bx; St calc, St chlor; Mod cpy-py; patches Mb, Tr Mag
249.7	259.0	9.3		2.57		.02		98	2.82							2.57										10		80				Sp						Hf-Bx; Mod-St cpy; St calc, Mod chlor, patches Mb + Tr.
259.0	268.9	9.9		1.54		.04		90	2.98							1.54				Tr																		Hf-Bx, intense chlor + Tr Alt; Sp-Mod cpy, Mod calc, Tr Tr
268.9	277.7	8.8		1.34		.05		100	2.96							1.34										5	Tr	85			Sp							Hf-wk Bx; dense, ST silicification; Mod cpy, Sp calc, Tr gte vns
277.7	287.2	9.5		1.50		.03		96	2.88							1.50												Sp										Hf-wk Bx, dense, ST SiO_2; inch in chlor; Sp cpy-py, Sp calc
287.2	297.0	9.8		.81		Nil		98	2.84							.81																						Hf-Bx; Mod calc, Sp cpy, St chlor, STFT; Tr Bar, Td(?), Tr gte
297.0	306.6	9.6		1.99		Nil		100	2.60							1.99												80						Dp-pseudo	305.0	99x	Hf-Bx; as above, ST calc To 305.0' then Dp? pseudo, Sp sulfs
																																						ST SiO_2, Tr Mafics; Tr Tr,
306.6	315.7	9.1		.13		Nil		83	2.61							.13			Tr											Tr								Dp; pseudo, ST SiO_2, Tr cpy-py, Tr Moly; Sp Mafics
315.7	323.9	8.2		.09				100	2.59							.09										Tr				Sp								Dp; pseudo; 99x, 99y; Mod silica, Tr sulfs, Md gte vning
323.9	333.5	9.6		.09				99	2.58							.09																	Tr					Dp; as above, Tr sulfs
333.5	342.9	9.4		.08				91	2.62							.08																						Dp; pseudo; ST Alt; Sp sulf, Sp cpy-py, Tr Moly, Mod gte vns
342.9	352.6	9.7		.05				64	2.65							.05																						Dp " " as above Sp Sulfs
352.6	355.4	2.8		.04				51	2.63							.04														Tr								Dp; Alt, Mod Sil, Mod gte vning, Tr sulfs, Tr chlor
355.4	362.5	7.1		.08				77	2.62							.08														Sp								Dp (pseudo) as above

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5-50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-71
Page 2 of 2 Pages
Collar Elev. 2881.36 Final Depth 450.3
Coords. N 36,048.12 E 18,401.74
Inclination VERT
Logged by SAA CWH
Date Start 1-26-62 Finish 2-5-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	362.5	373.0	10.5		.05				94	2.61							.05			Tr					Tr					Tr	Sp	60	Tr	Dp pseudo			Dp (?) dense, St silicification, Mod Matics, Tr cpy-py-moly, Tr vnlets
	373.0	382.2	9.2		.04				89	2.62							.04														Tr	60						Dp (pseudo) as above
	382.2	392.2	10.0		.03				95	2.62							.03													5	Tr	65						Dp " " dense, St silicification, cont Tr cpy-py-moly.
	392.2	399.1	6.9		.06				41	2.66						.02	.04														Tr	65						Dp 1 min as above, fresh. Cov badly bx.
8x →	399.1	409.0	9.9		.06				71	2.63							.06												Tr	Tr		40						Dp? Bkn. Alt, dec in silica, sp Sec, Tr sulf, sp qtz veing
1432	409.0	417.2	8.2		.04				66	2.62							.04															35						Dp? as above, less in Matics; Tr Sel, sp sulf
	417.2	425.6	8.4		.08				85	2.56							.08															35						Dp " " begins to resemble Mz?
	425.6	433.3	7.7		.10				62	2.50							.10														Sp	20						Dp; dense, silicified, St Matics, May be Mz? Tr Sulf
	433.3	442.7	9.4		.09				48	2.59							.09															20		Mz?	433.3	Bkn	Mz; silicified, Sp-Mod Feldspathization, Mod Matics, sp qtz veing, Tr sulf
																																						This May be a St Matics Facies of the pseudo dp?
	442.7	450.3	7.6		.03				81	2.62							.03													Tr		15		Dp?	442.7	Bkn	Dp?, pseudo, Mod silica, Tr chlor, sp qtz veing Tr sulf
							Avg Rec = 84%																															
					End of Hole																																	

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D72
Page 1 of 2 Pages
Collar Elev 2881.32 Final Depth 558.7
Coords. N 36,499.06 E 17,800.33
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 1-30-62 Finish 2-12-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	Limonite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	15.0	15.0		Tr		—		—	Rock	BIT																												Rock BIT
15.0	22.6	7.6		Dump					Dump																									AK	15.0	?		AK; Dump
22.6	30.5	7.9		"					"	"																												AK; Dump
30.5	30.9	0.4		"					"	"																												AK; Dump
30.9	41.1	10.2		.06				83	2.53	.03		Tr			.03			Tr			Tr							Sp	S	Tr		Tr		Dp	39.0	Vert	AK; Dump - as above — To 39.0' Then Dp, leached ALT
41.1	49.2	8.1		.11				93	2.51	.05	.01	.02			.03			Sp											S		Tr							Dp; ALT, leached, patches st lime lim; Mod gtz veining, Tr chlor; Tr vein
49.2	59.0	9.8		.22				86	2.52	.08	.01	.03			.10			Tr										S	10									Dp; ALT, leached; Sp Lim, Mod gtz veining; Tr carb + Blk cuo, Tr Sen
59.0	67.2	8.2		.05				96	2.50	.02		.01			.02													10	S									Dp with alt in patches of Md alt. Varying degree of leaching.
67.2	76.7	9.5		.12				94	2.55	.03		.01			.08													S	10									Dp as above plus wk cc fleck & veinlets leached.
76.7	86.2	9.5		.04				93	2.51	Tr					.04													Sp	S		Tr							Dp as above in a few small areas of wk cc in cappings
86.2	94.9	8.7		.06				93	2.49	.01					.05				Tr										S				Tr					Dp, gen wk alt, some extra silica & few areas where carbonates
94.9	104.5	9.6		.07				99	2.53	.02		Tr			.05													Tr	Sp			Tr						Dp, wk alt in patches of st. clay (HCl?) sp. thin lots & veins sp cc
104.5	112.0	7.5		.09				80	2.50	.01		Tr			.08																							Dp st lim @ start, quickly decreases some sp. cc & pp, with just leaches
112.0	120.9	8.9		.12				90	2.51	.03		.01			.08																							Dp med alt, leached, tr cc @ end.
120.9	130.2	9.3		.19				88	2.54	.05	.01	.02			.11									Tr														Dp wk alt, mined cap & sulf. sulf. wk as cc & py.
130.2	139.2	9.0		.30				69	2.55	.01		Tr			.29													S	S		Tr							Dp, wk alt. leaching carb @ 130.7. Wk cc, tr moly.
139.2	146.4	8.2		.15				71	2.57						.15													SP	Tr									Dp, wk alt, sp cc, tr moly. Cons fracturing &c.
146.4	153.5	7.1		.07				80	2.58						.02	.05												Tr			SP		SP					Dp, wk ALT, Mod Silica, Tr Moly, Tr py, Tr cc, Tr Jarb, Tr sec
153.5	164.7	11.2		.06				75	2.42						.03	.03													10				Tr					Dp; as above; broken, qtz; cont Mod silica, sp feldspathization
164.7	175.4	10.7		.17				69	2.46						.12	.05													SP									Dp; Broken; wk ALT, Tr cc, py; Tr moly; Sp silica, sp feldsp, sp qtz vein
175.4	183.3	7.9		.07				86	2.56						.02	.05												Sp			Tr							Dp, ALT. Mod ser; Tr cc, py, moly; Sp qtz veing, cont Feldspathization
183.3	192.8	9.5		.12				93	2.54						.09	.03															Sp							Dp; as above, much in silicification
192.8	201.5	8.7		.12				95	2.54						.11	.01												S	Tr		Tr		Tr					Dp; ALT - mod ser, chlor Tr moly, py, cpy. Feldspar, qtz veining
201.5	209.6	8.1		.06				96	2.59						.05	.01												Sp										Dp; ALT, wk ser, mod chlor, felds. Tr cc, py, moly, cpy
209.6	219.0	9.4		.07				97	2.59						.05	.02												Tr	Sp									Dp; ALT, wk ser, Tr chlor, felds. Tr moly, px, cc, QTz veining
219.0	228.7	9.7		.06				89	2.58						.05	.01												Sp	Tr									Dp; ALT Tr ser, chlor, cons qtz, wk felds, Tr py, moly. Breccia
228.7	238.7	10.0		.07				94	2.58						.05	.02												Tr										Dp; Sp ALT; Tr Ser; Mod qtz veing; sp Feldspathic; Tr py, Tr Moly
238.7	246.0	7.3		.06				90	2.60						.05	.01													S	Sp								Dp; ALT; Mod qtz veing; sp ser; sp silica, Tr in Feldspath, Tr moly
246.0	255.4	9.4		.14				97	2.59				Tr		.12	.02												Sp	Sp	Tr								Dp; ALT; [illegible]; sp ser; cont Feldspath; Tr cc, py, moly
255.4	263.2	7.8		.08				89	2.59						.07	.01													Tr									Dp; as above, vague banding in places, Tr sulf
263.2	270.9	7.7		.07				100	2.52						.06	.01												S				Tr						Dp, ALT; Mod Silica, cc matrix, Tr qtz veing, sp sulf, sed inclus
270.9	278.1	7.2		.09				52	2.59						.08	.01													Sp									Dp; as above, cont Tr much in matrix, sp silica, Tr sulf
278.1	284.4	6.3		.08				96	2.55						.07	.01												Sp	Tr									Dp, silicified; sp ser; sp matrix, Mod qtz veing, Tr sulf
284.4	293.8	9.4		.09				97	2.59						.07	.02													Sp		Sp							Dp, dense, Mod silica; wk qtz veing; Tr ser, Tr sulf
293.8	303.5	9.7		.08				72	2.55				Tr		.07	.01												Tr										Dp; as above
303.5	311.0	7.5		.07				98	2.55						.06	.01													Tr									Dp dense silicified; contains dk Ang Frags (sed)
311.0	318.5	7.5		.06				98	2.56						.04	.02													Sp		Tr							Dp; as above, cont dk Ang Frags & Tr sulf
318.5	329.3	10.8		.10				97	2.58						.06	.04													Tr		Sp							Dp; dense; silica; Tr calc; poss sed Frag; Tr sulf
329.3	337.8	8.5		.10				97	2.53				Tr		.06	.04													Sp									Dp; as above
337.8	345.3	7.5		.18				93	2.57						.15	.03													Tr									Dp " " Sed? incl.
345.3	352.5	7.2		.12				92	2.58						.06	.06																	Sp					Dp, dense, silicif, qtz veining, Tr matrix chlorite, cpy, py
352.5	361.8	9.3		.10				95	2.58				Tr		.04	.06													Sp				Tr					Dp, ALT, mod silicif, Tr chlor, Tr moly, cpy, py, sec, Brecciation, sed incl
361.8	370.1	8.3		.10				89	2.58							.10												Sp									Dp, ALT, mod silicif, feldspath, slight [illegible] Tr chlor, Tr cpy, py, moly
370.1	379.8	9.7		.04				88	2.60							.04												Tr	S									Dp, mod silicif, feldspath, Tr chlor, Tr px, moly, Tr sed incl
379.8	389.7	9.9		.19				94	2.59							.19													Tr									Dp, as above Tr cpy [illegible] 64' deep Frags (dig. int.) at 87.3'

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3): Ts - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-72
Page 2 of 2 Pages
Collar Elev. 2881.32 Final Depth 558.7
Coords. N 36,499.06 E 17,800.33
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 1-30-62 Finish 2-12-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Jn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
389.7	393.0	3.3		.13				79	2.60							.13			Tr						Tr				Tr	Tr	Tr	SP	Tr					Dp, ALT, mod silicif, feldspath, Tr mafics. Tr sp. py, mod. Qtz veining
393.0	404.4	11.4		.05				88	2.56							.05														SP								Dp; ALT. " " " " " as above
404.4	415.7	11.3		.06				96	2.57							.06														S								Dp, alt, silica, qtz veining, dk gray frags, Tr sulf
415.7	423.5	7.8		.08				84	2.60							.08					Tr										SP							Dp; as above, cont small dk gray frags of sed (?)
423.5	432.3	8.8		.07				97	2.60							.07														SP			SP					Dp; ALT, sil, ST qtz vns; Tr chlor & sulf; cont Aug frags
432.3	441.8	9.5		.10				94	2.57							.10					Tr										Tr							Dp, ALT " , Mz text, Tr calc
441.8	449.5	7.7	—	.50	1.47 & .43	.01	1.87 & .02	77	2.61	.01						.49														15			5					Dp; int. ALT; sp calc, patches Mz; Tr sp. pyrite mod, Tr chlor
449.5	456.5	7.0		.36		.02	.05	85	2.59	.02						.34									Tr	Tr	Tr			10			SP					Dp, as above; cont patches Tr Mz / Tr chlor
456.5	466.0	9.5		.29		.02		55	3.02	.02						.27									SP	50				5					Tr	456.5	Bxn	Tr, as Bx; Mod calc veining, sp chlor, sp sp.; py, Tr mly, Tr Mag
466.0	470.7	4.7		.39		.03		86	3.10	.03						.36									S	65				5			5					Tr as above. Tr Mzn
470.7	481.0	10.3		.11				94	2.61							.11															SP		SP		Dp	470.7	Est 55	Dp; ALT, Tr chlor; Tr sulf
481.0	486.6	5.6		.10				82	2.63							.10														SP	Tr	SP	Tr					Dp; Bxn, ALT Tr chlor & Tr sulf
486.6	493.2	6.6		.08				38	2.59							.08																Tr						Dp; as above, wk patches of Tr, Tr sul
493.2	503.3	10.1		.44	1.68 & .49	.03	1.68 & .03	85	2.82	.03						.41					Tr				S	S									Tr	500.1	66	Dp, patches of monz w Tr. Tr at 500.1
503.3	510.0	6.7		.57		.04		88	2.56	.04						.53									SP	To				S				Tr	Monz	505.4	"	Tr, Bx? mod cal. vein. Then monz at 505.4 Feldspath
510.0	520.7	10.7		.18		.03		93	2.55	.03						.15														Tr	CA	SP			Dp	513.9	"	Monz; feldspath w sed inc, Then Dp at 513.9, feldspath
520.7	530.5	9.8		.15				94	2.61							.15													SP									Dp Feldspath, Mz text, Tr sulf
530.5	539.3	8.8		.18				90	2.56						Tr	.18														SP	Tr							Dp (?) " " " "
539.3	548.5	9.2		.33				99	2.60						Tr	.33													15	S		Tr			Mz	539.3	Bxn	Mz, intense ALT, ST Sericitically, STRG; Sp cpy.
548.5	558.7	10.2		.14				68	2.59							.14													Tr	Tr		SP						Mz, Silicified, Tr sulf.
					AVG Rec = 86 %																																	
				End of Hole																																		

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. U-73
Page 1 of 2 Pages
Collar Elev. 2991.10 Final Depth 541.5
Coords. N 37,102.32 E 16,659.85
Inclination Vert
Logged by SAA, FTG, CWH
Date: Start 2/6/62 Finish 2-16-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	JASPER	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	4.0	4.0		—		—		--	—																													Rock bit
4.0	14.4	10.4		.05				58	2.55	.03		.01			.01			Sp			Tr							Sp	Tr	Tr				AK				AK, wk alt, mod-st lim, Sp gtz veins, high angle, vuggy
14.4	24.0	9.6		.14				95	2.44	.07	.01	.03			.03																		Tr					As above, no visible chrys.
24.0	33.5	9.5		.04				90	2.51	.02		.01			.01																							As preceding.
33.5	42.4	8.9		.04				85	2.58	.02		.01			.01																							As preceding
42.4	53.2	10.8		.06				89	2.54	.03		.01			.02																							" "
53.2	58.2	5.0		.03				94	2.56	.02		Tr			.01																							" " , good solid core.
58.2	67.7	9.5		.08				99	2.51	.02		Tr			.06																	Tr						AK, Alt, leached. Med lim + blue lim, Sp ser, sp gtz veins
67.7	77.5	9.8		.07				86	2.52	.03		.01			.05														S		Tr						AK, as above
77.5	85.4	7.9		.07				92	2.53	.03	Tr	Tr			.04														Sp								AK, " " Tr lim.
85.4	95.0	9.6		.10				93	2.56	.04	Tr	.01			.05				Tr	Sp																	AK as above, wk to gtz veining
95.0	104.4	9.4		.10				98	2.49	.03	Tr	.02			.05														Tr								AK, leached, Alt, Med "live lim", F.G. Aplite dikes, Tr sers + SUS
104.4	114.6	10.2		.06				94	2.48	.02		.01			.03			Tr															Tr					AK, as above, cont "live lim" + Tr SUS
114.6	124.5	9.9		.10				90	2.56	.03		.01			.06													Tr	S		Tr							AK, " "
124.5	131.0	6.5		.05				100	2.49	.02		.01			.02														Sp									AK, leached, Alt, Med lim + live lim, Sp gtz veins, Sp sers
131.0	140.9	9.9		.09				97	2.51	.03	.01	.01			.04													Sp										AK, leached, Alt, wk, Tr - Sp "live lim", lim Tr ser, gtz veins
140.9	147.1	6.2		.05				100	2.49	.02	Tr	.01			.02																							AK, leached, Alt, wk, Tr "live lim" lim, Sp sers, Tr ser gtz veins
147.1	156.4	9.3		.09				95	2.46	.03	.01	.01			.04						Tr							Tr										AK, leached, Alt, wk, Tr "live lim" lim, Tr sers, ser gtz veins
156.4	163.0	6.6		.14				91	2.47	.04	.01	.02			.07																							AK, as above
163.0	190.0	27.0		—				-0-	—																													No core, old drift(?)
190.0	197.0	7.0		.77		.60		83	2.43	.53	.02	.03			.17			Sp											Sp		Tr		Tr					AK, STRT, introduction of secondary biotite
197.0	206.1	9.1		.34	33%	.18	33%	67	2.51	.13	.02	.03			.16																T							AK, as above, less lim.
206.1	216.0	9.9		.50	6	.27	8	86	2.47	.25	.01	.01			.23													Sp	S									AK, intense Alt, cont sec biot, sp chry
216.0	223.0	7.0		1.02	52	.68	40	89	2.38	.62	.03	.03			.64														Sp									AK, as above
223.0	236.7	13.7		—				-0-	-																													No core, old stope
236.7	246.3	9.6		1.20		.53		30	2.43	.50	.01	.02			.67			S											+0	Tr		Sp		Dp?	236.7	33Y	Dp (?) intense Alt, spotty, ST lim, gtz veing, Ps
246.3	250.2	3.9		1.34		.45		73	2.51	.43	.01	.01			.89														55									Dp (Bx?); " " , intense lim clay with, Dp(?) frags, sp sulfides
250.2	257.9	7.7		2.27	68.6	1.55		80	2.20	1.29	.02	.04			2.2			SP											60		S	15						Dp (Bx?) Brkn, ogy, intense Jaro, STRT, mod carb
257.9	267.4	9.5		2.22	2	1.43	66.6	57	2.21	1.36	.03	.04			.89														65			SP 10						Dp (Bx); intense Jaro lim clay gg, mod solid Dp; sp-mod carb Tr
267.4	275.5	8.1		1.67	1.24	.9	.13	88	2.16	.04	.01	.02			.70			S											50	Tr		5				BK		Dp (Bx) as above
275.5	285.5	10.0		.62		.61		80	2.68	.56	.02	.03			.01			SP											40		Tr	SP						Dp (Bx) Brkn, dark in Jaro, ggy in Part
285.5	295.6	10.1		.52		.35		66	2.56	.33	.01	.01			.17														30			Tr						Dp (Bx) as above, may be old drift at this point
295.6	305.3	9.7		.40		.18		76	2.37	.15	.01	.02			.22			S										Tr	45									Dp (Bx) Brkn ggy, sp lim, Possible old filled stope
305.3	314.4	9.1		.23		.7		86	2.53	.05	.01	.01			.16																	SP						Dp (?) Bx as above " " "
314.4	324.9	10.5		.12				95	2.26		.01	Tr			.16			SP											35			Tr						Dp (?) Bx as above " " "
324.9	328.3	3.4		.24				94	2.52		Tr	Tr			.24														15	Tr						Y		Dp as above, more solid core
328.3	336.6	8.3		.02				86	2.51	Tr					.02			Tr											Tr		Tr	SP						Dp, Alt, leached, Tr chry
336.6	344.5	7.9		.09				93	2.54	Tr					.04														SP			Tr						Dp, " " "
344.5	354.1	9.6		.09				96	2.4						.09														Tr	SP								Dp " " "
354.1	362.5	8.4		.5				82	2.42	.01					.30	.04																SP						Dp leached w/ Alt, end of oxidation, Tr SUS
362.5	372.6	10.1		.20				85	2.51	Tr					.45	.05						Tr							SP			Tr						Dp, Alt, Sp sulfs, Brkn (?) ogy
372.6	376.3	3.7		.10				98	2.57						.27	.03				Tr									Tr									Dp; " " "
376.3	385.3	9.0		.15				72	2.58						.54	.01		Tr													Tr	SP						Dp, Alt) Brkn, Tr sulfs, sp gtz veing, patches of ST calcite
385.3	395.4	10.1						71	2.54						.4																	SP						Dp, as above, Tr calcite
395.4	405.0	9.6						81	2.58						.27														SP			T						Dp " " Tr chry, Py, poly

NC-W 2400

NX → 1875

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-73
Page 2 of 2 Pages
Collar Elev 2991.10 Final Depth 541.5
Coords. N 32,102.32 E 16,659.35
Inclination Vert
Logged by SAA, KTG CWH
Date: Start 2-2-62 Finish 2-16-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys	Pitch	Black	Blue Green	Cu	Cop.	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
405.0	415.4	10.4		.3		.01		56	2.57	.04	.01	.02		.28	1.00		Tr	Tr					Tr					Tr	Tr	Tr	Tr	Tr	Tr				Dp-Meta Sed?, Bx-dist chlor patches, Mod sily, Py, Moly, jaro
415.4	422.8	7.4		.12		.20		.3	2.60	.15	.04	.03		.40	1.52		Tr	Tr					Tr					Tr	Sp	Tr		Tr	Tr				Dp. Meta-Sed? as above
422.8	430.0	7.4		.35	.25	.19	.15	.31	2.61					.05	.30																						Dp-SITST?; Tr chlor, jaro, Mod silicif, Sp sulf, End of Ord
430.0	436.2	6.2		.08	.6	.10	.2	.66	2.60					.08	.100																						Dp-SITST?; High mafics, mod clay, alt, Tr sulf, Dark Facies
436.2	446.8	10.6		.08	.93	.6	.08	.44	2.64					.08	.80																						Dp-SITST? as above
446.8	456.5	9.7		.18		.04		.32	2.65					Tr	.48																						Dp-SITST? ST silicification, dk, Sp-Mod sulf
456.5	464.7	8.2		.14		.05		.65	2.57	.02		.03		.09																			AND	456.5	?	AND, Porph tuff, dk, Mod qtz bns, Tr sulf
464.7	474.6	9.9		.26		.03		.71	2.56					.10	.36													S		Tr	Tr		DP	464.7	Brkd	Dp, mod clay, mod silicif, Mod sulf
474.6	482.3	7.7		.68	1.65	.03	1.65	.49	2.54					.08	.68		Tr											Tr		P							Dp, brkn, as above Tr CB
482.3	491.1	8.8		.62	.65	.01	.02	.71	2.60						.62													SP			SP						Dp, brkn, dk clay, slicks, Incr mafics
491.1	496.8	5.7		.21		.02		.44	2.54					.02	.29																Tr						Dp, as above
496.8	505.4	8.6		.23				.85	2.57					.02	.21													Tr					Mz	496.8	Brkn	Mz, Intense silicification, Tr cpx-Moly
505.4	514.6	9.2		.15				.86	2.55						.15																						Mz, " " Sp Sex "
514.6	524.9	10.3		.12				.72	2.59						.12																Tr						Mz, as above
524.9	529.1	4.2		.09				.85	2.6						.09																						Mz, " "
529.1	537.5	8.4		.22				.85	2.57						.22																						Mz, ST silica, Tr cpx-Moly, Poor recov
537.5	541.5	4.0		.11				.9	2.53						.11																						Mz " " " "

Ave Rec = 77%

End of Hole

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-74
Page 1 of 1 Pages
Collar Elev. 2954.93 Final Depth 375.8
Coords N 36,260.49 E 18,579.83
Inclination VERT.
Logged by SAA - CWA - PTG
Date: Start 2-5-62 Finish 2-10-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	6.4	6.4						Rock	Bit																												Rock Bit
NX-7 1.875	6.4	15.6	9.2		.09				83	2.57	.04	.09	.02			.02			Tr										Tr	Tr	Tr				Dp	6.4	?	Dp, Sp Alt, wk leached
	15.6	23.0	7.4		.07				94	2.55	.03	.01	.01			.02																						Dp " "
	23.0	34.9	11.9		.06				56	2.57	.02	.01	.01			.02				Tr												Tr	Tr	Tr				Dp " "
	34.9	45.7	10.8		.07				86	2.58	.03	.01	.01			.02																						Dp " "
	45.7	54.9	9.2		.08				91	2.57	.02	.01	.01			.04				Tr																		Dp " "
	54.9	64.8	9.9		.11				78	2.50	.05	.01	.02			.03																						Dp, banded chaky material (close And contact?), brkn
	64.8	73.2	8.4		.07				70	2.58	.04	.01	.01			.01														Sp								Dp, brkn
	73.2	76.0	2.8		.05				81	2.56	.02	Tr	.01			.02																						Dp, wk Alt, - leached
	76.0	85.6	9.6		.43		.28		58	2.58	.20	.03	.05			.15				Tr																		Dp " "
	85.6	95.5	9.9		.09				76	2.58	.05	.01	.01			.02																						Dp, " "
	95.5	104.0	8.5		.09				80	2.57	.05	.01	.01			.02																						Dp, Alt st leached
	104.0	115.7	11.7		.05				76	2.54	.02	Tr	.01			.02																						Dp " " To Sulf
	115.7	122.8	7.1		.04				100	2.55	.02	Tr	Tr			.02														Tr					AND	122.4	56°	Dp as above To 122.4' Then Post min And dike
	122.8	131.8	9.0		.02				100	2.36	.01		.01																									AND, Post min dike
	131.8	141.6	9.8		.02				93	2.51	.01		.01																									AND, " "
	141.6	150.9	9.3		.01				96	2.55			.01																									AND " "
	150.9	160.8	9.9		.01				90	2.56			.01																Tr	Tr		Tr			Dp	152.9	99°	AND To 152.9 thru Dp, leached
	160.8	171.6	10.8		.03				94	2.45	.02		.01			Tr			Tr																AND	164.4	25°	Dp To 164.4' Then AND (post min dike)
	171.6	181.2	9.6		.01				94	2.59			.01																									AND, Post min dike
	181.2	185.6	4.4		.02				92	2.51	.01		.01			Tr													Tr	Tr					Dp	182.6	30°	AND To 182.6 Then Dp leached
	185.6	194.8	9.2		.01				92	2.55			.01																						AND	186.2	35°	Dp To 186.2' Then AND dike (post min)
	194.8	202.5	7.7		.07				85	2.55	.02	.01	.01			.03				Tr									Tr	Tr					Dp	198.0	"	AND To 198.0 Then Dp, Alt, Leached, To Chky
	202.5	209.4	6.9		.08				90	2.51	.03	.01	.01			.03																						Dp, Alt, Leached, Brkn, To Chky
	209.4	218.6	9.2		.03				95	2.60	.02		.01																						AND	209.4	Brkn	AND, Post min dike
	218.6	228.4	9.8		.02				95	2.55	.01		.01						Tr																			AND, " " "
	228.4	237.0	10.6		.02				60	2.72	.01		.01																Tr						Dp	228.4	Brkn	Dp w. more Tex To 233.9 Then And dike (post-min)
																																			And	233.9	Brkn	
	237.0	248.4	9.4		.01				99	2.50			.01																									And, (post min dike)
	248.4	257.8	9.4		Nil				96	2.57																												And "
	257.8	266.1	8.3		.08				90	2.61						.08				Tr					Tr				Tr	Tr	Tr		Tr		Dp	261.7	Brkn	And (") To 261.7, Then Dp w. Tr sed. incl
	266.1	273.5	7.4		.14				100	2.57						.14																						Dp, less mafics
	273.5	281.8	8.3		.07				78	2.54						.07																			And	280.9	Brkn	Dp, To 280.9, Then And (post-min dike) bleaching veinlets
	281.8	288.2	6.4		.02				95	2.31			.02																									AND, (post min dike)
	288.2	297.0	8.8		.12				94	2.57						.09	.08			Tr					Tr				Tr	Tr	Tr	Tr	Tr		Dp	290.0	"	AND " " To 290.0' Then Dp
	297.0	307.2	10.2		.34				79	2.58						.04	30																					Dp Tr cp, cp, Tr sed patches AND
	307.2	316.0	8.8		.14				100	2.62						.14																						Dp, Alt, To 308, cc, mly
	316.0	325.7	9.7		.08				92	2.51						.08																			AND	317.5		Dp " " To 317.5' Then Post min And dike
	325.7	335.1	9.4		.02				100	2.31			.02?																									AND " "
	335.1	345.0	9.9		.07				95	2.56						.02	.05			Tr					Tr				Tr	Tr	Tr		Tr					AND, Patches alt Mz
	345.0	352.2	7.2		.21				88	2.60						.21																			Mz	345.0	Brkn	Mz; Alt; Tr cp; py, Moly, Tr sed
	352.2	360.9	8.7		.16				98	2.47						.16																			And	356.5	88°	Mz; as above To 356.5' Then AND (post min)
	360.9	368.2	7.3		.05				98	2.35						.05																						AND, Post min, Patches Alt Mz
	368.2	375.8	7.6		.16				95	2.48						.16																			Mz And	368.8	Brkn	Mz; Post min And To 368.8 Then Mz Mz, with patches AND, 368.8' And
	END OF HOLE						Avg	Rec =	88%																													

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Docite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-75
Page 1 of 2 Pages
Collar Elev 3009.08 Final Depth 412.2
Coords. N 36050.93 E 18,201.47
Inclination Vert
Logged by SMA - CWH - FTG
Date: Start 2-10-62 Finish 2-20-62

	Depth From	Depth To	Intvl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	8.8	8.8						Rock	B.T																													Rock B.T
NX → 1.875	8.8	17.8	9.0		.16				61	2.56	.09	.01	.03			.03			Tr											Tr	SP	Tr		Tr		Dp	8.2	D	Dp, Clay, Tr dk Ang Frags
	17.8	26.6	8.8		.20				79	2.53	.13	.01	.02			.04																							Dp " "
	26.6	33.3	6.7		.20				48	2.55	.13	.01	.02			.04																							Dp, seen
	33.3	43.9	10.6		.18				53	2.56	.11	.01	.03			.03																							Dp " "
	43.9	52.0	8.1		.12				84	2.57	.06	.01	.02			.03														10									Dp
	52.0	61.7	9.7		.11				59	2.58	.05	.01	.02			.03														10									Dp as above cgr matrix
	61.7	71.4	9.7		.16				83	2.56	.09	.01	.02			.04														5									Dp, broken Tr sed frags
	71.4	80.5	9.1		.11				73	2.58	.04	.02	.02			.03														SP									Dp, as above light colored mgy alt patch
	80.5	83.3	2.8		.14				93	2.58	.07	Tr	.03			.04				Tr										5				Tr					Dp, broken Tr dk incl
	83.3	90.6	7.3		.14				90	2.57	.06	.01	.03			.04														SP									Dp, Brsh, Alt bleached
	90.6	99.8	9.2		.19				91	2.56	.05	.01	.02			.11														Tr									Dp; as above Tr sulfs.
	99.8	107.1	7.3		.22				90	2.54	.05	Tr	.01			.12														SP									Dp " " Tr sed incl
	107.1	116.6	9.5		.14				98	2.50	.02	1	Tr			.12													SP	5									Dp; Brsh, Alt leached or sleeve, Tr sed incl
	116.6	125.0	8.4		.14				92	2.56	.02	1	1			.12														10									Dp, as above
	125.0	133.5	8.5		.16				90	2.50	.02	1	1			.14														5	30								Dp; as above Then alt clay alt to 30% End of oxid
	133.5	144.3	10.8		.11				86	2.63	.02	1	Tr			.09						Tr								5	5								Dp, alt clay alt Tr SP, Tr dk fgs as Dp Sp sed incl Tr sub
	144.3	150.4	6.1		.12				100	2.61	.01		Tr			.11														SP			SP						Dp, dk frags, SP sed incl Tr of T frags (mass TcaT non-p)
	150.4	159.4	9.0		.08				50	2.61						.08														10			Tr						Dp, as above
	159.4	168.2	8.8		.07				99	2.60						.06	.01		Tr						Tr					SP			SP						Dp; alt, sericitized, Tr sulfs
	168.2	176.3	8.7		.07				86	2.60						.06	.01													5									Dp, " " Tr Moly
	176.3	182.9	6.0		.07				94	2.63						.07	Tr																Tr						Dp " "
	182.9	193.0	10.1		.37				100	2.99						.30	.07					Tr									Tr		SP						Dp(?), dk, st matrix, Mod cpy in Tr calc veins
	193.0	203.3	10.3		.08				92	2.54						.08	Tr													SP	5			Tr					Dp; alt, sericitized, Tr sulfs
	203.3	213.4	10.1		.10				98	2.60						.10	Tr													SP									Dp, as above
	213.4	223.2	9.8		.08				81	2.63						.07	.01													5									Dp " " alt patch strongly alt rk
	223.2	227.3	4.1		.06				95	2.61						.06	Tr													SP									Dp, " Tr dk ang frag
	227.3	235.8	8.5		.07				100	2.61						.07	Tr													Tr									Dp, " dark in matrix Tr banded incl
	235.8	242.6	6.8		.09				74	2.59						.05	.04																						Dp " " SP matrix, Tr cc
	242.6	250.1	7.5		.11				100	2.60						.06	.05																						Dp " " "
	250.1	260.0	9.9		.10				88	2.63						.04	.06												Tr	5		10							Dp alt, sericitized Tr sulfs
	260.0	271.9	11.9		.12				92	2.61						.12	.10													5		15							Dp " " "
	271.9	278.0	6.1		.08				97	2.59						Tr	.08													Tr		10							Dp " " "
	278.0	283.4	5.4		.11				100	2.57						.03	.08															5							Dp " " "
	283.4	292.6	7.0		.10				83	2.60						.04	.06															5	Tr						Dp, Mod silicif, Tr feldspath, Mc TcaT, Tr sulfs
	292.6	299.8	6.7		.21				96	2.61						.02	.19															10							Dp; as above Tr dk incl.
	299.8	308.1	8.1		.09				94	2.61							.09													SP		10							Dp, " "
	308.1	311.1	2.7		.05				99	2.65							.05															5							Dp; " " "
	311.1	312.3	1.2		—				NC	C.80																													NO CORE
	312.3	319.7	7.2		.07				100	2.64							.07			Tr										Tr	Tr	50				MeTSed	316.3	grad	Dp; as above To 316.3, Then qtz rich, contorted rock Dk (matrix) + lgT (Tr) layers Brsh, silicif sed? Tr sulfs, feldspath (Ribbon Rock ?)
	319.7	330.2	8.5		.06				82	2.67							.06													Tr	5		50							MeT sed (?) as above To 326.6 Then st clay alt Bx
	330.2	338.9	9.1		.13				100	2.58							.13								Tr						5		20							MeT sed (?) st clay alt bx. To 332.7, Then MeTa sed.
	338.9	348.1	9.5		.08				75	2.69							.08														SP		30							MeT sed (?), grading To apparent Dp at 345.5
	348.1	357.4	9.3		.09				39	2.63							.09																15			Dp	348.1	grad	Dp, mod silicif, patches of apparent MeTa seds

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5-50 %
Stong (St) + 50 %

Note (3)
Tt - Toctite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-75
Page 2 of 2 Pages
Collar Elev 3009.8 Final Depth 412.2
Coords. N 36,050.93 E 18,801.47
Inclination Vert
Logged by SAA - CWN - FTG
Date: Start 2-10-62 Finish 2-20-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem	Spec.	Other (2) Galena	Spinel	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
357.4	365.6	8.2		.10				91	2.64							.10			Tr						Tr				Tr	Tr	Tr	40						Op, mod silicif Patches of copper meta sed
365.6	376.5			.09				95	2.68							.09																30			Metased	365.6	grad	Metased, mod silicif. Sp folding in banding Tr sulf
376.5	384.4			.08				30	2.60							.08																55						Meta sed, as above. Clay alt patches.
384.4	393.9			.07				95	2.62							.07																60						Meta sed, possib Op patches lit silicif + feldspath patches
393.9	404.1			.05				88	2.59							.05													S			30	Tr		Op.	397.1	grad	Meta sed, as above Grad To st silicif Op at 397.1
404.1	408.7			.07				87	2.61							.07													Sp			55						Op, st silicif mod clay patches. Tr sulf
408.7	412.2			.06				92	2.60							.06																10						Op " " " Tr sulf
						AVG	Rec =	86																														
					End	of	Hole																															

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. U-15
Page 1 of 1 Pages
Collar Elev. 2902.01 Final Depth 366.5
Coords. N 36,349.35 E 15,200.44
Inclination VERT
Logged by SAA - ETS - WWW
Date Start 2-12-62 Finish 2-20-62

D76

Depth From	Depth To	Intvl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Native	Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	40.8	40.8		—				Rock	B.T																									—			Rock B.T
Mx → 40.8	49.0	8.2		.42	2.56	.33	2.56	94	2.22	.31	.01	.01			.09			SP			Tr						Tr	SP	10	Tr		Tr	Tr	Dp			Dp; Brkn, leached, SP ok frags, Then ST clay-jaro alT to T 63. No cak
1875 49.0	59.0	10.0		1.52	1.12	1.23	.92	80	2.39	1.19	.02	.02			.29			5										Tr	25				5				Dp, as above, less alT intense As like, mod chry
59.0	61.3	2.3		1.33		1.08		100	2.14	1.07	Tr	.01			.25			60											10				5				Dp(?), intense lim clay, se chry
61.3	66.4	5.1		1.37		1.17				1.13	.02	.02			.20			10											25				SP				Dp(?), as above Tr chry
66.4	72.7	6.3						No	Core																												Cavity
72.7	82.6	9.7		.24	.17	.51	.37	68	2.50	.48	.02	.01			.33			5										Tr	30			Tr	SP				Dp? (bx?), intense lim, clay alT Tr chry
82.6	92.4	9.8		.22	.33	.16	.34	100	2.41	.16	Tr	Tr			.06			SP										SP	10	Tr	Tr		Tr	And	87.7	30°	Dp; brkn, mod clay. Then And (post mn dike) aT 87.7
92.4	100.6	8.2		.19				90	2.46	.10	.02	.02			.05														SP			SP					And (post mn dike)
100.6	108.7	8.1		.18				56	2.57	.14	.01	.01			.02														5	Tr	Tr	Tr	Tr	Dp	101.1	brkn	And (post mn dike) To 101.1, Then Dp; brkn, Tr chry
108.7	117.4	8.7		.32				92	2.57	.18	.01	.01			.02														SP			SP		Dp mg	115.4	good	Dp; brkn w ok ang frags To 115.4 Then Dp migmaTite (?)
																																					migmaTite 0.2" Lands of mafic (?) or metallic min (?) w Dp
117.4	125.7	8.3		.35				83	2.54	.31	.01	.01			.02													SP	5	P		5		Dp	119.0	brkn	Dp, migmaTite TexT To 119.0 Then Dp; ST clay - jaro alT To
																																		Monz	122.2	brkn	122.2, Then Monz To 125.7
125.7	131.6	5.9		.30				100	2.62	.26	.01	.01			.02				Tr									SP	SP	Tr		SP		Dp mg	125.7	brkn	Dp, migmaTite TexT
131.6	140.8	9.2		.22				79	2.58	.14	.01	.02			.05			Tr											Tr				Tr				Dp; excess migmaTite patches
140.8	149.9	9.1		.08		.08		95	2.56	.07	Tr	.01			Tr			SP														Tr					Dp; migmaTite patches, Tr dk mnl, Tr suls Tr monz TexT
149.9	157.5	7.6		.09		.08		76	2.55	.07	Tr	.01			.01			Tr										Tr						Dp	149.9	good	Dp, Tr feldspath, Tr suls
157.5	166.5	9.0		4.58		4.14		71	2.80	4.00	.04	.10			.44			5											25			SP	5				Dp; To 159.6 Then inT clay - lim alT SP chry (Dp bx). No cak
166.5	176.1	9.6		2.10	3.69	2.04	3.69	74	2.29	2.00	.01	.03			.36			10											30				10				Dp; bx inT lim - clay - jaro alT Sp chry (higher To center of bx zone)
176.1	182.3	6.2		1.58	2.86	1.35	2.04	100	2.32	1.50	.03	.05			.23			5											20				20				Dp, mod clay - jaro alT SP bx patches
182.3	189.4	7.1		3.39		1.26		86	2.67	1.60	.02	.04		.20	.53	1.60		10	SP		Tr								15		5	10			Bx		Dp; bx lnT clay - jaro alT mod suls, chry less alT patches
189.4	194.4	5.0		1.49		.21		95	2.50	.17	.01	.03			1.00	.28		SP	Tr										10	Tr	10	5					Dp, bx Dp frags visible. ST clay - chlor alT. SP suls
194.4	201.6	7.2		.34		.16		94	2.58	.11	.01	.04			.30	.04													10		5	5					Dp; Tr feldspath Tr chry suls
201.6	210.8	9.2		.10				99	2.59	.01	Tr	.01			.08	Tr		Tr			Tr								P		SP	Tr		Monz	205.5	good	Dp, as above To 205.5, Then more Tr suls
210.8	219.7	8.9		.06				91	2.54			.01			.05													Tr	5					Dp	210.8	Bx	Dp, like, Tr dk incl
219.7	229.3	9.6		.06				95	2.54			.01			.05						Tr								8				SP				Dp, Tr feldspath, Tr suls
229.3	238.4	8.1		.08				76	2.53		Tr	.01			.01	Tr													5								Dp, " Tr dk frags. Incr matrix
238.4	248.2	9.8		.09				94	2.53			.01			.06	.02													SP			Tr	Tr				Dp, as above, incr feldspath
248.2	256.3	8.1		.09				92	2.56						.03	.06														Tr				Dp-Bx	251.6	good	Dp, Bx, solid. cemented Bx; mod felds
256.3	265.6	9.3		.05				76	2.64						.03	.02							Tr	Tr						SP	SP			DP	265.6	Bxw	Dp, dense, high Sio2
265.6	276.9	11.3		.06				95	2.51						.03	.03					Tr																Dp, " " Tr sew, Tr suls
276.9	286.0	9.1		.08				95	2.60						Tr	.08													5			5					Dp, " incr in Matrix
286.0	293.8	7.8		.03				98	2.59						.01	.02												Tr		Tr	SP						Dp as above, last ft. $9x
293.8	299.6	5.8		.07				98	2.65							.07													SP			5		Mz	293.8	Bxw	Mz, good core, Sta matrix
299.6	309.4	9.8		.05				94	2.69							.05													P			SP					Mz, " " sp feldspathization
309.4	313.9	4.5		.06				100	2.62							.06												Tr	5								Mz, as above
313.9	323.0			.07				95	2.64							.07													SP								Mz,
323.0	332.5			.05				93	2.76							.05												SP									Mz, " Tr suls
332.5	342.5			.07				99	2.62							.07												Tr									Mz, " wk clay alT Tr suls
342.5	351.1			.11				100	2.67							.11													5			Tr					Mz; as above
351.1	359.3			.08				95	2.66							.08								Tr					P					Mz bx	359.0	45°	Mz, " grading To Mz bx w feldsp frags aT 359.0
359.3	366.5			.10				100	2.66							.10					Tr							S	S			S					Mz; feldspath frags Tr cnl - clay alT Tr suls
						Ms	Sec.	88%																													

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-77
Page 1 of 2 Pages
Collar Elev 2808.80 Final Depth 591.0
Coords. N 32,400.18 E 16400.41
Inclination VERT
Logged by SAA - CWH - FTG
Date: Start 2-17-62 Finish 3-9-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	50.0	50.0						Rock	BIT																												Rock BIT
NX 1.875	50.0	60.0	10.0		.18				69	2.53	.13	.01	.03			.02			SP											SP	10	Tr		Tr	Tr	Dp	50.0	?	Dp, leached, Alt, Md Lim
	60.0	70.8	10.8		.27				82	2.49	.18	.02	.04			.03															15								Dp, brkn, leached, mod lim
	70.8	79.3	8.5		.16				71	2.57	.11	.01	.02			.02			Tr											Tr	5								Dp, brkn, leached, mod clay - jaro - lim alT
	79.3	85.4	6.1		.14				96	2.55	.09	.01	.02			.02															Tr								Dp, wk clay - jaro alT, leached
	85.4	90.9	5.5		.24		.15		76	2.61	.10	.02	.03			.08	.01		SP	Tr												Tr	Tr					Dp, mod silicif, Tr sulfs
	90.9	100.3	9.4		.79	35% @ .54	.43	35% @ .58	96	2.54	.36	.02	.05			.30	.06																						Dp, wk clay - jaro alT Tr chrys sulfs
	100.3	109.2	8.9		.61		.49		95	2.56	.45	.01	.03			.12														SP	SP								Dp, as above
	109.2	117.0	7.8		.19		.09		97	2.55	.06	Tr	.01			.10			Tr																				Dp, Mod Sert, Tr clay-sulfs
	117.0	126.3	9.3		.50		.09		89	2.61	.07	Tr	.02			.41				Tr										Tr	Tr		Tr						Dp, St Alt, Mod Lim, Tr chrysos
	126.3	135.6	9.3		.27		.03		99	2.52	.03		Tr			.24						Tr								SP				Tr					Dp, " " as above
	135.6	145.2	9.6		.12				92	2.55	.06	.01	.02			.03			SP												SP								Dp, Alt, Tr sen, Tr cpy
	145.2	155.2	10.0		.26				95	2.58	.03	Tr	.01			.22			Tr	Tr																			Dp, Alt, Mod lim, mod cc
	155.2	164.3	9.1		.20				90	2.59	.10	.01	.02			.07														Tr									Dp, wk lim - jaro alT, mod silicif Mod Text alT
	164.3	170.8	6.5		.31		.18		83	2.52	.15	.01	.02			.10	.03		SP			Tr									S		Tr						Dp, wk lim - jaro alT, Tr sulfs Mod Text alT
	170.8	180.2	9.4		.53	93 @ .52	.16	93 @ .16	37	2.56	.14	Tr	.02			.39	.07		Tr												10								Dp, sT clay - jaro alT
	180.2	189.9	9.9		.21		.10		82	2.60	.07	.01	.02			.11	Tr														SP								Dp, wk jaro alT Sp lim
	189.9	198.3	8.4		.15				88	2.55	.07	Tr	.01			.07	Tr														Tr								Dp, wk jaro alT Incr matrix
	198.3	206.5	8.2		.26				100	2.57	.05	Tr	.01			.20	Tr																						Dp, " " Matrix, Tr cc, py
	206.5	215.8	9.3		.32		.08		94	2.58	.05	.01	.02			.30	.02											Tr											Dp, Tr lim; sp matrix, Tr cc, py, cpy
	215.8	224.7	8.9		.41		.08		99	2.57	.05	.01	.02			.30	.03														SP			Tr					Dp, " " as above
	224.7	233.5	8.8		1.14	47.2	.13	47.2	88	2.62						.25	.06														Tr								Sp, Tr cc; sp cpy as units
	233.5	243.4	9.9		.31	@ .55	.04	@ .06	93	2.59						.24	.07			SP								Tr					Tr						Dp, ST Alt, sp cc, Tr cpy-py
	243.4	253.2	9.8		.46		.05		95	2.54						.30	.16														5		SP			Mz	249.7	Brkn	Dp; Tr lim, " " To 249.7 Then Mz Alt
	253.2	263.0	9.8		.37		.01		76	2.51						.07	.30														SP		S			Dq	255.5	Brkn	Mz; mod clay - jaro alT To 255.5, Then Dp, mod silicif Tr sulfs
	263.0	272.0	9.0		.26				91	2.58						Tr	.26																SP						Dp, mod silicif, Tr sulfs
	272.0	282.9	10.9		.29				87	2.60							.29														Tr		S						Dp, as above
	282.9	291.9	9.0		.27				72	2.59							.27														SP		10						Dp; wk Alt, sp cc, py, Tr Moly
	291.9	299.1	7.2		.14				88	2.60							.14														Tr		15						Dp, as above, Mod Silicification
	299.1	308.2	9.1		.13				85	2.60						.03	.10			Tr													8						Dp, as above "
	308.2	316.4	8.2		.15				59	2.63							.15																5						Dp, " Tr eng ind
	316.4	325.9	9.5		.14				91	2.61							.14														SP		5						Dp, as above
	325.9	335.0	9.1		.15				68	2.64							.15													Tr	Tr		5						Dp, " incr matrix Tr sulfs
	335.0	345.2	10.2		.12				59	2.62							.12																SP						Dp, brkn, wk clay alT Mod silicif Tr sulfs
	345.2	353.0	7.8		.09				66	2.59							.09														SP								Dp, brkn, wk clay, mod silicif Mz Text Tr sulfs
	353.0	359.2	6.2		.16				77	2.59							.16																						Dp, as above
	359.2	367.3	10.1		.10				63	2.60							.10														Tr								Dp, wk clay, silicif Tr sulfs
	367.3	379.6	10.3		.03				77	2.60							.03														SP								Dp; as above wk Mz Text
	379.6	389.3	9.7		.10				77	2.48							.10																	Tr					Dp, " Mz at 386.0 for 6 in
	389.3	399.6	10.3		.06				89	2.60							.06																						Dp, mod silicif
	399.6	409.0	9.4		.13				73	2.58							.13																	Tr					Dp, as above Tr sulfs
	409.0	419.0	10.0		.05				46	2.56							.05														S		Tr						Dp, " "
8 X → 1.932	419.0	426.2	6.2		.93	140 @	.02	140 @	31	2.76							.93									S	S	S	S		40								Dp, brkn Int clay alT ST sulfs, Tr pyrrhotite
	426.2	434.0	7.8		2.26	1.67	.05	.03	22	2.37							2.26			10						10	30	30			30						Tt	426.2	brkn	Tt, brkn ST gary, ST sulfs
	434.0	436.4	2.4						0	0																												Tt Core

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Note (3): Tt - Toctite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-77

Page 2 of 2 Pages

Collar Elev. 2802.80 Final Depth 591.0

Coords. N 37,400.18 E 16,400.44

Inclination VERT

Logged by SAA - CWH - FTG

Date: Start 2-17-62 Finish 3-9-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov.	Sp. Gr.	Cu (1): Chrys.	Pitch	Black	Blue Green	Cc.	Cpy.	Born	Fe (2): Lim.	Py.	Mag.	Hem.	Spec.	Other (2): Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz.	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
436.4	444.4	8.0		.14		.03		4	3.39						.14								Tr		85	5				Tr						Tt; pure gar, Tr. sulf.
444.4	449.4	5.0		1.24	8.1	.03	.01	10	2.97						1.24		Tr								30	5		40	Tr		Tr					Tt; lower part int alt Dp Tr sulfs
449.4	452.4	3.1		.34	1.20	.02	.03	39	2.42						.34													45		Tr	SP		Dp ?	449.4	broken	Dp; st. clay alt, Tr sulfs
452.4	461.4	8.9		.11		.03		46	2.97						.11								Tr					30		5						Dp.? " " Sp sulfs
461.4	471.2	9.8		.32		.04		17	3.42						.32										65	5		10		SP			Tt	468.7	broken	Dp? as above To 468.2 Then Tt, massive gar, Mod sulf
471.2	476.7	5.5		.76		.02		18	3.05						.76										85	5										Tt, massive, low gar; Mod sulf
476.7	485.0	8.3		.49	2.46	.02	28.6	8	2.65						.49								Tr	Tr	60	30		10			SP		Dp	481.8	broken	Tt " " broken, sandy, Mod sulf To 481.8 then Dp?
485.0	486.0	1.0		.96	3.66	.03	.02	77	3.20						.96										70	5		15			SP		Tt	485.0	" "	Tt, bra gar, sandy Tt; wk clay matrix; fine gr. Mod sulf
486.0	492.2	6.2		.58		.01		18	2.77						.58										70	25		5		Tr						Tt, " " " becomes more solid
492.2	499.8	7.6		.80		.02		23	2.53						.80									5	20	70		SP			TH		Hf	492.2	broken	Hf; Tt Silica, patches Ig? Dp or meta Sed
499.8	508.0	8.2		.23		.05		86	2.66						.23									5	25	70										Hf (?); st sulf May be meta Sed near Ig contact
508.0	517.9	9.9		.32		.03		62	2.68						.32								Tr	SP	10	65		Tr		25			ms	508.0	broken	Meta Sed; broken Mod silicif, Tr sulf Tr Hf, Tt, Dp
517.9	527.3	9.4		.47		.05		83	2.55						.47										70	20			SP	20						Meta Sed, as above
527.3	536.2	8.9		.56	3.52	.04	.52	72	2.72						.56									10	5	70		SP	Tr	15	SP		Hf	528.5	broken	Meta Sed, " " To 528.5 Then Hf, wk clay, Mod sulfs
536.2	543.8	7.6		.68	.55	.02	.04	58	2.74						.68									10	5	70				15						Hf, Mod silicif Tr Mz, Dp, Meta Sed Tr sulfs
543.8	553.1	9.3		.54		.03		50	2.62						.54									10	5	65				10						Hf, broken, Mod silicif, wk clay alt Tr sulfs
553.1	558.8	5.7		.38		.02		66	2.63						.38									15	SP	60				10	5					Hf, as above, SP sulfs
558.8	562.0	3.2	NO	CORE				0	0																											No Core
562.0	570.0	8.0		.49		.01		45	2.63						.49		Tr						Tr					Tr	Tr	8	Tr		Mz	563.3	broken	Mz Mod silicif, SP sulfs
570.0	578.1	8.1		.42	2.78	.03	.29	51	2.63						.42															15						Mz, as above
578.1	586.3	8.2		.87	.60	.03	.03	47	2.63						.87													Tr	SP		SP					Mz, wk silicif, wk clay alt SP sulfs Dar mafics
586.3	591.0	4.7		.64		.04		61	2.63						.64													Tr								Mz, as above

AVG Recv. 70%

END OF Hole

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-78
Page 1 of 1 Pages
Collar Elev 2899.00 Final Depth 403.2
Coords. N 36,348.93 E 18,400.47
Inclination Vert
Logged by SAA : FTG
Date: Start 2/20/62 Finish 2/28/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Chrys.	Pyph	Black	Blue Green		Cc.	Cpy.	Born	Lim.	Py	Mag.	Hem	Spec.	Galena	Sphal.	Molyb	Calcite	Garnet	Stibnites	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	UNKNOWN	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
	0.0	30.0	30.0						Rock	Bit						.																							Rock bit
NX → 1.875	30.0	38.7	8.7		.11				91	2.56	.06	.01	.02			.02			Tr											Sp	Sp	Tr		Tr		Dp	30.0	?	Dp; wk alt, Sp lim, mod mafics
	38.7	49.1	10.4		.10				74	2.59	.06	Tr	.02			.02																							Dp; as above
	49.1	60.0	10.9		.07				91	2.54	.04	Tr	.02			.01																							Dp; wk alt, wk lim, Tr chrys + Silicon
	60.0	70.0	10.0		.08				83	2.57	.04	.01	.01			.02				Tr																			Dp, as above; Tr sulf
	70.0	79.3	9.3		.14				70	2.56	.08	.02	.02			.02														Tr				Tr					Dp; Sp-Mod Mafics
	79.3	88.9	9.6		.15				89	2.58	.02	.01	.02			.04																Sp							Dp; mod silicif, leached wk lim
	88.9	96.4	7.5		.10				87	2.59	.06	.01	.02			.01														Sp	S	Tr		Tr					Dp; leached, mod clay alt wk lim
	96.4	106.7	10.3		.10				93	2.59	.05	.01	.02			.02														Tr	Sp								Dp, leached, incr mafics Tr lim, feldspath
	106.7	115.2	8.5		.10				75	2.58	.06	.01	.01			.02																							Dp; as above
	115.2	124.5	9.3		.17				94	2.59	.10	.04	.01			.05						Tr																	Dp; " patch of Monz. Text
	124.5	132.6	8.1		.06				76	2.59	.05	.01	.01			.01															Tr								Dp; as above
	132.6	141.4	8.8		.07				100	2.59	.03	.01	.01			.02						Tr										Sp							Dp, " "
	141.4	151.3	9.9		.10				90	2.61	.06	.01	.01			.02														Sp		Tr							Dp, Tr lim, wk alt, Tr chrys
	151.3	158.4	7.1		.13				90	2.60	.07	.01	.01			.04																							Dp; as above
	158.4	169.0	10.6		.16				94	2.57	.10	.01	.01			.04						Tr																	Dp; " " Patches Mz Text
	169.0	178.3	9.3		.09				90	2.59	.05	.01	.01			.02																		Tr					Dp; " " " " Tr sulf
	178.3	184.5	6.2		.13				94	2.60	.06	.01	.01			.05																							Dp, leached alt, wk lim, Tr sulf
	184.5	191.0	6.5		.28				96	2.59	.08	.01	.01			.15	Tr					Tr								Sp						Mz	184.5	Brk	Mz; Alt, leached: Tr chrys
	191.0	198.6	7.6		.21				93	2.56	Tr	.01	.02			.18									Tr				Sp	Tr									Mz, wk lim, clay Tr sulf
	198.6	206.8	8.2		.22				98	2.59		Tr	.01			.17	.04												Tr										Mz, as above 5" patches, mod clay alt
	206.8	213.6	6.8		.26				96	2.58		Tr	.01			.17	.09													Sp									Mz; wk lim, clay Tr sulf
	213.6	223.1	9.5		.20				99	2.51		Tr	Tr			.15	.02													Tr									Mz; as above
	223.1	233.2	10.1		.13				92	2.57			.01			.09	.03													Sp				Sp					Mz, "
	233.2	244.0	10.8		.28				96	2.59			.01			.20	.08																	Tr					Mz; "
	244.0	252.0	8.0		.21				95	2.59			.01			.15	.05													Tr									Mz, "
	252.0	257.8	5.8		.08				86	2.53			Tr			.04	.04													Sp		Tr		Tr					Mz; wk lim, mod silicif. One HT patch alt lim-clay-jore alt.
	257.8	263.8	6.0		.20				92	2.59			Tr			.14	.06															S							Mz, wk lim, Mod-sTr silicif
	263.8	272.8	9.0		.27				95	2.59						.18	.09													Tr		T							Mz; end of acid, wk alt Apl D 263.9 - 264.0 Tr. sulf
	272.8	281.2	8.4		.20				99	2.56						.11	.09													Sp		S							Mz, wk clay alt, silicif, Tr sulf (cov)
	281.2	289.2	8.0		.29	10.5	.02	10.5	98	2.56						.18	.11															Sp							Mz, wk clay alt, Tr sulf. Decr mafics.
	289.2	299.7	10.5		.51	.51	.01	.01	86	2.58						.16	.35													8		Tr							Mz; broken Mod clay alt Tr. sulf
	299.7	309.7	10.0		.15		.03		86	2.62						.05	.10													5									Mz; broken Mod clay alt Tr sulf; Apl D 303.8 - 305.7
	309.7	318.3	8.6		.22				95	2.62						.02	.20													Sp									Mz; wk alt Tr. sulf Tr feldspath
	318.3	326.9	8.1		.43	16.5	.02	16.5	86	2.58							.43																					Mz; " " Sp carb, " "
	326.9	334.8	8.4		.45	.44	.02	.02	37	2.61							.45													Th									Mz; as above
BX → 1.432	334.8	343.7	8.9		.17		.02		100	2.61							.17																						Mz; " "
	343.7	353.3	9.6		.22				88	2.58							.22															Th							Mz; SP ALT, Tr cp, - py - moly cont. Feldspath
	353.3	361.9	8.6		.21				95	2.60							.21																						Mz; as above
	361.9	371.4	9.5		.14				94	2.59							.14																						Mz " "
	371.4	380.8	9.4		.17				93	2.58							.17																						Mz " "
	380.8	388.2	7.4		.15				95	2.57							.15																						Mz; SP ALT, Tr sulf
	388.2	398.3	10.1		.14				96	2.62							.14															Tr							Mz; " "
	398.3	403.2	4.9		.13				100	2.58							.13																						Mz, " "
	End of Hole						Avg Recv		90%																														

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3)
Tr - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Dc - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-79
Page 1 of 1 Pages
Collar Elev. 3006.61 Final Depth 350.1
Coords. N 35400.58 E 18769.37
Inclination Vert
Logged by SAA / FTG
Date: Start 2/20/62 Finish 2/28/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cov.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	Magnetite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	5.5	5.5						Rock	Bit																													Rock Bit
NX → 1.875 5.5	14.5	9.0		.69	.27 3'	.58	.27 3'	92	2.53	.50	.03	.05			.11			SP											Tr	SP	Tr	Tr	Tr	Dp	5.5		Dp, brka; leached, Md Lim, Sp Alt.
14.5	24.0	9.5		.42	.58	.32	.28	79	2.59	.24	.02	.06			.10																							Dp; as above, Tr Aug. inclusions
24.0	32.8	8.8		.61		.55		96	2.55	.44	.03	.08			.06			Tr												Tr								Dp; leached; sp lim
32.8	41.0	8.2		.22				83	2.57	.12	.02	.04			.04			SP													Tr							Dp, as above
41.0	49.6	8.6		.16				61	2.48	.10	.01	.02			.03															S								Dp, "
49.6	59.8	10.2		.26				66	2.58	.15	.01	.03			.07				Tr											SP		Tr						Dp, brka, leached, sp lime, pyr alt
59.8	68.8	9.0		.12				92	2.60	.06	.01	.02			.03																							Dp; leached, sp lim, incr. mafics
68.8	78.9	10.1		.24				87	2.60	.17	.01	.02			.04				Tr											Tr		10						Dp; leached, incr silicif.
78.9	85.5	6.6		.20				97	2.61	.12	.01	.02			.05															SP		10		Tr				Dp, as above, Tr aug. incl.
85.5	95.1	9.6		.12				79	2.61	.06	.01	.01			.04				Tr											Tr		10						Dp, as above, incr. mafics
95.1	103.2	8.1		.11				94	2.61	.06	Tr	.01			.04																	15		Tr				Dp, as above
103.2	110.2	7.0		.11				91	2.53	.05	.01	.01			.04															SP								Dp; leached, Sp lim., patches more Text
110.2	119.8	9.6		.13				96	2.60	.05	.01	.02			.05															Tr		SP						Dp, leached, Sp lim, sSp silicif
119.8	130.8	11.0		.13				94	2.62	.06	Tr	.02			.05																			Tr				Dp, as above, Tr aug incl. patches more Text
130.8	141.3	10.5		.12				91	2.59	.06	Tr	.02			.04																							Dp, as above, decr mafics
141.3	151.2	9.9		.14				60	2.62	.07	.01	.02			.04																	Tr						Dp, leached, Sp lim incr mafics
151.2	157.6	6.4		.09				59	2.61	.05	Tr	.02			.02														Tr									Dp, leached, mod clay alt
157.6	163.2	5.6		.10				99	2.59	.04	.01	.02			.03															SP								Dp, as above
163.2	172.7	9.5		.09				83	2.58	.04	.01	.02			.02										Tr													Dp; " "
172.7	181.6	8.9		.06		.07		88	2.58	.03	Tr	.01			.02																							Dp, " "
181.6	191.8	10.2		.11				71	2.60	.05	.01	.02			.03																							Dp; SP Alt; leached, Mod Mz Text
191.8	202.0	10.2		.15				90	2.59	.08	.01	.02			.04				Tr											Tr				Tr				Dp; leached alt
202.0	210.5	8.5		.41	.41	.28	.26	88	2.55	.22	.02	.04			.13																	10						Dp " "
210.5	218.5	8.0		.09		.06		88	2.57	.04	Tr	.02			.03			Tr														10						Dp alt, " "
218.5	227.7	9.2		.08				90	2.60	.04	Tr	.02			.02																	5						Dp " "
227.7	237.1	9.4		.11				94	2.61	.05	.01	.02			.03																	SP						Dp " Mz Text Tr aug incl
237.1	248.6	11.5		.03				66	2.60	.02	Tr	Tr			.01															SP								Dp; as above
248.6	258.5	9.9		.05				77	2.59	.03	Tr	.01			.01																	S						Dp, wk lim, Sp clay alt; Tr aug incl. Decr mafics
258.5	265.5	7.0		.07				81	2.60	.03	.01	.01			.02			S												S		SP						Dp, brka as above. To 265.3 Then int banded lim-clay alt
265.5	270.0	4.5		.11				92	2.49	.07	.01	.02			.01			10			Tr								SP	SP				SP				Dp? Int lim-clay alt
270.0	279.0	9.0		.09				79	2.59	.05	Tr	.02			.02			Tr								Tr			Tr	8				Tr	AND	275.7	Brka	Dp; Brkn, leached, SKF; To 275.7 Then And, Post Min dike
279.0	288.8	9.8		.05				76	2.63	.02	.01	.01			.01															SP								And, Post Min dike, calc veins
288.8	298.5	9.7		.09				35	2.43	.02	.01	.02			.04																Tr				Dp.	287.6	brka	And, Post Min Dk To 287.6 Then Dp brka
298.5	308.8	10.3		.09				85	2.42	.02	.01	.03			.03																				And	298.5	brk	And, Post Min D w. pT lim-clay alt. Dp at 305.7 w. int clay alt
308.8	318.4	9.6		.04				100	2.53	.01	.01	.02																		Tr								And, Post Min D.
318.4	323.3	4.9		.04				93	2.49	.01	.01	.02																			Tr		Tr					And, " mod lim alt
323.3	330.7	7.4		.05				91	2.58	.02	.01	.02																										And; " Mod clay alt Dp at 323.3 for 4 FT, mod clay alt Strong contact
330.7	339.0	8.3		.04				96	2.59	.03	Tr	.01																										And Post min D. Minute cal veinlets.
339.0	342.0	3.0		.03				96	2.62	.02	Tr	.01																										And. As above
342.0	350.1	8.1		.03				93	2.62	.02	Tr	.01																										And, " wk lim alt

END OF HOLE

Avg Assays 0.39%

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Mo) 5-50 %, Strong (St) + 50 %

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-8D
Page 1 of 2 Pages
Collar Elev 2938.91 Final Depth 612.9
Coords N 35,748.89 E 18,600.37
Inclination Vert
Logged by SAA - CWY - FTG
Date: Start 2-28-62 Finish 3-8-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cov.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sil. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	17.0		ROCK	BIT																																		ROCK BIT
MC →	17.0	27.0	10.0		.34		.23		68	2.95	.17	.01	.02	.03		.02	.09		Tr	Tr	Tr						10	5	20	Tr	Sp	Tr	Tr	Tr		Hf	17.0		Hf, mod clay-jaro alT, wk lm Tr suls, chry, mal, Cu frags
24.00	27.0	33.0	6.0		.50		.18		94	2.61	.11	.01	.02	.04		Tr	.32										15	10	75										Hf, alT, wk silic, SP Tt Tr suls, chry
	33.0	42.9	9.9		.58	35.7	.32	35.7	80	2.56	.25	Tr	.02	.05			.26										20	10	65		S								Hf, mod clay alT wk Tt Tr suls, chry
	42.9	46.0	3.1		.34	4.7	.24	3.7	82	2.63	.19		.01	.04			.10										20	5	65		10								Hf, as above SP chry
NX →	46.0	53.2	6.2		.58		.16		77	2.63	.11	.01	.02	.03			.22		Sp								10	5	60		25		Tr						Hf, brkn, st clay-jaro alT 6" patch alT Mz (?), wk Tt
1875	53.2	62.7	9.5		.44		.36		75	2.83	.30	.01	.02	.03		.02	.06										25	5	40	Tr	30					TT	61.3	brkn	Hf, brkn, st clay alT Tr chry, To 61.3, Then Tt
	62.7	66.0	3.3		.29		.19		93	3.78	.16	Tr	.01	.02			.05		Tr		Tr						5	60	35		Sp	Tr							Tt, wk clay Tr chry
	66.0	75.3	9.3		.54		.54		99	2.85	.38	Tr	.01	.09			.06										10	50	35		5								Tt, leached alt
	75.3	85.2	9.9		.29		.26		80	3.51	.20		.01	.05			.03										5	65	25		5								Tt, " " patches 4" x 6"
	85.2	93.3	8.1		.29				85	3.48	.22	.01	.01	.03			.02										15	45	30		5								Tt, " " sp suls
	93.3	102.8	9.5		.14				72	3.53	.08	Tr	.01	.02			.03										10	60	20										Tt, " " sp suls, Tr alt, 2.5
	102.8	111.7	8.9		.18				100	2.59	.11	Tr	.01	.02			.04				Tr						15	55	20					SP		Hf	108.0	grad	Tt, " " To 108.0, Then Hf, mod mafics
	111.7	121.6	9.9		.18				100	2.52	.08	Tr	.01	.01			.10										5	20	55		8		Tr						Hf, wk lm, Tr suls SP Tt
	121.6	131.0	9.4		.15		.12		100	2.62	.09	.01	.01	.02			.03				Tr						5	10	65		5		Tr	5					Hf, leached Tr chry, Tr Tt
	131.0	140.0	9.0		.41		.30		100	2.57	.20	Tr	.01	.09			.11										10	10	60		5			5					Hf, mod clay alT Tr chry, suls Tr Tt
	140.0	149.7	9.7		.94		.09		94	3.09	.02		Tr	.02		.05	.80										5	50	35		5			SP		Tt	140.0	grad	Tt, leached, mod clay, SP chry Tr Hf
	149.7	159.3	9.6		.78		.23		94	2.87	.18		.01	.04		.03	.52										5	25	50		5			8		Hf	152.1	grad	Tt, as above To 152.1 Then Hf, Tr suls
	159.3	169.2	9.9		.73		.14		100	2.42	.08		Tr	.06			.59				Tr		Tr	Tr			5	10	75		10	Tr							Hf, mod clay alT Tr suls
	169.2	178.1	8.9		.18		.10		95	3.34	.08			.02			.08										5	10			5		Tr	Tr					Hf, mod devel of jar Tr chry
	178.1	188.1	10.0		.20		.13		93	3.07																	5	25	65		5								Hf, as above
	188.1	197.8	9.7		.11	3.0 / .70	.07	3.0 / .17	85	3.16	.06		.01				.04										5	10	70										Hf, mod clay alT Leached spots Tr chry
	197.8	207.7	9.9		.26		.21		75	3.12	.18		.03	Tr			.05										15	5	60		10								Hf, as above Tr Tt, Mb
	207.7	217.7	10.0		.66		.05		98	2.61	.04		.01				.01										10	5	70		Sp			5					Hf, mod chlor SP suls
	217.7	225.5	7.8		.60		.16		100	2.84	.15		.01	Tr			.44										10	Sp	60					Sp					Hf, " " Tr Tt
	225.5	235.0	9.5		1.24	5.32 / .05	.11	5.32 / .18	81	2.80	.10		.01				1.13										5		65		5								Hf, as above Mod suls w chlor SP Tremolite, Tr wollastonite
	235.0	245.5	10.5		.79		.12		100	3.16	.10			.02			.67										5	5	60		8								Hf, as above Tr Cu w chlor
	245.5	253.2	7.7		1.60		.03		100	3.10	.02			.01			1.57										5	Sp	65		10			Sp					Hf, mod chlor alT SP suls
	253.2	260.9	7.7		1.66		.66		65	3.62	.61	Tr	Tr	.05			.50										5	15	65		10			7					Hf, SP chry alT Tr suls, chry
	260.9	265.6	4.7		.30		.15		91	3.52	.13			.02			.15										5	25	55		5		Tr	SP					Hf, as above w Tt veinlets + patches
	265.6	274.0	8.4		.63		.44		100	3.19	.40	Tr	Tr	.04			.19										5	20	60		5		T						Hf, mod clay, Tr suls + chry Tr Tt
	274.0	284.0	10.0		.12		.10		71	2.70	.08		.01	.01			.02										5	5	70	Tr	10								Hf, bleached, Tr chry
	284.0	294.8	10.8		.17		.12		33	2.79	.09		.01	.02			.05										5	10	55		15			Tr					Hf, as above
	294.8	304.7	9.9		.47		.09		72	2.58	.07		.01	.01			.38										25	5	50		5			SP					Hf SP chlor, Tr suls Cuttings (Hf?) from 300.1 To 304.2
	304.7	309.3	4.6						0	0																													No core
	309.3	313.0	3.7		.07				8	2.49	.06			Tr			.01			Tr							30	5	50		Sp			Sp					Hf, as above Tr suls
	313.0	321.0	8.0		.23				83	2.61											Tr																		Hf, SP silicif, Tr suls
	321.0	328.3	7.3		.13				94	2.61	.03			.07			.01										5	10	60		Sp	Tr		5					Hf, SP silicif, Tr suls Tr fluorite
	328.3	338.3	10.0		.19				94	2.56	.07			.02			.10		Tr								5	5	65		5			5					Hf, SP silicif, Tr suls SP dk veinlets
	338.3	347.7	9.4		.22				98	2.69							.22										10	5	65		5			SP					Hf, as above
	347.7	352.8	5.1		.11				93	2.62							.11										15	Sp	60		Sp			1					Hf, "
	352.8	362.6	9.8		.22		.15		98	2.59	.14			.01			.07		Tr								30	Sp	55					5					Hf, Mod chlor SP dk veinlets Tr suls
	362.6	372.1	9.5		.41		.07		97	2.72	.07						.34		Tr		Tr						15		60		Tr			8					Hf, as above Tr Tt
	372.1	380.5	8.4		.33				99	2.66	.02			.01			.30										20		75					5					Hf, " "
	380.5	389.1	8.6		.22		.04		94	2.62	.03		.01	Tr			.18										20		70					10					Hf, " " SP jaro

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %, or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-80
Page 2 of 2 Pages

Collar Elev. 2938.91 Final Depth 612.9
Coords. N 35,248.89 E 18,600.37
Inclination Vert.
Logged by SAA-CWM-FTG
Date: Start 2-28-62 Finish 3-8-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
389.1	396.7	7.6		1.60		.03		98	3.11							1.60			Tr	Tr						20	5	80		SP	Tr		Tr					Hf, Mod chl Tr Tt mod suls
396.7	406.2	9.5		1.14		.02		98	2.60							1.14										15	10	70		Tr			S					Hf, " " patches Mb.
406.2	415.8	9.6		.64	56.9	.02	56.9	98	2.78							.64									Tr	10	5	85					SP					Hf, wk leached, " " sp suls
415.8	425.2	9.4		.53	2	.03	@	91	2.82							.53										20	10	65				Tr	S					Hf, as above
425.2	436.0	10.8		1.49	102	.01	.03	82	3.14							1.49										20	10	60		SP			10					Hf, " " ; Patches Mb
436.0	446.0	10.0		.78		.07		89	2.66							.78		Tr		Tr						20	10	55					8					Hf, Mod Mb, sp suls
446.0	453.7	7.7		.22		.02		97	2.81							.22										25	5	65					5					Hf, turn to Mb
453.7	463.4	9.7		.22				96	2.59							.22										20	10	60					10		Mb	458.6	grad	Hf, To 458.6 Then Mb, mod chlor, Tr suls
463.4	472.2	8.8		.19				91	3.35							.19										20	20	50		Tr			5		Hf	462.8	" "	Mb To 462.8 Then Hf, sp suls
472.2	482.2	10.0		.18				98	2.79				Tr			.18										15	15	60					SP					Hf, Mod patches Mb
482.2	491.4	9.4		.20				93	2.92				Tr			.20										45	30	20							Mb	482.2	grad	Mb, Tr suls Patches Tt
491.6	500.	8.5		.30				99	3.15							.30										10	30	50							Hf	491.6	grad	Hf, Tr suls, Patches Mb + Tt
500.1	508.8	8.7		.28				90	2.88							.28										15	10	65										Hf, Tr suls, ST Mb
508.8	519.0	10.2		.28				92	2.77							.28										15	10	65					5					Hf as above
519.0	528.5	9.5		.37				100	2.75	Tr						.37										25	5	60					5		Mb	519.0	grad	Mb Tr suls mal. Mod Hf, Tr Tt
528.5	538.4	9.9		.34		.20		80	3.26	.20						.14										15	5	25					SP		Tt	528.5	50°	Tt, ST gar, SP mal Mod Mb To 537.5, Then Hf
																																			Hf	537.5	brkn	
538.4	547.7	9.3		1.91		.08		81	3.18							.91		Tr	Tr	Tr						10	5	65					5					Hf, wk chlor - clay alt wk-mod suls, mal SP mb
547.7	557.6	9.9		.55	460 @	.07	460 @	71	2.62							.55										5	10	65					10					Hf, as above
557.6	567.2	9.6		1.52	1.28	.08	.06	92	2.84							1.52										5	5	65		5			10					Hf, " "
567.2	576.2	9.0		2.41		.04		89	2.74						.5	2.26							Tr	Tr		5	10	65		SP		Tr	10					Hf, wk chlor. Mod cpy Tr Tt
576.2	584.4	8.2		.51		.03		98	2.65							.51										5	10	75		Tr			5					Hf, Tr suls. Tr Tt
584.4	592.6	7.2		.11				100	2.99							.11										5	30	45				5	5					Hf, wk chlor, Tr suls Tt from 585.1 - 589.9, mod silicif
592.6	600.9	8.3		.14				95	2.79							.14							Tr	Tr		5	25	55				SP	5					Hf, mod chlor, Tr suls SP Tt
600.9	605.6	4.7		.06				100	2.66							.06										5	15	65				Tr	SP		Tt	604.8	grad	Hf, as above To 604.8. Then Tt, mod silicif
605.6	612.9	7.3		.06				91	2.63							.06										5	15	35					Tr					Tt, mod silicif, Tr Dp Text.
						Avg Rec		87%																														
				End of Hole																																		

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows:
Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D 81
Page 1 of 6 Pages
Collar Elev. 3030.74 Final Depth 505.2
Coords. N 36,299.22 E 12,897.02
Inclination VERT
Logged by SAA - [illegible] - PTB
Date: Start 3-1-62 Finish 3-9-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py.	Mag	Hem.	Spec.	Other (2) Galena	Sphal	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	5.0	5.0	Rock	BT																																		Rock BT
5.0	13.9	8.9		.44		.27		11	3.08	.02	Tr	.01	.16			.17		5							8	SP	60		10	Tr		SP		Hf	5.0	?	Hf, leached, mod clay - mod alt. Tr chry
13.9	23.0	9.6		.57	42.8 @ .52	.32	42.8 @ .38	97	2.67	.15	Tr	.1	.20			.20		5			Tr				5	SP	50		20			5					Hf, leached, brkn, mod. T chy - l mal
23.0	29.6	7.6		.84		.66		96	2.62	.20	Tr	.01	.35			.18									SP		50		20			8					Hf, leached, brkn, ST lim. SP Tt patches
29.6	39.2	9.6		3.6		.24		77	3.13	.5	Tr	.01	.08			.12									5		40		20			15					Hf, leached, brkn, SP Tt. Tr chry
39.2	47.8	8.6		.46		.43		82	3.09	.5	Tr	Tr	.28			.03						SP			5	5	55		10			10					Hf, leached, mixed Tt patches, Tr chry
47.8	52.5	9.7		.14		.10		98	3.66			Tr	.10			.04									5	10	60		5			SP		Tt	47.8	good	Tt, leached, Tr patches Hf, ST silic & ign. ch 5.45 - 52.5 (Mz ?)
52.5	67.0	9.5		.21				85	3.15	.05		Tr	.14			.02									5	25	40		10			15					Tt, leached, Mod silicif, chlor, SP Hf
67.0	77.1	10.1		.20				73	2.96	.02			.02			.21					SP				5	25	30		5			10					Tt, leached, Mod Hf, Tr chry
77.1	84.7	7.6		.21				76	2.53	.10		Tr	.10			.01												Tr	Tr		Tr	Tr		Mz	77.1	brkn	Mz, leached, mod clay, Tr chry, SP feldspath
84.7	94.3	9.6		.33				77	2.91	.10	Tr	Tr	.10			.13			Tr		Tr				Tr	35	20			SP		5		Tt	87.0	brkn	Mz, as above To 87.0. Then Tt, mod silicif
94.3	105.7	9.4		.26				90	3.25	.04	Tr	Tr	.15			.07									SP	55	20			Tr		10					Tt, mod silicif. SP Hf patches, Tr chry, leached
105.7	113.3	9.6		.20				82	3.25	.03		Tr	.05			.12									SP	40	40		Tr			5		Hf	105.7 / 113.3	brkn	Hf, Tr sulfs To 108.5. Then Tt mod silicif
113.3	22.9	9.6		.13		.15		91	2.86	.01		Tr				.15							Tr	Tr		45	10					20					Tt, leached, Tr chry, SP Hf
122.9	131.4	8.5		.184		.122		91	2.81							.184									5	5	55					15		Hf	122.9		Hf, mod chlor, SP sulfs
131.4	139.0	7.6		.17		.14		100	2.82							.17					Tr				5	SP	60		5			5					Hf, as above incr clay
139.0	148.6	7.6		.54		.02		100	2.81							.54				Tr			Tr	Tr	5	SP	65		5			15					Hf, mod chlor, SP sulfs
148.6	158.8	10.2		.63		.01		94	2.51							.63									20	15	50		SP			5					Hf, as above 1 ft Tt, 3 ft Mb
158.8	167.0	8.2		.82	.46 @ .64	.04	.46 @ .03	100	2.75							.89									15	5	65					5					Hf, mod chlor, Tr sulfs
167.0	176.6	9.6		.22		.03		97	2.73							.32							Tr	Tr	25	SP	55					5					Hf, as above, Mod Mb
176.6	181.4	4.8		.33		.01		99	2.66							.33							Tr	Tr	15		65					5					Hf, " "
181.4	[illegible]	[illegible]		.18		.04		97	2.72							.18					Tr				70		10					5		Mb	181.4	good	Mb, SP [illegible], SP chlor, Tr Hf
181.4	188.0	6.6		.57		.04		92	2.86							.57									60		20	Tr				5					Mb, " " " " Tr Hf
188.0	196.5	8.5		.85		.04		91	2.67							.85					Tr				40	15	25					15					Mb, as above, mod chlor
196.5	206.9	10.4		.28		.03		100	2.69							.28									55	5	30	Tr				5					Mb, SP sulfs, Tr calcite
206.9	224.6	17.7		.17				98	2.72							.17									90		5		SP			5					Mb, " "
224.6	226.8	2.2		.02				91	2.81							.2									90		SP					SP					Mb, as above
226.8	245.9	19.1		.07				98	2.68							.07							Tr	Tr	80		10		Tr			5					Mb, Frds, [illegible] chlor, Tr Hf
245.9	252.4	6.5		.30		.04		95	2.73							.30									50	SP	35					10		Hf	248.6	good	Mb, as above To 248.6, then Hf
252.4	261.6	9.6		.20				99	2.76							.20				Tr	Tr				40	5	45					10					Hf, SP [illegible], Mod chlor, patches Mb
261.6	272.2	10.6		.23		.03		90	2.94							.23								Tr	35	5	55		Tr			5					Hf, ST patches Mb, Tr sulfs
272.2	281.6	9.4		.88		.05		90	3.09							.88									10	20	60					10					Hf, ST Tt patches, SP Mod [illegible], Debris
281.6	291.3	9.7		.24		.01		98	2.80							.24									35	5	55					5					Hf, as above, patches Mb
291.3	301.0	9.7		.57		.04		92	3.42							.57									20	30	40		Tr			10					Hf, " " ST Mod [illegible]
301.0	311.4	10.4		.48		.03		98	2.90							.46									25	10	60					5					Hf, as above Mod clay alt
311.4	321.1	9.7		.37		.03		96	2.80							.37									35	5	55					5		Mb	311.4	brkn	Mb To Hf, Mod [illegible]
321.1	328.9	7.8		1.37		.03		97	[illegible]							1.27									20	15	60		Tr			5		Hf	321.1	10°	Hf, SP chlor alt Mb & Tt patches Mod - ST sulfs in veinlets
328.9	338.0	9.1		.75	128.5 @ .81	.08	128.5 @ .05	98	2.89							.75				Tr				Tr	10	15	75					SP					Hf, SP chlor alt Mod - ST sulfs
338.0	347.5	9.5		.64		.05		96	2.82							.64									15	10	70					5					Hf, " " wkly mod sulfs
347.5	353.7	6.2		.25		.06		91	2.69							.25									15	10	70					5					Hf, as above
353.7	363.9	9.7		.84		.05		92	2.75							.84							Tr		10	20	60		SP			10					Hf, mod clay alt Mod Tt - Mb, ST sulfs
363.9	373.5	9.6		.106		.05		89	2.94							.106									5	30	50					5					Hf, as above Decr sulfs
373.5	383.1	9.6		1.80	200.5 @ .79	.04	200.5 @ .04	92	3.11							1.80									5	5	70		5			SP					Hf, wk clay alt Bleac SP sulfs
383.1	393.4	8.3		.22		.04		97	2.94							.22									10	SP	70		5			Tr					Hf, wk chlor alt SP - Mod sulfs
393.4	400.7	7.3		.77		.05		85	2.85							.77									5	1	60		5			10					Hf, Mod alt, Mod sulfs in veinlets

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %, or, as follows. Trace (Tr), Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-81
Page 2 of 2 Pages

Collar Elev. 3030.74 Final Depth 505.2
Coords. N 36,799.88 E 19,597.02
Inclination Vert
Logged by SAR - CWJ - FTC
Date: Start 3-1-62 Finish 3-9-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Chly	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
400.7	409.2	8.5		.35		.04		82	2.74							.35			Tr					Tr		10	5	75		SP			10					Hf, Mod chlor, wk clay, SP suls
409.2	416.0	6.8		.44		.04		97	2.59							.44			SP	Tr						20	55	55		Tr	Tr		10					Hf, wk silic'f, SP suls
416.0	424.1	8.1		.39		.03		84	2.96							.39								Tr		10	5	75		5			5					Hf, wk silic'f, wk suls Tr Tt
424.1	433.4	9.3		.63		.03		85	3.06							.63									Tr	10	5	70		5		Tr	10					Hf, as above Tr gl gn
433.4	442.2	8.8		.32		.02		100	3.19							.32											5	50	40		Tr		5	Tt	435.1	good	Hf, as above To 435.1 Then Tt wk suls
442.2	448.4	6.2		1.25	.486	.02	.486	92	3.55							1.25											SP	60	40				SP					Tt, Tr chlor, Tr suls, Patches Hf
448.4	458.1	9.7		.79	.92	.03	.03	98	2.65							.79										10	30	55		5			5	Hf	450.2	broken	Tt, as above To 450.2, Then Hf, wk silic'f, wk-mod suls
458.1	462.0	3.9		.81		.03		93	2.61							.81										10	10	70		SP			10					Hf wk silic'f Patches of Dp, mod silic'f
462.0	472.7	10.7		1.64		.04		96	2.61							1.64										SP	Tr				Tr		SP	Dp	463.2	good	Hf, mod silic'f to 463.2, Then Dp wk silic'f, Tr suls
472.7	482.0	9.3		.23		.03		76	2.62							.23													Tr				Tr					Dp, wk silicic Tr feldspar, Tr suls
482.0	490.5	8.5		.17		.01		97	2.54							.17					Tr								Tr									Dp, as above
490.5	498.5	8.0		.20		.01		95	2.59							.20																						Dp, " "
498.5	505.2	6.7		.22		.03		95	2.62							.22													SP									Dp " "
						AVG	REC	%																													
		END	OF	HOLE																																		

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; on as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3)
Tr - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. DH 82
Page 1 of 1 Pages
Collar Elev. 2937.20 Final Depth 328.0
Coords. N 86,202.17 E 18,805.47
Inclination VERT
Logged by SRA FTG
Date: Start 3-8-62 Finish 3-17-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Lim.	Py	Mag.	Hem.	Spec	Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Wh. Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	3.3	3.3						Recov	2.12																													Rock SLT
N.C. 3.3	11.7	8.4		.13		.09		87	2.59	.09					.04			Tr	Tr											Tr	Tr		Tr	Tr	Dp	3.3	?	Dp, bleached, wk alt, sp clay, Tr suls
3.400	11.7	20.9	9.2		.11			82	2.56	.11		Tr			.03									Tr														Dp as above Tr arg incl
	20.9	30.2	9.3		.12			94	2.60	.11					.01													Tr	Sp	Sp								Dp " "
	30.2	40.5	10.3		.07			76	2.57	.07											Tr										Tr							Dp, wk alt, [illegible]
	40.5	48.2	7.7		.08			25	2.56	.08																				Tr								Dp, slt, Bxx, Mod lim
	48.2	56.8	8.6		.15			32	2.60	.13					.02														S								Dp " " "
	56.8	60.4	3.6		.13			59	2.68	.13																			Sp									Dp, Alt, leached, Mod lim
	60.0	69.4	9.0		.35			86	2.37	.30					.03													Sp	S				Sp	Mz	62.0		Dp; as above, To 62.0 Then Mz (?) St leached, mod clay
	69.4	79.1	9.7		.20			83	2.52	.17					.03													Tr	S			Sp		Dp, mg / Mz	76.3	good	Mz; leached, Mod clay alt. To 76.3, Then Dp mg.
	79.1	90.6	11.5		.25			78	2.55	.20					.05														8			Tr			84.6		Dp, mg To 84.6 Then Mz(?) leached st clay - carb alt.
N.X.	90.6	100.1	9.5		.29			85	2.55	.25					.04														Sp				Tr					Mz; leached wk clay alt. Tr sulf, chry, Tr dk incl
1.375	100.1	109.7	9.6		.12			82	2.55	.10					.12														Tr		Tr			Dp	100.1	Sikr	Dp, leached wk clay alt
	109.7	117.9	8.2		.11			91	2.57	.08					.03														Sp									Dp, as above Tr feldspath, Tr dk. incl
	117.9	127.0	10.1		.23			96	2.57	.18					.05																		Tr	Mz	124.4	Brkn	Dp, as above To 124.4, Then Mz wk clay alt
	127.0	137.7	9.7		.15			88	2.60	.08		.01			.06																			Dp	128.0	"	Dp leached + Alt
	137.7	147.8	10.1		.34			91	2.69	.16	.01	.03			.07	.13													Tr					Mz	144.0	Vert	Dp as above To 144.0 Then Mz, Alt, wk leached, sericite
	147.8	157.4	9.6		.34			97	2.61	.09	.01	.02			.06	.06															Tr			Dp	147.8	80°	Dp, wk clay alt
	157.4	164.3	6.9		.12			94	2.61	.08	Tr	.01			.03														Sp									Dp, " " " Dense matrix
	164.3	174.0	9.7		.10			93	2.57	.06		.01			.03																Tr		Tr					Dp, as above Sulfied patches
	174.0	184.1	10.1		.15			81	2.49	.07	.01	.02			.05			Tr										Sp	10									Dp, as above
	184.1	194.5	10.4		.16			77	2.52	.09	.01	.01			.05														S									Dp, as above To 188.8, Patch Dp; st clay - hmt alt To 192.8
	194.5	203.5	9.0		.07			66	2.59	Tr	Tr	Tr			.07									Tr				Tr	Sp									Dp, " "
	203.5	215.5	12.0		.05			74	2.56			Tr			.05																							Dp " " End of oxidation
	215.5	225.2	9.7		.16			94	2.61			Tr			.16													Sp										Dp, " " Tr suls.
	225.2	233.1	7.9		.10			97	2.61						.09	.01																						Dp, " " " Tr Mz Test
	233.1	242.3	9.2		.05			99	2.59						.01	.04				Tr				Tr					Tr	Sp								Dp, as above
	242.3	252.1	9.8		.06			92	2.60						.03	.03														Tr								Dp, Sp sulf, Tr suls, No Test, Tr arg. incl
	252.1	261.2	9.1		.09			99	2.59							.09																						Dp, as above
	261.2	270.4	9.2		.19			88	2.59							.19																						Dp, " " " Speckles
	270.4	275.8	5.4		.53		.01	69	2.52							.53												Tr		S	Tr							Dp Mod stains, Tr py
	275.8	285.2	9.4		.95		.03	95	2.97							.95		Tr	Tr					20	Sp	70				Tr		10		Hf	275.8	90°	Hf, St silic, Sp - mod spy, Mod calc veins
	285.2	294.3	9.1		1.00	47.2	.03	97.3	100	2.78						1.00				Sp				15	S	65						15						Hf " as above
	294.3	303.9	9.6		1.07	1.0	.02		100	2.60						1.07								25	S	60						10						Hf, " "
	303.9	313.1	9.2		1.79	1.49	.04	.03	100	2.78						1.79				Tr				20	S	65					Tr	10						Hf, " "
	313.1	322.6	9.5		1.89		.01		96	2.59						1.89								10	10	40	Tr					Sp		Dp	315.0	Brkn	Hf, Silicified, Tr Suls + sulfides, To 315 + Then Dp
	322.6	326.4	3.8		.13			93	2.63							.13								Tr							S	Tr						Dp, sulf, Sp dk arg incl Tr suls
	326.4	335.3	8.9		.07			96	2.61							.07												Sp			10							Dp, as above
	335.3	344.7	9.4		.06			88	2.59							.06															5							Dp, " "
	344.7	351.2	6.5		.05			100	2.59							.05													Sp		10							Dp " "
	351.2	358.1	6.9		.04			95	2.55							.04												Tr			Tr							Dp, " "
	358.1	368.5	10.4		.03			90	2.58							.03													Tr				Tr					Dp, " " Incr matrix
	368.5	375.4	6.9		.04			98	2.60							.04												Sp			Sp							Dp, wk. sulf. Tr suls Tr Mz Test
	375.4	381.4	6.0		.03			90	2.57							.03												Tr										Dp, as above
	381.4	388.0	6.6		.06			84	2.59							.06																						Dp, " "
				END	OF Hole			86%																														

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Mo) 5 - 50 %; Strong (St) > 50 %

Note (3)
Tf - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-83
Page 1 of 4 Pages
Collar Elev. 3611.21 Final Depth 612.8
Coords N 36,946.50 E 19,596.63
Inclination Vert
Logged by SAR - CWH - FTG
Date: Start 3-9-62 Finish 3-23-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jasper	Tc. Fluorite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	10.0	10.0	Rock	B.T																																			Rock B.T
NX 1.875	10.0	20.0	10.0		1.56	20.0	1.15	20.0	27	2.48	1.13	Tr	.02			.41			St	Tr		Tr								Tr	5	Tr		Tr		Mz	10.0		Mz, brkn, leached Tr chry
	20.0	28.0	8.0		.49	@	.14	@	40	2.54	.11	.01	.02			.35															5	Sp	Tr						Mz, leached wk silif
NX 3.00	28.0	30.0	2.0		.49	1.03	.45	.58	89	2.51	.44		.04				.04									Tr	75	20					Sp			Tf	28.0	brkn	Tf, leached, mod silicif, Tr chry
NX 1.875	30.0	39.3	9.3		.28		.21		88	2.69	.24	Tr	.02				.02									85	5	70		Sp						Hf	30.0	brkn	Hf, bleached, Tr chry, Tr Tf
	39.3	50.0	10.7		.22				57	3.24	.19	Tr	.02				.01		St							5	10	70		5			Tr						Hf, as above Incr gar
	50.0	59.4	9.4		.15				92	3.32	.12		.01				.02		Tr							10	5	70		Sp				Tr					Hf, as above
	59.4	69.8	10.4		1.05	2.00	.95	2.00	85	3.06	.05	.01	.01	.88			.10									5	25	55		5				5		Tf	59.4	brkn	Tf, leached, Tr chry, St clay - pro alt from 64.8
	69.8	79.4	9.6		1.09	1.07	.82	.89	93	2.59	Tr	.01	.01	.80			.27									5	10	50		Sp			25	Tr		Hf	69.8	brkn	Hf, st chlor alt, Tr sulf, chry
	79.4	88.4	9.0		.22		.12		88	3.08		Tr	.01	.11			.10				Tr					10	5	60		Sp			20						Hf, as above Incr chlor Patches Tf
	88.4	96.4	8.0		.14		.11		98	3.30		.01	.01	.09			.03									10	5	70					5						Hf, as above
	96.4	105.4	9.0		.44		.37		90	3.19	.10	.01	.02	.24			.07									5	15	65					10			Tf	99.1	grad	Hf, " " To 99.1, Then Tf, st leached, Tr chry
	105.4	115.1	9.7		.23		.15		99	2.52	.04	Tr	.01	.12			.08									10	10	70					5						Tf, Tr chry, Mod Hf
	115.1	123.4	8.3		.34				90	3.17	.02	Tr	Tr	.27			.27									5	40	25			Tr		Sp			Dp	119.6	grad	Tf, Tr sulf, chry, Patches Hf To 119.6, Then possib. Dp ?
	123.4	132.5	9.1		.10				100	2.55	Tr	Tr	Tr	.01			.09									Tr		Tr					5						Dp, st feldspath, wk silicif Tr chry
	132.5	142.1	9.6		.28				100	2.48	Tr	Tr	Tr	.02			.26									Sp	15	5					8			Tr	137.0		Dp, as above To 137.0, Then Tf, Tr chry
	142.1	151.6	9.5		.10				92	2.58		Tr	.01	.03			.06										10	5	Sp				Sp			Dp	143.4	bx	Tf, Tr chry To 143.4 Then possib Dp, st feldspath, mod silicif
	151.6	158.4	6.8		.15				100	2.56	.01	Tr	Tr			Tr	.14									Tr	5	Sp				Tr	Tr						Dp, st feldspath, mod silicif, Tr Tf
	158.4	168.1	9.7		.08				99	2.78				Tr			.08									10	5	3	3				1			Hf	166.6	grad	Dp, decr feldspath To 166.6, Then Hf, mod Tf
	168.1	174.2	6.1		.10				83	3.08		Tr	Tr	Tr			.10								Tr	15	20	55					Sp						Hf, Tr Tf, Tr chlor
	174.2	183.8	9.6		.13				100	2.75	Tr	Tr	Tr				.13					Tr					10	20	45					20						Hf, mod chlor, mod Tf
	183.8	193.4	9.6		.32				96	2.78		Tr	Tr				.32							3			50	5	20					10		5	Mb	183.8		Mb, Tr sulf Tr gn st fluorite
	193.4	197.6	4.2		.12				88	3.18							.12							57	42		30						40			20				Mb, fluorite var, st gn st [Ag - .28 oz]
	197.6	207.8	10.2		.10				91	2.70							.10					Tr				Tr	90		Tr					Tr						Mb, Tr chlor
	207.8	217.2	9.4		.09				100	2.70							.09									Tr	90				Tr			Tr						Mb, " "
	217.2	226.8	8.9		.08				99	2.69							.08					Tr				Tr	95		Tr		Tr			Tr						Mb, " "
	226.8	235.8	9.0		.07				92	2.69							.07										90		Tr					Tr						Mb, " "
	235.8	245.1	9.3		.08				100	2.69							.08										65	25			Tr			5						Mb, " "
	245.1	254.3	9.2		.06				93	2.69							.06					Tr					85				Tr			Sp						Mb, " "
	254.3	263.5	9.2		.09				97	2.70							.09									Tr	95							Tr						Mb, " "
	263.5	272.7	9.2		.03				100	2.69							.03										95							5						Mb, " "
	272.7	282.3	9.6		.05				96	2.69							.05										95							5						Mb, " " Tr chlor
	282.3	291.8	9.5		.08				98	2.70							.08										95							5						Mb, " " " "
	291.8	301.2	9.4		.23				98	2.70							.23										80	10		Tr				5						Mb " " Mod chlor
	301.2	310.5	9.3		.06				91	2.61							.06										75	10						5						Mb " " Tr sulf.
	310.5	318.6	8.1		.18				99	2.60							.18										70	20		Tr				5						Mb, " " " "
	318.6	327.7	9.1		.19				100	2.55							.19										70	20						8	Tr					Mb, as above
	327.7	336.7	9.0		.17				92	2.57							.17										70	20						8	Tr					Mb, " " wk clay
	336.7	345.7	9.0		.26				98	2.59							.26										60	25						15						Mb, as above
	345.7	354.8	9.1		.28		.09		89	2.79							.28										60	20						20						Mb, " " Incr chlor
	354.8	364.7	9.9		1.39		.03		87	3.22							1.39	Tr									50	35	10					5	Tr					Mb, as above, Tf from 359.8 - 363.5
	364.7	374.2	9.5		.92		.08		94	3.16							.92										50	20	15					Sp						Mb, Tr chlor Tr Tf, Hf
	374.1	383.4	9.3		.46	6.32	N.A	69.2	71	3.23							.46										10	60	15		Sp		Tr	Tr						Mb, as above
	383.4	393.7	9.6		.94	@	.05	@	45	3.03							.94										10	50	15		Tr						Tf	383.4	grad	Tf, mod sulf mod Mb
	393.7	397.7	4.0		2.04	.99	.05	.04	94	2.55							2.04										10	50	25		S				Tr					Tf first 2'3" solid sulf, Dc 394, sp-mod chlor, st gar

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-33
Page 2 of 2 Pages
Collar Elev. 3011.21 Final Depth 612.8
Coords. N 36,946.50 E 19,596.63
Inclination Vert
Logged by SAB - CWH - FTG
Date: Start 3-9-62 Finish 3-28-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pnch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Mpyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
397.7	406.6	8.9		.58		.06		79	3.04							.58			Tr						Tr	5	45	30		5			Tr					Tt, st grey, sp-mod sulf, Tr chlor
406.6	415.6	9.0		.30		.05		91	2.72							.30			1						1	5	5	65		5			1		Hf	406.6	grad	Hf, Mod chlor, Md calc, mod sulf
415.6	424.0	8.4		1.00		.05		100	2.60							1.00			1						1	5	8	65		8			1					Hf, " " "
424.0	433.6	9.6		.28				93	3.01							.28			1						1	5	5	70		10			1					Hf, dense, sp chlor, sp sulf, patches Tr
433.6	442.2	7.6		.12				100	2.83							.12			1						1	5	5	70		5P			1					Hf, " " Shattered " " " "
442.2	452.6	9.4		.29				97	3.22							.29			1						1	5	45	45		1			1		Tt	443.2	grad	Tt, dense, sp chlor, sp sulf; patches Hf
452.6	459.7	7.1		.19				99	3.02							.19			1							5	50	45		1			1					Tt, " " " cont patches Hf, sp sulf
459.7	469.5	9.8		.17				92	2.89							.17			SP							5	65	25			Tr		5		Hf	459.7	grad	Hf, slight, Tr Tt patches, SiTsT
469.5	480.3	10.8		.14				98	2.76							.14			Tr							5	20	40		Tr		60	Tr		SiTsT	469.5	grad	SiTsT Tr sulf 50% Tt
480.3	490.5	10.2		.25				100	2.76							.25									Tr	5	40	65		1		20	5		Tt	480.3	grad	Tt, wk clay alt Tr sulf
490.5	500.5	10.0		.17				77	3.13							.17										5	15	60		5P		15	5					Tt, as above Tr SiTsT, Hf
500.5	509.5	9.0		.26				87	2.99							.26										5	30	45				15	5					Tt, as above
509.5	516.4	6.9		.10				82	2.93							.10										10	30	40		5		10	5					Tt " "
516.4	525.9	9.5		.30				88	2.90							.30			SP							10	10	55		5	Tr	5	5		Hf	516.4	grad	Hf, Tr feldspath Tr bx Tr sT Mod Tt
525.9	535.5	9.6		.07				95	3.06							.07										10	20	55		5		5	5		Tt	531.0	grad	Hf, as above To 531.0 Then Tt, Sp silicif
535.5	543.6	8.1		.12				92	3.18							.12										15	10	55		5		10	5		Hf	540.5	grad	Tt, sp silicif, Tr sulf To 540.5 Then Hf, wk clay
543.6	554.4	10.8		.04				88	3.28							.04										10	5	70		5		5	5					Hf, wk clay, alt Tr sulf, Tr Tt
554.4	564.3	9.9		.52		.01		91	3.19							.52			20							Tr	5	70		5			SP					Hf, as above, massive pyrite 555.4 To 557.4
564.3	573.0	8.7		.23	35.9	.01	35.9	84	3.21							.23			SP							10	5	80		SP		Tr	5					Hf, sp sulf, sp chlor
573.0	581.0	8.0		.51	.43	.05	.03	99	2.84							.51			5							10	5	75		Tr		10	SP					Hf, " " " wk chlor sulf
581.0	590.3	9.3		.46		.05		79	2.60							.46			SP							Tr				SP	SP	Tr	Tr		Da	581.0	Burn	Da, Burn, ggy, Tr sulf, sp chlor, sp sulf
590.3	599.5	9.2		.16		.04		70	2.62							.16																15						Da, " " above
599.5	606.5	7.0		.14				68	2.61							.14			Tr													10						Da, silicified, Tr sulf
606.5	612.8	6.3		.22				83	2.63							.22														Tr		15						Da, " " "
						Avg. Rec. = 89%																																
				End of Hole																																		

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 % Moderate (Md) 5-50 % Strong (St) + 50 %

Note (3)
Tr - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-84
Page 1 of 2 Pages
Collar Elev 3,710.78 Final Depth 405.2
Coords N 36,947.63 E 18,384.00
Inclination Vert
Logged by SMA, FTG
Date: Start 3-18-62 Finish 3-20-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green	Supergene	Cc	Cov	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	3.0	3.0	Rock	B.T																																	Rock B.T
NC →	3.0	13.0	10.0		.63		.07		63	2.62	.07					.56			Tr	Tr					Tr				Tr	SP	Tr		SP	Mz	3.0		Mz, Brkn, wk clay alt Tr sulfs
2,400	13.0	21.8	8.8		.45		.04		73	2.58						.43	.02																					Mz; wk clay alt. Tr mafics, Tr sulfs
	21.8	26.0	4.2		1.13		.07		87	2.58	.07					1.06	.05		Tr																		Mz, as above
	26.0	32.4	6.4		.52		.04		85	2.60						.50	.02																Tr				Mz, " "
	32.4	40.9	8.5		1.73		.06		96	2.57						1.73																	SP				Mz, as above Incr chlor alt Incr alt of Gypse
	40.9	47.5	6.6		.68		.05		84	2.59						.68						Tr															Mz; as above. Tr feldspath
	47.5	58.6	11.1		1.06	95.1	.15	95.1	51	2.59						1.06														Tr			Tr				Mz, as above
	58.6	65.4	6.8		1.20	@	.05	@	93	2.61	.05					1.10	.05		SP											SP			SP				Mz, brkn Mod lim alt Decr mafics
	65.4	73.9	8.5		.76	.88	.05	.68	93	2.60	.35					.59	.02															Tr	Tr				Mz, wk silicif, Tr feldspath Tr mafics Tr dk incl
	73.9	80.3	6.4		.41		.04		89	2.56	.04				Tr	.40	.01													Tr							Mz; as above
	80.3	88.7	8.4		.68		.19		98	2.55	.14				Tr	.54			Tr													SP					Mz; " "
	88.7	98.1	9.4		.62		.10		93	2.54	.05				Tr	.57														SP		Tr					Mz; sp silicif, sp Feld sparks + Mafics, pyr has Ak rest
	98.1	108.0	9.9		.34		.10		100	2.55	.05				Tr	.29																					Mz; as above
	108.0	115.7	7.7		.13		.03		98	2.52						.13																					Mz, " " decr in Mafics cont Ak test, Mod chlor + Sulf
	115.7	122.6	6.9		.19				98	2.57						.19																	Tr	Dp	120.7	Brkn	Mz; as above To 120.7 Then Dp Brkn, B.T, Sp chlor + sulf
	122.6	131.2	8.6		.27				94	2.58						.27															Tr	SP					Dp; brkn wk silicif, chlor alt Tr sulfs Tr ang incl
	131.2	139.0	7.8		.31				95	2.57						.31																	5	Ak	136.5	brkn	Dp; as above w incr chlor To 136.5 Then Ak; mod silicif
	139.0	149.3	10.3		.01				97	2.59						.01													Tr		SP		Tr				Ak wk clay, sp silicif alt Tr sulfs
	149.3	155.6	6.3		.01				98	2.54						.01																					Ak as above Tr chlor
	155.6	166.0	10.4		.04				94	2.57						.04															Tr						Ak " "
	166.0	174.4	8.4		.06				95	2.55						.06																					Ak as above Tr sulfs
	174.4	184.0	9.6		.10				98	2.53						.10																					Ak " "
	184.0	191.4	7.4		.16				95	2.55						.16			Tr		Tr																Ak " " Near Mz contact possib
	191.4	200.4	9.0		.10				100	2.57						.10															Tr						AK; Alt, Mod SiO_2, Tr sulfs
	200.4	207.5	7.1		.07				100	2.55						.05	.02												Tr	SP							AK; " as above
	207.5	216.6	9.1		.13				89	2.60						.04	.09													SP			SP				AK, incr mafics. Mz Text. Contact zone?
	216.6	220.0	3.4		.13				87	2.66							.13														Tr	Tr	Tr					AK, Alt, Tr chlor, Tr Sulfs
NX →	220.0	229.3	9.3		.09				33	2.66							.09													Tr			SP	Meta Sed	220.0	brkn	Meta Sed, Tr chlor, Tr sulfs Patches Dp
1,875	229.3	238.7	9.4		.11				75	2.71							.11														SP						Meta Sed, as above Bx 233.1 - 234.1
	238.7	247.6	8.9		.09				89	2.55							.09														Tr	Tr					Meta Sed, Tr sulfs Decr chlor
	247.6	256.6	9.0		.37				86	2.65							.37																				Meta Sed, mod chlor, Tr sulfs
	256.6	261.8	5.2		.29				100	2.62							.29													5							Meta Sed, as above
	261.8	270.0	8.2		.32		.02		92	2.73							.32									15	40			Tr			20	HF	261.8	?	Hf, mod chlor, sp-mod calc, sp-mod sulfs
	270.0	277.4	8.4		.55	.82	.02	.82	84	3.07							.53									15	35			8			25				Hf, as above; bxx, ggx, mod sulfs
	277.4	288.2	8.8		.46	.80	.03	.78	78	2.77							.46									15	50			SP	Tr		20				Hf, " " " "
	288.2	298.8	10.6		.36		.02		81	2.72							.38									15	50			5			20				Hf; " Mod SiO_2, sp sulfs
	298.8	305.6	6.8		.28				92	2.93							.28				Tr					10	50			10			10				Hf, sp sulfs, mod calc
	305.6	310.0	4.4		.06				98	2.66			.167													Tr				TH				And	305.6	gsy	And, dk gry; Post Min And dike
	310.0	319.0	9.0		.03				89	2.67			.03																								And, as above
	319.0	327.5	8.5		.23				100	2.81							.23				Tr					SP	Tr	60			Tr		5	HF	322.8	72°	And " " " To 322.8 Then Hf, sp-Mod sulf + chlor
	327.5	333.6	6.1		.24		.05		86	3.08							.24									5	50					Tr	10				Hf, sp sulfs, sp chlor first 1.5 And dike
	333.6	343.2	9.6		.95		.05		91	3.47							.95		5					Tr	5	15	75						5				Hf, as above, incr in qtz
	343.2	354.9	11.7		.26		.04		60	3.08							.26		SP		Tr					10	10	70				Tr	10				Hf-Tt, sp-Mod sulfs, Mod chlor
	354.9	364.2	9.8		.16				82	3.05							.16									5	10	50					10	And	359.8	Brkn	Hf, as above To 359.8, Then Post Min And dike
	364.2	374.2	9.5		.09				82	3.13				.04	.05				TH							Tr	Tr	5					Tr	Hf	372.3	" "	And To 372.3 Then Hf.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif Igneous

Hole No. P-84
Page 2 of 2 Pages
Collar Elev 2710.78 Final Depth 405.2
Coords. N 86,947.63 E 16,387.06
Inclination VERT
Logged by SAR, ETG
Date Start 3-10-62 Finish 3-20-62

Depth From	Depth To	Intvl	Elev	% Cu Total	% Cu Avg	% Cu N S	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys	Pitch	Black	Blue Green		Cc.	Cov	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sh. Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
324.2	384.7	10.5		.21				80	2.75							.21		Tr	Tr		Tr					5	5	65		5	Tr		5				Hf, silicified, sp sels, sachlor
384.7	394.3	9.6		.17				72	2.62							.17										5	SP	70		SP			SP				Hf; St. silicification, Tr Sels
394.3	405.2	11.1		.14				43	3.08							.14										5		70					5				Hf. " "
						Avg Rec		85%																													
				End of Hole																																	

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 60 %; Strong (St) + 60 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 283
Page 1 of 1 Pages
Collar Elev. 3957.59 Final Depth 352.1
Coords. N 36,051.76 E 18,673.34
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 3-17-62 Finish 3-23-62

Depth From	Depth To	Inf'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Varnish	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	3.2	3.7						Rock	2.18																													Rock alt
3.7	8.0	4.3		.05				100	2.30	.05		Tr						Tr								Tr				Tr			Tr		And	3.7	?	And, leached, wk lim
8.0	16.2	8.2		.12				73	2.55	.11	Tr	.01						Tr			Tr								Tr		Tr				Dp	8.0	?	Dp, wk alt. leached
16.2	25.4	9.2		.13				74	2.59	.12	Tr	.01																										Dp, as above Possib. bx 9.0 - 22.0
25.4	33.9	8.5		.07				83	2.56	.05	.01	.01																		SP								Dp, as above Incr clay alt
33.9	42.5	8.6		.08				93	2.55	.06	.01	.01																					SP					Dp, wk clay alt Tr Mz TexT leached
42.5	50.0	7.5		.08				97	2.56	.04	.01	.02			.01				Tr											Tr			Tr					Dp, leached wk clay alt Tr dk ind
50.0	58.1	8.1		.07				87	2.55	.04	.01	.01			.01																							Dp, as above
58.1	62.8	4.7		.09				95	2.57	.04	.01	.01			.03															SP								Dp, " "
62.8	70.0	7.2		.10				89	2.57	.02	.01	.01			.06															S								Dp, " " ST clay alt w suls from 67.3 - 69.3
70.0	80.2	10.2		.07				87	2.57	.02	Tr	.01			.04															Tr				And	75.4	brkn	Dp, " " To 75.4, Then PosT min And
80.2	87.7	7.5		.02				88	2.54			.02														Tr												And, post min. dike Tr cal
87.7	93.6	5.9		.01				99	2.51			.01																										And, " " " "
93.6	102.1	8.5		.02				93	2.56			.02																										And, " " " "
102.1	109.2	7.1		.06				81	2.56		.01	.04			.01				Tr										Tr	Tr	Tr				Dp	105.0	brkn	And, as above To 105.0, Then Dp, leached
109.2	117.8	8.6		.04				89	2.47			.04																							And	109.2	brkn	And, postT min dike Tr cal
117.8	127.2	9.4		.05				90	2.55			.05																		SP								And, as above Mod lim alt
127.2	136.2	9.0		.04				100	2.53			.04																										And, " "
136.2	145.5	9.3		.04				87	2.58			.04						SP																				And, " "
145.5	154.9	9.4		.04				97	2.55			.04						Tr																				And, " "
154.9	163.9	9.0		.03				89	2.62			.03																		Tr								And, " "
163.9	173.5	9.6		.02				97	2.59			.02																										And, " "
173.5	183.5	10.0		.05				86	2.49			.05			Tr														Tr	SP	Tr				Dp	180.2	45°	And, " " To 180.2 Then Dp, brkn, wk clay alt
183.5	193.8	10.3		.11				70	2.59	.06	.01	.02			.02				Tr						Tr					Tr								Dp, wk clay alt
193.8	202.6	8.8		.10				85	2.56	.05	.01	.02			.02																							Dp, wk clay alt. To dk ind
202.6	211.7	9.1		.10				49	2.59	.04	Tr	.02			.04																	Tr						Dp, as above
211.7	219.1	7.4		.11				96	2.58	.05	.01	.02			.03																S							Dp, " " Tr Mz TexT
219.1	230.0	10.9		.12				80	2.59	.05	Tr	.02			.04	.01															S							Dp, as above
230.0	239.4	9.4		.06				89	2.52	.02		Tr			.04	Tr														SP	Tr							Dp, " " Decr mafics
239.4	250.7	11.3		.04				86	2.61	.02					.02															Tr					And	241.4	brkn	Dp, as above To 241.4, Then And, postT min dike
250.7	260.2	9.5		.05				95	2.58			.05														Tr												And, PostT min dike Tr cal
260.2	269.5	9.3		.13				93	2.46						.10	.03			Tr						Tr				Tr		Tr				Dp	260.2	brkn	Dp, Sc clay alt Tr suls Tr Mz TexT, To 265.7, Then And Pm d
																																			And	265.7	brkn	
269.5	280.4	10.9		.07				95	2.49			.07														Tr							Tr					And, PostT min dike Tr cal
280.4	290.7	10.3		.05				96	2.58			.05																										And, as above
290.7	300.2	9.5		.06				79	2.56						.04	.02		Tr	Tr										Tr		Tr	Tr			Dp	294.2		And, as above To 294.2, Then Dp, wk clay alt Tr suls
300.2	306.8	6.6		.16				74	2.61						.02	.14									Tr												Dp, wk clay alt Tr suls Tr dk ind
306.8	312.5	5.7		.15				97	2.61							.15																						Dp, as above
312.5	319.5	7.0		.02				59	2.68							.02														SP								Dp, " "
319.5	332.7	13.2		.05				78	2.81							.05														Tr					And	321.8	brkn	And, PostT min Dike
332.7	340.7	8.0		.09				93	2.53							.09															Tr				Dp	338.0	brkn	And, To 338.0 Then Dp wk alt Tr suls
340.7	352.1	11.4		.06				93	2.43							.06																			And	344.0	brkn	Dp, as above To 344.0, Then And, postT min dike

AVG Rec = 87%

End of Hole

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-96
Page 1 of 1 Pages
Collar Elev. 2711.31 Final Depth 350.0
Coords. N 32,100.33 E 16,362.22
Inclination Vertical
Logged by SAR / FTG
Date: Start 3/21/68 Finish 4/3/68

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Cuprite	Cc.	Cpy.	Born	Native Copper	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	11.8	11.8		Rock	BIT																																		Rock BIT
NC 2.40	11.8	20.6	8.8		.16				63	2.49	.01	.02	.03			.04				SP			Tr								SP	SP	Tr				Ak	11.8		Ak, wk clay alt; leached Tr liv lim
	20.6	25.0	4.4		.16				10	2.52	.01	.02	.02			.04							SP																	Ak, as above
	25.0	33.0	8.0		.14				53	2.43	.07	Tr	.02			.05															10		Tr	Tr						Ak, leached Mod clay alt
	33.0	39.5	6.5		.08				10	2.46	.06	Tr	.01			.01							Tr								5									Ak, brkn, as above
	39.5	45.2	5.7		.11				17	2.41	.08	Tr	.02			.01															5			Tr						Ak, as above
	45.2	55.7	10.5		.10		.01		0.6	2.41	.08	Tr	.01			.01															SP									Ak, " "
NX 1.875	55.7	63.5	7.8		1.34		.98		4	2.44	.43	.02	.03		.50	.36				Tr											30									Ak; highly brkn, mod clay alt, Mod cpy
	63.5	70.0	6.5		2.63		.78		0	2.46	.20	.02	.03		.73	.65				SP											40									Ak, as above
	70.0	78.3	8.3		3.05		2.25		92	2.10	.70	.02	.03		1.50	.80															40									Ak (?) bx, int clay - sere alt. Mod mal? Possible Dp.
	78.3	87.0	8.7		.86		.62		62	2.39	.10	Tr	.01		.51	.24				Tr											40						DP BX?	78.3	brkn	Dp (?) bx " " "
	87.0	90.0	3.0		0		0		No	Core																														No core
	90.0	101.5	11.5		.57	115.3 @ 1.37	.47	115.3 @ .89	35	2.40	.01	Tr	Tr		.46	.10				Tr										Tr	30	Tr		Tr	Tr					DP(?) bx, int. clay & sere - Mod cpy & Mal
	101.5	110.5	9.0		.51		.41		57	2.36	.08	Tr	.01		.32	.10															40									Dp(?) bx as above
	110.5	120.9	10.4		.81		.64		63	2.41	.13	Tr	.01		.50	.17					Tr										30									Dp (?) bx " "
	120.9	130.0	9.1		1.20		.37		80	2.44	.04	.01	.02	CUPRITE	.30	.83															25					Dp	120.9	55°	Dp; st Alt, wk bleached, Mod N.S. Cpy, To 130
	130.0	136.1	6.1		3.94		.18		74	2.50	.03	Tr	.01		.10	3.76														SP	5									Dp; as above
	136.1	144.9	8.8		4.97		2.61		98	2.38		Tr	Tr	261				2.36												Tr	5				SP	And	139.9	~30°	Dp; " " Then And; Tr cup, sere
	144.9	153.8	8.9		2.32		.26		40	2.99	.24	.01	.01			2.06					Tr										5					Dp	144.9	brkn	Dp, st. silicif, Tr suls To 152.9, Then And; postmin dike
																																				And.	152.9	brkn	
	153.8	162.5	8.7		3.08		1.86		93	2.67		Tr	Tr	186				1.22		Tr											SP									And, post min dike, Tr cup
	162.5	171.0	8.5		1.07		.39		69	2.64		Tr	Tr	.39				.63													5			Tr						And; as above
	171.0	178.4	7.4		.17		.13		43	2.66	.11	.01	.01	Tr		.04					Tr								Tr	10	Tr					Dp	178.2	bx	And; " " Possible bx cont. w. Dp at 178.2
	178.4	187.8	9.4		.40		.14		82	2.51	.13	Tr	.01			.26					Tr										10									Dp, Brkn, wk and Bx, Tr suls
	187.8	194.0	6.2		1.20		.10		54	2.63	Tr		Tr			.20	.100														SP									Dp; as above
	194.0	201.5	7.5		.69	56 @ .75	.11	56 @ .07	61	2.16						.50	.19														10									Dp; st. clay alt. Tr suls.
	201.5	207.3	5.8		.53		.02		35	2.60						.45	.08														5									Dp; as above
	207.3	214.8	7.5		.39		.03		35	2.62						.35	.04														5									Dp; " " Incr lim
	214.8	217.1	2.3	NO	CORE				0	0																														NO CORE
	217.1	227.6	10.5		.93		.03		40	2.64						.90	.03													5	20	Tr									Dp bx, int clay alt Tr suls
	227.6	234.4	6.8		1.49		.05		78	2.53						.70	.79													SP	30				SP					Dp bx; 5 ft solid core, Then as above
	234.4	244.8	10.4		.37		.03		68	2.65							.37										SP	Tr	0	Tr	5			5		Hf.	238.5	brkn	Dp as above To 238.5, Then Hf, Sp clay alt Tr suls.
	244.8	253.9	9.1		.41		.03		65	2.64							.41										10	Tr	60		Tr	1		15						Hf, as above Tr feldspath
	253.9	264.4	10.5		.32	38 @ .42	.02	38 @ .02	72	2.62							.32										10		65					15						Hf " "
	264.4	271.5	7.1		.51		.02		70	2.71							.51										10		60					25						Hf " "
	271.5	278.9	7.4		.49		.03		87	2.64							.49										10	SP	65					20						Hf, Sp chlor alt Tr suls.
	278.9	287.1	8.2		.23		.04		66	2.58							.23			Tr							10		70					10						Hf, as above Tr feldspath
	287.1	295.7	8.6		.21				58	2.64							.21										Tr	10	75					15						Hf, as above
	295.7	303.5	7.8		.18				53	2.55							.18										1	10	75		SP			15						Hf, brkn; as above
	303.5	308.1	4.6		.26				64	2.53							.26										1	10	70		1	Tr		10						Hf, as above Incr clay alt
	308.1	316.1	8.0		.28				87	2.64							.28										1	0	70		Tr	1		10						Hf, wk silicif - chlor alt. Tr suls.
	316.1	324.0	7.9		.17				79	2.72							.17										1	10	75					10						Hf, as above
	324.0	333.3	9.3		.23				77	2.72							23										1	10	70			SP		8						Hf, " "
	333.3	343.7	10.4		.24				59	2.64							24											5	SP	85			Tr	10	Tr					Hf, wk mod silicif
	343.7	350.0	6.3		.34				72	2.61							.34											5		75				20						Hf, as above
			END	OF	HOLE					Av. Rec = 58%																														

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Mod) 5-50 %, Strong (St) + 50 %

Note (3): Tf - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Ms - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-83
Page 1 of 2 Pages
Collar Elev 3080.84 Final Depth 513.3
Coords. N 30,77862 E 19,398.45
Inclination Vertical
Logged by SAG / ATG
Date: Start 3/23/82 Finish 4/9/82

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chys	Cu (1) Pitch	Cu (1) Black	Cu (1) Blue Green	Cu (1)	Cu (1) Cc	Cu (1) Cpy	Cu (1) Born	Fe (2) Lim	Fe (2) Cp	Fe (2) Mag	Fe (2) Hem	Fe (2) Spec	Other (2) Galena	Other (2) Sphal	Other (2) Molyb	Other (2) Calcite	Other (2) Garnet	Other (2) Silicates	Other (2) Sericite	Other (2) Clay	Other (2) Vn. Qtz	Other (2) QUARTZ	Other (2) CHLORITE	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
0.0	17.5	17.5		Rock Bit																																	Rock Bit
17.5	27.0	9.5		.96				92	2.79	.10	.01	.02	.08			.15		Tr	Tr							5	35	55		Tr	Tr		Tr	Hf	17.5		Hf; Tr sulf, Patches Tf w chry
27.0	37.4	10.4		.19				78	2.97	.08	.01	.02	.03			.06										10	20	65		5							Hf, as above. Tr bx
37.4	47.3	9.9		.29				92	2.78	.12	.01	.01	.05			.11		SP								5	15	60		10				Tf	37.4	grad	Tf; Tr chry Patches Hf
47.3	55.8	8.5		.23		.12		91	2.61	.06	.01	.01	.04			.11		Tr			Tr					5	5	70		5				Hf	49.0	grad	Tf, as above To 49.0, Then Hf, wk silicif
55.8	65.5	9.7		.28		.70		88	2.69	.55	.01	.02	.13			.18										5	75	10		SP				Tf	58.0	grad	Hf, wk clay To 58.0, Then Tf, mod chlor, hem
65.5	73.5	8.0		1.14		.02		87	2.66	.90	.01	.01	.10			.12										5	65	20									Tf as above
73.5	83.8	10.3		.59		.47		78	2.52	.50	.01	.01	.08			.12										5	35	40									Tf, leached, Mod MS Cu, Mod hem, patches Hf
83.8	91.1	7.3		.65	72.6 @ .80	.58	72.6 @ .82	91	2.45	.50	.01	.02	.05			.07										5	30	55						Hf	85.8	grad	Tf as above, To 85.8 Then leached Hf
91.1	100.6	9.5		.48		.33		92	2.76	.20	.01	.01	.11			.15		5								10	20	65		5		1					Hf, leached, St lim - ggy, sPsT, Mod MS Cu
100.6	109.2	8.6		.69		.58		61	3.09	.30	.01	.01	.26			.11		5								15	15	65		5							Hf, as above
109.2	118.6	9.4		1.35		.87		83	2.50	.45	.01	.01	.40			.48		5								10	10	65		8							Hf " " Tr Tf
118.6	128.4	9.8		.62		.51		66	3.25	.20	.01	.02	.29			.11		SP								10	30	45		5	Tr						Hf; leached, St lim ggy patches Tr
128.4	138.5	10.1		.25		.19		76	2.63	.08	.01	.02	.09			.06		Tr								5	10	70		SP							Hf, wk leached, St silicification, patches SPST
138.5	143.0	4.5		.15				98	2.57	.06	.01	.01	.05			.02		Tr								5	5	75					5				Hf as above
143.0	150.6	7.6		.38		.34		100	2.64	.15	.01	.01	.17			.04					SP					5	35	60					SP				Hf; Mod chlor, St lim & Hem stain
150.6	161.2	10.6		.22		.16		98	2.69	.05	.01	.02	.09			.06										5	20	65		Tr			1				Hf " " wk patches Tr & Silica
161.2	168.0	6.8		.78	16.8 @ .35	.58	16.8 @ .40	97	2.80	.20	.01	.02	.35			.20										5	15	65		Tr			10				Hf; T cels wing, St lim patches, sPsT lim stain, trivs
168.0	177.8	9.8		.89		.29		98	2.80	.10	.01	.01	.17			.60										5	20	65				SP	10				Hf " " St Hem & lim stain, sp suls
177.8	187.3	9.5		1.26		.05		100	2.62	.01	Tr	Tr	.04			1.21										5	Tr	40	Tr				10				Hf, Mod chlor, sp cels wing, Mod sPx ggy, Tr Tf
187.3	192.2	4.9		1.30		.07		97	2.78	.04	Tr	Tr	.06			1.23										5	8	50			Tr		30				Hf, as above
192.2	198.4	6.2		.41		.02		87	3.34		Tr	Tr	.02			.39										10	15	55			SP		8	Tr	192.2	grad	Tf, Mod suls, patches white silica
198.4	207.9	9.5		1.22		.05		93	3.08							1.22					5					10	50	20					SP				Tf " " dk red stain
207.9	217.1	9.2		1.25		.03		97	3.02							1.25					15					15	55	15					SP				Tf, Mod - St suls, St gar, Mod hem
217.1	225.9	8.8		.87		.06		100	2.95							.87					15					15	50	20					SP				Tf, as above
225.9	234.9	9.0		1.36		.06		96	2.76							1.36			T		10					15	50	15					5				Tf " " Mod calc wing, Tr chlor
234.9	244.1	9.2		1.17		.08		98	2.49							1.15	.02				5					10	40	35					15	Hf-Tr Bx	238.8	grad	Tf " " To 238.8 Then Hf Tr Bx, Mod chlor
244.1	253.5	9.4		1.71		.08		103	2.69		Tr					1.71					5			Tr		10	45	30					10	Tr	248.7	Bx	Hf-Tr-Bx To 248.7 Then Tr, Mod Suls
253.5	263.6	10.1		.71		.06		64	3.21							.71					SP					10	50	25		5			10				Tf, ggy, sandy gar, Mod suls, Tr chlor
263.6	272.5	8.9		2.54	205.8 @ 1.45	.05	205.8 @ .04	66	3.17							2.54					Tr			Tr		10	60	20		SP			10				Tf, Mod chlor & suls
272.5	277.9	5.4		.77		.06		89	2.79							.77										10	45	35			5		SP				Tf " " patches Hf & SPST
277.9	287.3	9.4		2.06		.03		73	3.92		Tr					2.06					Tr					15	5	70		Tr	SP		10	Hf	277.9	brk	Hf, wk clay alt, Mod suls, Patches Tf
287.3	294.4	7.1		.53		.03		95	2.73							.53										15	15	60			Tr		5				Hf wk char - silicif alt SP suls SP gar
294.4	304.0	9.6		.98		.02		100	2.61							.98										10	10	75					5				Hf, mod clay alt Tr suls, gar
304.0	313.7	9.7		.77		.02		100	2.89							.77										10	15	70					5	Tf	306.2	grad	Hf, SP chlor alt, Tr suls To 306.2 Then Tf, mod suls
313.7	322.5	8.8		2.15		.07		100	3.39							2.15				5		Tr				10	40	20		10			10	Hf	315.3	grad	Tf, mod suls To 315.3, Then Hf; St clay alt & St suls Tr Dp?
322.5	329.1	6.6		1.80		.02		93	2.60							1.80				SP						10	20	50		5			15				Hf, mod - St clay char alt Mod suls
329.1	338.9	9.8		2.35		.03		87	2.82							2.35				Tr						10	10	60		SP	Tr		20				Hf, mod chlor alt, Mod suls
338.9	344.9	6.0		.62		.02		89	2.93							.62						Tr				10	5	60		Tr			20				Hf, as above
344.9	354.6	9.7		1.08		.02		100	2.39							1.08										15	SP	65					15				Hf, " "
354.6	364.3	9.7		1.88		.02		95	2.67							1.88						Tr				10		65					10				Hf, " "
364.3	373.8	9.5		1.54		.02		98	2.72							1.54										15	40	20		5			5	Tr	367.0	grad	Tr, ggy gar sand, Mod - St spy
373.8	383.6	9.8		2.77		.04		100	2.56							2.77										15	35	30		5			5	Hf	372.0	" "	Tr as above To 372.0 Then Hf, Mod - St suls
383.6	393.2	9.6		.58		.02		95	2.70							.58										10	SP	70		Tr	SP		SP				Hf, sp chlor, Mod suls
393.2	400.3	7.1		.26		.03		99	2.68							.26										10	25	50			Tr		1				Hf, " " patches SPSPT, sp spy

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-81
Page 2 of 2 Pages
Collar Elev. 5884.94 Final Depth 513.3
Coords. N 36,188.64 E 19,398.45
Inclination Vertical
Logged by SHA & FTG
Date: Start 3/28/62 Finish 4/4/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Chys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vs. Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
400.3	409.7	9.4		.50		.03		100	2.59							.50			Tr						Tr	10	20	50		Tr	SP		S					Hf, as above, sp. sulf.
409.7	418.9	9.2		.32	.75	.04	.75	99	2.67							.37										10	15	60		Tr	Tr		S					Hf, sp. chlor, mod calcareous, mod sulf
418.9	428.5	9.6		.31	@	.03	@	96	3.14							.31										10	25	55			S		Tr					Hf, as above
428.5	438.1	9.6		.67	.49	.05	.04	100	2.60							.67		Tr								10	25	50			S		SP					Hf, " " Mod Tt
438.1	447.8	9.7		.68		.06		91	2.51		Tr	Tr				.68										10	15	55		Tr	SP		Tr	SP				Hf, wk chlor - limonIT Tr Dp
447.8	456.7	8.9		.46		.03		83	2.60							.46										SP	5	Tr			Tr				Dp	grad		Dp, wk feldspaTh - clay alT Tr Hf Tr sulf
456.7	466.1	9.4		.22		.02		49	2.59							.22										Tr						Tr		Tr				Dp, wk silicif Tr Mz TexT
466.1	471.3	5.2		.14				83	2.58							.14														SP								Dp; brkn wk clay alT
471.3	480.0	8.7		.20				66	2.58							.20																						Dp, as above Tr Mz TexT
480.0	486.6	6.6		.31				78	2.60							.31		Tr												S		Tr			Mz	485.0	brkn	Dp, " " To 485.0 Then Mz; sp clay alT Tr sulf
486.6	495.8	9.2		.09				49	2.98							.09														SP								Mz; as above
495.8	505.9	10.1		.18				72	2.58							.18		Tr												10		Tr						Mz; brkn, mod clay alT Tr sulf
505.9	513.3	7.4		.30				84	2.60							.30														S								Mz; wk clay alT Tr sulf

AVG Rec = 89%

End of Hole

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %, or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-88
Page 1 of 2 Pages
Collar Elev. 3008.31 Final Depth 388.0
Coords. N 35,900.01 E 18,701.97
Inclination Vertical
Logged by SAB & RCG.
Date: Start 3/21/82 Finish 4/2/82

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Peach	Black	Blue Green	$CuSO_4$	Cc	Cpx	Born	Fe (2) Lim.	Py	Mag	Hem	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Wh. Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	3.7	3.7		Rock B.T																																	Rock B.T
NC 240 3.7	12.2	8.5		.13				78	2.62	.11	.01	.01						Tr										Tr	Tr	Sp		Tr		Dp	3.7		Dp, wk alT leached
12.2	22.4	10.2		.20				80	2.62	.18	.01	.01																	S	Tr							Dp; wk- mod clay alT. Tr chry
22.4	29.3	6.9		.10				95	2.59	.09	Tr	.01																	Tr								Dp; wk alT leached
29.3	38.8	9.5		.17				78	2.51	.15	.01	.01																									Dp; Tr feldspath, Tr chry, Tr. ang incl. leached
38.8	46.3	7.5		.13				92	2.60	.11	.01	.01																		Sp							Dp; as above
46.3	55.0	8.7		.12				89	2.60	.11	Tr	.01																									Dp, " "
55.0	62.6	7.6		.15				92	2.52	.13	.01	.01																	S								Dp, " " Med- st. clay alT of. 60.0
62.6	67.8	5.2		.18				40	2.60	.15	.01	.02																	Tr		Tr						Dp, wk alT leached
NX 1875 67.8	74.8	7.0		.13				21	2.60	.11	.01	.01																									Dp, as above
74.8	84.6	9.8		.19				25	2.59	.17	.01	.01									Tr																Dp; " "
84.6	87.7	3.1		.30				95	2.59	.28	.01	.01																					S				Dp; " " 4 in. patch st. clay - gr alT
87.7	96.4	8.7		.14				96	2.60	.12	.01	.01		Tr																			Tr				Dp, wk. silicif Tr chry leached. Tr ang incl
96.4	105.0	8.6		.05				91	2.59	.04	Tr	.01		Tr																							Dp; wk alT Tr Mz Text " " " "
105.0	114.6	9.6		.10				87	2.58	.09	Tr	.01		Tr															Sp	Sp							Dp; wk clay alT " " " " " " " "
114.6	123.7	9.1		.06				72	2.62	.05	Tr	.01		Tr															Tr								Dp as above
123.7	133.6	9.9		.06				91	2.61	.05	Tr	.01		Tr																			Tr				Dp; " " Tr chry
133.6	144.2	10.6		.11				94	2.58	.07	Tr	.01		.03																							Dp; as above.
144.2	154.9	10.7		1.60		.09		96	2.58	.04	.01	.02				.50	.03		Tr						5	Sp	35					5		Hf	151.6	grad	Dp, " " To 151.6 Then Hf; mod chlor. Tr suls
154.9	164.6	9.7		1.64		.03		100	2.70		Tr					1.64									10	5	60					20					Hf; mod chlor alT. Tr suls.
164.6	173.9	9.3		2.29		.04		97	2.80		Tr					2.29									5	5	65					25					Hf, st chlor alT SP suls
173.9	183.5	9.6		.65		.03		97	2.96							.65									10	5	05			Tr		5					Hf, wk clay- silicif alT Tr suls
183.5	192.5	9.0		.25		.10		98	2.82		Tr					.25		Tr							Tr	8	5	70				5					Hf; as above patches Tt
192.5	201.0	8.5		.48		.32		96	2.66	.30	.01	.01				.16									Tr	Tr	5	Tr	Tr		Sp			Do	192.5	grad	Do, high mafics, Tr chry To 200.2, Then Hf; wk sil, Tr suls.
																																		Hf	200.2	grad	
201.0	210.6	9.6		.40	117.3 @	.05	117.8 @	98	2.91			Tr				.40		Tr	Tr						Tr	5	35	30			5		5		Tt	202.6	grad	Hf, mod sil, Tr suls. To 202.6, Then Tt, Tr chlor, suls.
210.6	220.0	9.4		.66	.88	.02	.07	87	3.20							.66										5	45	20		Tr	10		15				Tt, mod silicif. Tr suls.
220.0	228.2	8.2		1.26		.03		100	2.74							1.26		Tr								5	10	60			10		10	Hf;	220.0	grad	Hf wk silicif Tr suls, Tr. Tt
228.2	237.6	9.4		.48		.03		97	2.99							.48										5	5	25			5		5				Hf, as above.
237.6	246.5	8.9		.41		.11		57	2.88			.01			NATIVE COPPER	.40										8	20	65			5		Sp				Hf " "
246.5	255.6	9.1		.48		.06		89	2.99			Tr				.42										5	10	70			Sp		10	Dp	253.9	brkn	Hf, " " To 253.9, Then Dp; mod silicif Tr suls
255.6	262.0	6.4		.66		.10		90	2.60			Tr			.05	.61		Tr								5	15	40		Tr			10	Tt	258.5	sheared	Dp, as above To 258.5, Then Tt; st silicif Tr Co
262.0	271.1	9.1		.84		.51		93	2.71		Tr	.01	.50		.05	.28										5	5	35					Sp	Dp	266.5	brkn	Tt, st silicif, Tr Co To 266.5, Then Dp leached, Tr chry
271.1	281.0	9.9		.39		.31		89	2.61	.08	Tr	Tr	.01	.22		.08										Sp	5	15		Tr							Dp; leached Tr chry Patch Hf from 272.9- 272.1
281.0	286.3	5.3		.15				87	2.54		Tr	Tr		.09		.06																	Tr				Dp; as above.
286.3	293.2	6.9		.10				94	2.61			Tr		.05		.05																					Dp, wk clay- gra. alT Tr Mz Text Tr dk. incl
293.2	302.9	9.7		.25				58	2.60		Tr	.03		.10		.15									Tr		Tr										Dp; as above Tr mal Tr Hf
302.9	313.1	10.2		.07				65	2.57	.01	Tr	.02		.01		.03													Sp				Tr				Dp; as above
313.1	324.1	11.0		.18				60	2.62	.05	Tr	.02	.02			.09													Tr								Dp; as above. Incr mafics.
324.1	325.6	1.5		NO CORE				0	0																												NO CORE
325.6	333.9	8.3		.21				92	2.63	.02	Tr	.01	.10			.08		Tr	Tr										Tr	Tr		Tr	Tr	Tt	328.5	grad	Dp, as above To 328.5, Then Tt
333.9	343.3	9.4		.12				89	3.28	.02		Tr				.10									10	65	20										Tt, wk clay- gra alT
343.3	348.3	5.0		.14				65	3.17	.01		.01				.12		Sp							10	60	20		Sp								Tt; wk clay - lim alT
348.3	355.9	7.6		.38				86	3.19		Tr	.01	.20			.17									10	65	25		Tr								Tt, as above Tr mal
355.9	362.0	6.1		.18				84	2.60		L	Tr	.08			.09		Tr							Sp	5	5							Mz	352.5	grad	Tt, " " To 352.5, Then Mz, brkn, Sp mafics. Tr suls.

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
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Do - Docite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-28
Page 2 of 2 Pages
Collar Elev. 3000.37 Final Depth 388.0
Coords. N 35,900.01 E 18,701.97
Inclination Vertical
Logged by SAA & FTG
Date: Start 3/24/62 Finish 4/2/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pirch	Black	Blue Green	$Cu-SO_4$	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
362.0	372.2	10.2		.11				95	2.60			Tr				.11		Tr	Tr									Tr	Tr	Tr		Tr					Mz, vk clay, tr. Tr sulf
372.2	378.1	5.9		.11				91	2.61			Tr	Tr			.11		1	1									1	1	1		1					Mz; as above Tr. dk. incl
378.1	388.0	9.9		.07				80	2.61			1	1	Tr		.07		1	1									1	1	1		1	Tr				Mz; as above
										Av. Rec. = 82%																											
				END OF HOLE																																	

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-89
Page 1 of 3 Pages
Collar Elev. 3003.77 Final Depth 522.7
Coords. N 35 149.70 E 18 801.46
Inclination Vert
Logged by SAA . ETG
Date: Start 4-3-62 Finish 4-17-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Barn	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	2.4	2.4		ROCK BIT																																		ROCK BIT
NC→ 2.4	11.0	8.6		.13				38	2.54	.12		.01						Tr												Tr	.90				QTzTe	2.4		QTzTe Tr chry. Possib. silicif. Dp.?
2.400	11.0	14.6	3.6	.05				7	2.62	.04		.01																			.90		Tr					QTzTe-Bx, Brkn & " "
	14.6	23.3	8.7	.38				100	2.18	.37		.01						SP													.90							QTzTe-Bx (?), Avg qTzTe Frags in rust Hem cement
	23.3	32.4	9.1	.39				58	3.03	.38		.01						Tr											Tr		Tr		Tr		Dp	23.3	88°	Dp, Brkn, Alt, Leached
	32.4	40.6	8.2	.15				89	2.58	.14		.01																										Dp, " " Tr calc veins
	40.6	51.2	10.6	.13				71	2.58	.12		.01																										Dp, Alt. Tr. N.S. Cu, sp-Med. SiO2
	51.2	57.1	5.9	.09				80	2.54	.08		.01																		SP								Dp; as above
	57.1	66.3	9.2	.23				73	2.60	.22	Tr	.01																		Tr								Dp; Brkn, Alt Leached
	66.3	71.8	5.5	.30				72	2.60	.29		.01																										Dp, " "
	71.8	80.9	9.1	—				—																														Old stope
	80.9	86.4	5.5	.21				81	2.55	.20		.01						Tr											Tr	Tr	Tr		Tr	Tr				Dp; Brkn, Alt, Leached
NX→	86.4	92.9	6.5	.35		.27		88	2.54	.23	.01	.03			.08															S								Dp; " " ", Patches of Mz Text
1875	92.9	101.1	8.2	.23		.10		85	2.53	.08	Tr	.02			.13															S								Dp, as above
	101.1	109.8	8.7	.24		.12		89	2.56	.09	.01	.02			.12				Tr							Tr SP				SP		TH						Dp, Brkn Alt, St. Matrix, med Mz Text, contact Phenom to
																																			Hf	107.8	Low	107.8 Then Hf, leached
	109.8	119.2	9.4	.66	.98	.47	.18	86	3.03	.17	Tr	Tr		.30		.02	.7	Tr	Tr							5 30 65		SP	Tr		Tr				Tt	119.2	grad	Hf, leached, med clay alt w. Dp (?) patches To 119.2, Then Tt, Tr mal, Tr mb
	119.2	128.6	9.4	.62	.64	.47	.47	86	2.89	.17				.30		.09	.06			Tr						50 20 30			Tr						Mb	122.0	grad	Tt, Tr mal, Tr mb. To 122.0, Then Mb, leached, Tr Tt
	128.6	136.9	8.3	.36		.26		97	2.76	.06				.20		.05	.05									70 10 20												Mb; leached
	136.9	145.4	8.5	.10		.05		100	2.69	.02				.03		.01	.04									70 10 20				Tr	Tr							Mb; " Incr mafics
	145.4	156.2	10.8	.16		.08		86	2.67	.02				.06		.02	.06									60 20 20												Mb, as above
	156.2	165.9	9.7	.27		.22		90	2.68	.09				.18		.02	.03									90 5 5												Mb, " " Tr Tt
	165.9	175.5	9.6	.18		.15		95	2.70	.02		Tr		.13			.03									90 SP 5												Mb " " "
	175.5	185.1	9.6	.23		.19		99	2.76					.19			.04									90 5 5												Mb, " " " Tr N.S. Cu
	185.1	190.1	5.0	.49		.41		96	2.69	.35				.06			.08									90 5 5							Tr					Mb " " as above
	190.1	198.7	8.6	3.58	40.2	3.21	40.2	59	2.74	2.80	Tr	Tr		.41			.37	20								20 20 40				Tr					HF	191.0	grad	Mb To 191.0 Then gry vuggy ST Lim & N.S. Cu in Hf, & Exotics
	198.7	208.4	9.7	.71	.16	.41	.94	95	3.11	.35	Tr	.01	.05		.15		.15	Tr						Tr	Tr	10 15 50						20						Hf, Med Hem, sp sols
	208.4	218.1	9.7	.33		.23		100	2.50	.20	Tr	.01	.02				.10									10 35 40		5				SP						Hf, w/ Tr patches of Mb + Tt, Med N.S. Cu, Med Lim
	218.1	225.3	7.2	.46		.26		81	2.78	.20	.01	.02	.03				.20	SP								10 20 60		5										Hf; " " " , Patches of Alt Leached Dp
	225.3	234.2	8.9	.21		.17		99	2.63	.15	Tr	.01	.01				.04									10 15 70		SP										Hf; dense, Med chlor, patches of Dp
	234.2	242.4	8.2	.37		.19		75	2.98	.18	Tr	.01					.18	Tr								10 10 60		Tr										Hf, as above
	242.4	250.4	8.0	.32				92	2.63	.02	Tr	.01					.29									10 10 70												Hf, " "
	250.4	259.2	8.8	.13				97	2.61	.01	Tr	Tr					.12									15 10 70												Hf, dense, Speckled, Med S (?) Tr sols
	259.2	268.5	9.3	.24				93	2.56	.06	1	1			.15		.03									SP SP 20	Tr						Tr		Mz	262.3	45°	Hf, as above To 262.3, Then Mz; wk. alt, Tr mal
	268.5	277.5	9.0	.31		.17		99	2.59	.08	Tr	.01	.08				.14									10 5 75							SP		Hf	268.5	brkn	Hf, mod silicif, chlor Tr Mz
	277.5	284.4	6.9	.40		.07		92	2.64	.02	.01	.01	.03				.33									10 5 65	Tr						5	Tr				Hf, as above Mz from 287.7 - 290.0
	284.4	292.0	7.6	.24		.13		86	2.61	.09	Tr	.01	.03				.11									5 SP 40							SP		Mz	287.0	63°	Hf, " " To 287.0, Then Mz, wk clay-jaro alt
	292.0	301.2	9.2	.36	.23.5	.25	.23.5	93	2.55	.02	Tr	.01	.22				.11									10 55 20					Tr	Tr			Tt	292.7	60°	Mz; as above To 292.7, Then Tt; mod silicif. Tr mal
	301.2	307.1	5.9	.65	.46	.39	.23	100	2.65	.05	1	.01	.33		.15		.11									10 55 25					5							Tt; mod silicif, leached, Tr mal
	307.1	315.5	8.4	.43		.10		87	2.63			Tr	.10				.33									10 55 20					SP	5	Tr					Tt, mod silicif, Tr sulf
	315.5	325.2	9.7	.24		.05		91	2.64			Tr	.05				.19									10 30 45					SP	SP			Hf	320.4	grad	Tt, as above To 320.4, Then Hf, mod silicif
	325.2	334.9	6.7	.69		.08		100	2.61			Tr	Tr				.69									10 15 70							Tr					Hf, mod silicif, Tr sulf
	334.9	339.3	7.4	.41	29.1	.05	29.1	95	2.67			Tr					.41									10 10 70				Tr	S	S						Hf, as above
	339.3	347.5	8.2	.55	@	.05	@	100	2.67								.55									10 10 70					SP	5						Hf, wk. silicif Tr sulf. Mod Tt
	347.5	354.3	6.8	.60	.56	.13	.08	95	2.84								.60									10 5 60					5	10						Hf, as above

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr), Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Manzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-89
Page 2 of 2 Pages
Collar Elev. 3003.97 Final Depth 520.7
Coords. N 35749.90 E 18801.46
Inclination vert
Logged by SAA - FTG
Date: Start 4-3-62 Finish 4-17-62

	Depth From	Depth To	Int'vl	Elev	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz	QUARTZ	CHLORITE	BARITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	354.3	363.1	8.8		.23				100	2.58							.23		Tr	Tr					Tr	8	5	65	Tr		SP	15	Tr	HF			HF, dense, silicified, wk sulf
	363.1	373.7	10.6		.32				89	2.64			Tr				.32	Tr	1	1					1	10	5	65		1	5	10	1					HF; as above
	373.7	383.0	9.3		.38				100	2.61			1				.38		1	1					1	10	5	65		1	10	5						HF, " "
	383.0	391.4	8.4		.33				93	2.63							.33		1	1						10	10	60		1	5	5	Tr					HF, " " Leached
	391.4	401.2	9.8		.38				79	3.18			Tr				.38		1	1						15	25	50		SP	5	SP	SP					HF, Leached, sp. ins. ca. Mod Tt.
	401.2	410.5	9.3		.34				92	2.64			1				.34		1	1						15	10	65		Tr	5	5	Tr					HF, " " "
	410.5	420.5	10.0		.25				81	2.38			1		.07		.18		1	1						15	10	60	Tr	1	10	5	1		Dp	416.6		HF, " " " @ 416.6 thru Dp, Tr ms ca & cm
	420.5	423.1	2.6		.09				25	2.60			1		.05		.04		1	1									1	SP	SP	Tr	1					Dp, Bkn. alt Leached
	423.1	430.4	7.3		.11				75	2.63						.01	.10		1	1									1	Tr	Tr	1						Dp; wk clay alt Tr suls, mal. Tr dk. ind
	430.4	439.8	9.4		.08				64	2.59							.08			1						Tr			1	1	1	1						Dp; as above ≥ 6" patches And, post min dike
	439.8	447.8	8.0		.11				73	2.63						.01	.10			1									1	1	1	1						Dp, wk alt Tr suls Tr Mz. Text
x →	447.8	456.9	9.1		.13				20	2.62							.13		Tr	1									1	1	1	1						Dp, bkn. wk alt Tr suls Tr Mz. Text.
432	456.9	466.2	9.3		.09				30	2.64							.09		1	1						Tr			1	1	1	1						Dp, as above Patch And; post min dike
	466.2	472.2	6.0		.11				44	2.62							.11		1	1									1	1	1	1						Dp, " "
	472.2	481.2	9.0		.05				78	2.63							.05		1	1									1	1	1	1						Dp, wk alt Tr suls Tr dk ind Tr Mz Text
	481.2	487.9	6.7		.03				100	2.62							.03			1					Tr				1	1	1	1						Dp; as above
	487.9	498.5	10.6		.04				90	2.63							.04			1									1	1	1	1						Dp; " "
	498.5	507.0	8.5		.06				92	2.63							.06			1									1	1	1	1						Dp; " "
	507.0	516.6	9.6		.07				82	2.62							.07			1									1	1	1	1						Dp; " "
	516.6	520.7	4.1		.06				65	2.20							.06			1									1	1	1	1						Dp; " "

Avg Rec = 83%

END OF Hole

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-90
Page 1 of 1 Pages
Collar Elev 2713.27 Final Depth 246.4
Coords. N 37,853.17 E 16,397.40
Inclination Vertical
Logged by SAA + FRG
Date: Start 4/3/62 Finish 4/9/62

	Depth From	Depth To	Int'vl	Elev	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Senarite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Hematite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	7.7	7.7						Rock	B.T																													Rock B.T
NC → 2.960	7.7	16.6	8.9		20		.12		54	2.45	.10	.01	.01			.08			Tr		Tr								Tr	SP	Tr			Tr	Dp	7.7	?	Dp, bleached, Alt, sp Lim, Tr Bx
	16.6	25.8	9.2		1.14		.107		90	2.57	.105	.01	.01			.07														Tr			Tr						Dp as above, Med clay
	25.8	34.1	8.3		.52		.52		93	2.46	.51	Tr	.01			.05														SP									Dp, " " " Tr cc
	34.1	44.5	10.4		.52		.46		100	2.54	.45	Tr	.01			.06																							Dp bleached, Dike, Alt, Tr cc, clay
	44.5	50.6	6.1		.34	32.9	.25	32.9	92	2.55	.24	Tr	.01			.09																							Dp as above
	50.6	56.1	5.5		.59	@	.40	@	89	2.55	.40	Tr	Tr			.19														Tr									Dp " " , 3 ft. sist. incl
	56.1	66.8	10.7		.38	71	.26	58	86	2.59	.26		Tr			.12																							Dp, bleached, Alt, Tr Mo, Tr Mz
	66.8	76.4	9.6		.55		.45		83	2.51	.44	Tr	.01			.10														SP									Dp as above
	76.4	86.8	10.4		.27		.14		77	2.53	.14		Tr			.13																							Dp, Bleach, Alt, Tr Mo, Tr Mz, Tr Mz Tect
	86.8	93.3	6.5		.39		.25		99	2.59	.24		.01			.14	Tr			Tr					Tr								Tr	SP					Dp, " " , Patch of Tr Mafics, Mz Tect
	93.3	102.5	9.2		1.35		1.04		81	2.61	1.03	Tr	.01			.30	.01				Tr																		Dp, as above, Med clay
	102.5	109.5	7.0		1.89		1.58		78	2.56	1.57	Tr	.01			.20	.11																						Dp " "
	109.5	124.3	14.8		—		—		-	-																													Old Stope
	124.3	130.0	5.7		.57		.34		5	2.59	.34	Tr	Tr			.15	OX		Tr	Tr									Tr	Tr	Tr			Tr	Tr				Dp, Bro, Alt, bleached
NX → 1.895	130.0	140.4	10.4		2.54	38.2	1.92	38.2	63	2.15	1.92		Tr			.60	.02		SP	Tr									SP	SP				S	Q	Dp Bx?	130.0	?	Dp Bx, St Lim gg, Med Mz Cc, Strongly recemented "pebble dike"
	140.4	151.0	10.6		.47	@	.15	@	46	2.05	.15					.20	.12		Tr											40				S	S			Dp Bx, Aug to sub Aug frags of Sp (?) in Chloritic Matrix " "
	151.0	161.2	10.2		.51	108	.11	66	82	2.06	.11					.10	.30													50				S	15			Dp Bx (Pebble dike ?) as above, Med Sulf, Med Chlor
	161.2	162.5	1.3		1.05		.41		91	2.08	.41					.54	.10													70				S	15			Dp Bx " " as above " "
	162.5	172.0	9.5		—		—		-	-																													Old Stope
	172.0	181.1	9.1		1.00		.10		31	2.82	.10					.85	.05		Tr	Tr										SP	25			S	10			Dp Bx, St chlor + Px, SP = cc
	181.1	191.0	9.9		.86		.07		55	1.75	.07					.65	.14													1	35			S	SP			Sp Bx, Crnt St chlor matrix, St fr, SP cc
	191.0	196.0	5.0		.31	60.5	.05	60.5	70	2.27	.05					.10	.16													5	30			10				Sp (?) intense chlor, Tr sed, SP sulf
	196.0	204.3	8.3		.34	@	.05	@	72	2.23	.05					.20	.09		Tr											5	55			15				Dp-Bx " " matrix "
	204.3	213.1	8.8		.73	65	.10	70	52	2.08	.10					.60	.03					Tr								5	60			20				Dp-Bx, gg St clay, Aug frags
	213.1	223.6	10.5		.53		.08		44	2.77	.08					.40	.05													5	20			5				Dp-Bx " " " No calc
	223.6	232.5	8.9		.58		.10		59	2.23	.10					.38	.10													5	55			35				Dp-Bx " " No calc Tr asbestos
	232.5	242.6	10.1		.35		.06		64	2.16	.06					.20	.07													5	50			5				Dp-Bx " "
	242.6	245.0	2.4		.4		.07		91	2.41	.07					.07														5	40			5				Dp-Bx as above, May have Tr of meta sed
	245.0	246.4	1.4		.25				90	2.45	.05					.25	.05												Tr	5	50			8				Dp-Bx as above, Tr sulf " "
							Avg Rec		70%																														
				End of Hole																																			

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 15-91
Page 1 of 2 Pages
Collar Elev. 3030.08 Final Depth 515.1
Coords. N 37,104.01 E 19402.24
Inclination Vert
Logged by SAA, PBG
Date: Start 4-4-62 Finish 4-16-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys	Pitch	Black	Blue Green	Cu SO4	Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jarosite	FERRUITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	4.9	4.9		ROCK BIT																																			ROCK BIT
4.9	15.4	10.5		.34				71	2.93	.30	Tr	.01		.03				SP								SP	20	50	5		5	SP	Tr		Hf	4.9		Hf, wk-med clay-jaro alT Tr mal, sul. Tr Tt.
15.4	25.1	9.7		.23				100	2.76	.02	Tr	Tr			-	.21		Tr	Tr							5	15	55	SP		SP							Hf, wk alT Tr chry, sul Tr Tt
25.1	33.7	8.6		.35				100	2.88	.02	1	.01			-	.32	Tr									10	10	60	Tr		Tr	5						Hf, as above Mod Tt
33.7	43.2	9.5		.28				96	2.65	Tr		Tr			-	.28										10	5	65		Tr		5						Hf, as above. Tr chlor
43.2	52.8	9.6		.10				96	3.16	.07		.01				.02										10	50	35		1		SP	Tr		Tt	48.3	broken	Hf, as above To 48.3'. Then Tt, Tr suls
52.8	62.6	9.8		.15				75	3.02	.10	.01	.01				.03		SP								10	55	25		1		SP						Tt, Sp clay alT. Tr suls
62.6	73.1	10.5		.28		.21		88	2.91	.20	Tr	.01				.07		Tr								10	60	25		1								Tt, " " " Tr sul. cu
73.1	82.8	9.7		2.12		1.97		70	3.02	1.95	.01	.01				.15		SP	Tr							10	50	30		1		1						Tt " " " "
82.8	92.3	9.5	—	.41		.32		91	2.89	.31	Tr	.01				.09		Tr								10	40	30		1		1						Tt " " " "
92.3	101.9	9.6		.81	.116	.22	.116	97	2.87	.21	Tr	.01			-	.59										10	40	20		1		15						Tt, " " St chlor at 99' Mod sul.
101.9	111.3	9.4		1.23	.6	.24	.6	100	2.65	.23	Tr	.01			-	.99										15	50	25	Tr	1		10						Tt, First 3' intense chlor, then decrease To.
111.3	118.5	7.2		.23	.69	.08	.34	70	3.06	.07	Tr	.01			-	.15										15	40	30		1		SP						Tt, dense, silicified, sp Mz cu, To Hf
118.5	122.6	9.1		.30				89	3.05	.25	.01	.01				.03		SP								15	45	30		1		1						Tt, as above
122.6	138.5	10.9		.30				93	3.13	.15	Tr	.01				.14		Tr								10	60	20		1		1						Tt " " , sp Hf patches
138.5	149.0	10.5		.72		.42		91	2.83	.22			.20		-	.55				Tr	Tr					10	30	60	Tr						Hf	142.5	grad	Tt; " " To 142.5, Then Hf; wk chlor alT Tr suls
149.0	157.1	8.1		.34		.03		95	2.62						-	.34										15	10	75										Hf, as above, Tr Tt
157.1	166.4	9.3		.17		.02		59	3.68						-	.17										20	5	65	S	Tr		5						Hf; " "
166.4	175.0	8.6		.45		.30		100	2.82	.05			.25			.15		Tr								70	10	20	Tr			SP			Mb	167.4	grad	Hf, " " To 167.4, Then Mb, Tr Hf
175.0	184.7	9.7		.71		.41		93	2.74	.11			.30			.39										60	10	30										Mb; leached; Tr Hf
184.7	189.6	4.9		.25		.05		99	2.68						-	.25										70	5	30										Mb; "
189.6	198.6	9.0		.39				100	2.79						-	.39									Tr	85	5	10				SP						Mb; " " "
198.6	208.2	9.6		.15				99	2.78							.15								Tr		90	5	5										Mb, Tr suls, Tr gar Tr sl
208.2	218.0	9.8		.20				86	2.98							.20										90	5	5	Tr	Tr								Mb; Tr chlor, Tr suls
218.0	227.7	9.7		.12				98	2.70							.12					Tr					85	5	10										Mb, as above
227.7	237.4	9.7		.19				99	2.69							.19										85	5	10										Mb, " "
237.4	244.7	7.3		.09				99	2.71							.09										90	5	5				Tr						Mb, " "
244.7	254.3	9.6		.13				95	2.72							.13										90	5	5										Mb, " "
254.3	264.0	9.7		.08				96	2.69							.08		Tr								90	5	5										Mb, " "
264.0	275.6	11.6		.07				99	2.71							.07							Tr	Tr	Tr	75	5	20	Tr	Tr	Tr			Tr				Mb, " " Tr gar, sl
275.6	284.1	8.5		.29				99	2.72							.29					Tr					60	10	30										Mb; Mod chlor; Tr suls
284.1	293.4	9.3		.14				98	2.68							.14										80	5	15										Mb, Tr chlor, Tr suls
293.4	303.0	9.6		.09				97	2.58							.09										85	5	10	Tr									Mb, as above
303.0	312.3	9.3		.09				100	2.59							.09										80	5	15										Mb, Mod chlor, wk clay alT
312.3	318.9	6.6		.21				97	2.59							.21										80	5	15										Mb, as above Tr suls
318.9	327.5	8.6		.62		.04		91	2.67							.62										75	5	20		Tr		SP						Mb; Mod-St chlor wk clay alT Tr suls
327.5	332.4	4.9		.31		.03		92	2.69							.31										65	3	30	SP									Mb; as above Hf Tex I
332.4	339.8	7.4		.34		.03		100	2.66							.34										50	5	40	S						Hf	332.4	grad	Hf, Mod-St chlor, Sp suls
339.8	349.1	9.3		.50		.03		82	2.98							.50										15	5	70	SP			5						Hf " " "
349.1	357.3	8.2		.26		.04		71	3.11							.26										10	SP	85				SP						HF " " Mod calc veins
357.3	366.6	9.3		.43		.06		87	2.56							.43					Tr					10		65				20						Hf, as above
366.6	371.0	4.4		.80	.1565	.05	.1565	100	2.73							.80							Tr	Tr		10		60				25						Hf, " " Tr galena + sphal
371.0	378.9	7.4		.24	.6	.03	.6	100	2.61							.24										15		70				5						Hf; Mod chlor, Tr suls, Mod calc veins
378.9	387.2	8.8		1.35	.69	.06	.04	61	2.75							1.23							Tr	Tr		15		60	5			10		Tr				Hf, wkn; Mod clay-chlor alT. Tr suls.
387.2	395.0	7.8		.50		.04		50	3.15							.50										10		60	SP			25						Hf, mod chlor alT Tr suls Tr fluor, veinlts.

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Toctite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Docite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-71
Page 2 of 2 Pages
Collar Elev. 3030.08 Final Depth 515.1
Coords. N 32,109.01 E 18403.34
Inclination Vert
Logged by SAA - PTG
Date: Start 4-4-62 Finish 4-16-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
395.0	403.9	8.9		1.23		.04		83	3.16							1.23			Tr				Tr	Tr	10	SP	65		Tr		25	Tr					Hf; med chlor alt. Tr suls. Md Tt. Tr fluor ve. alt. w. gn, sl
403.9	412.5	8.6		.35		.05		89	2.54							.35			1		Tr		1		10	1	75		1		Tr	15	1				Hf; as above
412.5	422.2	9.7		.35		.02		86	2.52							.35			1		1		1		10	1	65		5	Tr		15	5				Hf; as above
422.2	431.0	8.8		.41		.01		92	2.67							.41			1		1				10		65		8			15					Hf; med chlor alt. Tr suls. Tr fluor w. gn.
431.0	438.9	7.9		1.06		.02		77	2.58							1.06			1		1				10		60		15			10					Hf; med clay-chlor alt. Tr suls, gn
438.9	446.6	8.2		.55		.02		48	2.99							.55			1		1				10	1	60		5			20					Hf; med chlor alt. Tr suls
446.6	457.3	10.7		1.01		.02		72	2.78							1.01			1		1		Tr		10	5	60		5			20	Tr				Hf; med clay-chlor alt. Tr suls. Tr fluor w. gn.
457.3	467.0	9.7		.34		.05		64	2.54							.34			1		1		1		10	10	60		5	1		10	1				Hf; " " " " SP suls
467.0	475.4	8.4		.73		.04		78	3.05							.73			1		1				15	5	60		5	1		15					Hf; as above. ST suls
475.4	483.2	7.8		.26		.02		85	2.58							.26			1						5	Tr	20	SP	20	1		5		Dp	477.1	60°	Hf; " " To 477.1, Then Dp(?) ST clay-cal alt. Tr suls
483.2	490.0	6.8		.21				80	2.51							.21			1						Tr			1	25	1		Tr					Dp; mod - ST clay - cal. alt. Tr suls.
490.0	499.0	9.0		.21				61	2.55							.21			1									1	25	1		1					Dp; ST clay alt. Tr suls. Tr Bx?
499.0	508.1	9.1		.20				34	2.57							.20			1									1	10	SP		SP					Dp; as above.
508.1	515.1	7.0		.12				76	2.61						.08	.04			1		Tr							1	P	Tr		1					Dp; vk- med clay alt. Tr suls

Avg. = 86%

End of Hole

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-32
Page 1 of 1 Pages
Collar Elev. 2711.12 Final Depth 268.3
Coords. N 87,292.18 E 16,055.19
Inclination Vert
Logged by SAA - FTG
Date: Start 4-9-62 Finish 4-14-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	14.0	14.0																																				Rock Bit
NC → 2-400	14.0	24.1	10.1		.198		.13		78	2.83	.12	Tr	.01			.45	.40		Tr	Tr									Tr	Tr	Tr		Tr			Dp	14.0	?	Dp, Brkn, Mod leached, SP-Mod Mal & chrx
	24.1	34.2	10.1		.27		.12		57	2.80	.11		.01			.15						Tr																	Dp, " " " Tr suls, Patch of Hf @ 22.5'
	34.2	44.0	9.8		.33				43	2.77	.10		.01			.15	.07													SP			SP					Dp, Brkn, Leached, Tr cc, chrx, Mod Lim
	44.0	52.6	8.6		.20				82	2.93	.14	Tr	.01			.05						Tr								5			Tr			AND	44.0	?	And, Leached, ggx To 48.1' Then Dp Cont with
	52.6	61.6	9.0		.24				88	2.25	.17	.01	.01			.05			5											5				Tr		Dp	48.1	50°	Dp, Leached Alt, Mod lim
	61.6	69.1	7.5		.11				90	2.31	.07	Tr	.01			.03			SP											5								Dp, Leached, Alt, Tr chrx
	69.1	79.8	10.7		.08				76	2.61	.05	Tr	.01			.02						Tr								SP		Tr							Dp, as above, Tr sc, SP-Mod silic
	79.8	85.7	5.9		.07				89	2.57	.03	Tr	.01			.03																							Dp, Alt, leached, SP sils, Mod silicification
	85.7	96.5	10.8		.13				79	2.54			Tr	.01		.12			Tr											Tr		SP							Dp, leached Tr silicif, Tr dk incl
	96.5	102.8	6.3		.14				91	2.61			Tr	Tr		.14																Tr							Dp, Tr silicif, Tr sul, Tr dk incl
	102.8	112.8	10.0		.15				100	2.54			Tr			.15																		Tr					Dp, as above
	112.8	121.1	8.3		.12				90	2.60			Tr			.08	.04															SP	SP		SITST	115.0	brkn	Dp, " " To 115.0 Then SITST, Tr chlor alt
	121.1	131.7	10.6		.13				67	2.72						.04	.09																						SITST, Tr chlor, Tr cal
	131.7	142.2	10.5		.08				82	2.71							.08													SP									SITST, as above Tr clay alt
	142.2	151.3	9.1		.12				93	2.63							.12									10	SP	65					25		Hf	142.2	brkn	Hf, brkn wk clay alt Tr suls, Patches post-min And
	151.3	161.7	10.4		.17				76	2.62							.17									10	1	60					25						Hf, as above
	161.7	172.0	10.3		.49		.01		97	2.60							.49			SP						10	5	65		Tr	Tr		20						Hf, wk clay alt Tr suls
NX → 875	172.0	180.0	8.0		.81	51.8 C	.07	51.8 C	95	2.94							.81									10	10	60					20						Hf, wk silicif, chlor Sp suls Mod Tt
	180.0	190.0	10.0		.47		.01		98	2.72							.47			Tr						10	5	60			5	Tr	10						Hf, as above Patches Tt
	190.0	200.4	10.4		.54	50	.01	.02	92	2.75							.54									10	10	55			5	SP	10						Hf, as above
	200.4	210.0	9.6		.36		.01		90	2.37							.36									10	5	60			5	5	10						Hf, wk chlor alt Tr suls, Mod Tt
	210.0	219.5	9.5		.39		.01		96	2.84							.39									10	5	65			5	SP	5						Hf, wk chlor alt Tr suls
	219.5	227.2	7.7		.31		.01		99	2.68							.31								Tr	10	SP	70			5	1	15						Hf, mod silicif, Tr suls
	227.2	237.2	10.0		.34				98	2.68							.34									10	1	75			5	1	5						Hf, wk silicif, Tr suls
	237.2	246.6	9.4		.09				95	2.65							.09									Tr		20					SP		And	238.3	60°	Hf, as above To 238.3, Then And, post min dike Tr cal
	246.6	254.3	7.7		.05				100	2.63							.05													Tr								And, post min dike Tr cal
	254.3	262.7	8.4		.07				91	2.61							.07																					And, as above
	262.7	268.3	5.6		.09				100	2.61							.09																					And, as above

Avg Rec = 86%

END OF Hole

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Manzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-93
Page 1 of 2 Pages
Collar Elev. 2988.73 Final Depth 468.0
Coords N 36,851.08 E 16,851.12
Inclination Vert
Logged by SAA - PTG
Date: Start 4/16/62 Finish 4/28/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Un. Qtz	QUARTZ	CHLORITE	JAROSITE	BARITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	1.5	1.5		Rock	B.T																																		Rock B.T
N.C →	1.5	10.9	9.4		.39		.34		90	2.58	.34		Tr			.05														Tr	Tr	Tr					Ak	1.5	—	Ak; wk clay alt. Tr chry.
2.900	10.9	20.8	9.9		.63		.50		90	2.56	.50					.13																				Tr				Ak, as above Tr barite
	20.8	30.0	9.2		.67		.58		92	2.51	.50	.02	.06			.09										Tr					Sp									Ak wk. clay alt Tr chry.
	30.0	37.5	7.5		.78		.71		100	2.56	.68	Tr	.01	.02		.07													Sp											Ak; as above. Tr mal
	37.5	47.5	10.0		.84		.75		94	2.56	.78		.01	.04		.09													Tr	Tr										Ak; as above Tr barite
	47.5	57.7	10.2		1.49		1.36		91	2.83	1.32	.01	.01	.02		.13																	Tr							Ak; as above
	57.7	64.5	6.8		1.11		1.02		100	2.53	1.01	Tr	.01	Tr		.09																								Ak; " "
	64.5	73.5	9.0		1.07		.96		89	2.54	.91		.01	.04		.11																								Ak, leached, Alt., sp. chry
	73.5	82.8	9.3		.68	1468	.57	1468	95	2.55	.54		Tr	.03		.11																		Tr	Tr					Ak, as above
	82.8	93.1	10.3		.66	8	.55	8	95	2.54	.53			.02		.11																								Ak; " "
	93.1	102.5	9.4		.43	.73	.38	62	86	2.54	.37			.01		.05																								Ak, leached wk clay-jaro alt Tr chry.
	102.5	110.6	8.1		.56		.48		100	2.55	.47	Tr		.01		.08																								Ak; as above.
	110.6	121.2	10.6		.34		.25		82	2.52	.25			Tr		.09																								Ak; " "
	121.2	131.6	10.4		.62		.48		84	2.54	.47		.01			.14																	Tr							Ak, leached Sp clay alt Tr chry.
	131.6	142.3	10.7		.69		.44		60	2.47	.42		.02			.25			SP												8		SP							Ak, leached Sp clay-lim-chlor alt Sp chry
	142.3	152.4	10.1		.63		.50		89	2.48	.50		Tr			.13			Tr												SP		Tr							Ak, brkn, leached, sp clay alt Tr chry
	152.4	157.7	5.3		.49		.35		75	2.56	.35					.14																Tr					Dp	153.4	brkn	Ak, as above To 153.4. Then Dp. Leached Alt, Tr chry
NX →	157.7	167.5	9.8		.31		.24		87	2.52	.24	Tr				.07																								Dp, Leached, Alt, Tr chry, Sp lim
1.875	167.5	178.7	11.2		.17				71	2.56	.14					.03																								Dp; as above Tr Jaro
	178.7	188.8	10.1		.14				79	2.50	.10					.04			SP																					Dp; " " "
	188.8	198.0	9.2		.10				83	2.57	.02					.08			Tr	Tr										Tr										Dp; " " "
	198.0	208.0	10.0		.13				70	2.54	.09					.04																								Dp; " " "
	208.0	218.4	10.4		.16				75	2.56	.14		Tr			.02																								Dp; Brkn, Leached, Tr chry, Sp Lim
	218.4	228.0	9.6		.35		.29		78	2.49	.28		.01			.06																		SP						Dp; as above
	228.0	237.0	9.0		.25		.14		65	2.40	.42	Tr	.02			.31			SP																		DP-BX	235.5	Brkn	Dp; " " To 235.5. Then Dp-BX (good example)
	237.0	240.0	3.0		.83	292	.29	292	17	1.97	.28	Tr	.01			.54			S												40				S					Dp.Bx SSY, ST Lim + Jaro Alt Mod M.S. Cu
	240.0	247.8	7.8		1.60	8	.54	8	55	1.70	.53	1	.01			1.06			35												45				15					Dp.Bx as above
	247.8	257.2	9.4		1.11	1.10	.51	.47	73	2.49	.50	1	.01			.60			8												20	Tr			8					Dp Bx " "
	257.2	266.3	9.1		.20		.08		89	2.56	.07		.01			.12			Tr												5				SP		DP	257.2	Brkn	Dp, Brkn, Leached, Alt, Mod Lim + Jaro, Tr M.S. Cu
	266.3	273.2	6.9		.14				92	2.49	.07					.07															SP									Dp, as above, Sp Mafics, Tr Mz Text.
	273.2	279.4	6.2		.18				94	2.51	.06					.12			SP												Tr				Tr					Dp, " " ST Mafics, ST Mz Text
	279.4	287.7	8.3		.13				89	2.48	.07					.06																								Dp; " " " " " " "
	287.7	297.9	10.2		.27		.09		63	2.47	.08		.01			.18			Tr																					Dp, 35% fg. mafics speckled in fspar matrix Sp clay alt Tr suls
	297.9	308.0	10.1		.72		.46		86	2.50	.40	.02	.04			.26																								Dp; as above Sp clay - jaro alt Salt-pepper Text
	308.0	318.4	10.4	-	.51	286	.37	286	88	2.45	.30	.02	.05			.14			SP																					Dp; " " Tr chry. Tr Mz. Text
	318.4	326.5	8.1		.50	.58	.29	.36	97	2.40	.20	.01	.03			.26				Tr																				Dp; " " 15% mafics. Tr chry, suls
	326.5	335.4	8.9		.33		.03		74	2.53	.07	.01	.01			.24																			Tr					Dp; as above Tr normal Dp; mod silicif, Sp clay alt
	335.4	340.5	5.1		.22				90	2.50	.05	.01	.01			.15																	Tr							Dp; mod silicif; ST Mz Text
	340.5	348.2	7.7		.04				85	2.53	Tr	Tr	Tr			.04																								Dp; wk silicif Tr suls
	348.2	358.5	10.3		.33				84	2.54	.05		Tr			.28																		SP						Dp; spotty chlor alt wk clay alt Tr suls. Tr dk mnl
	358.5	369.3	10.8		.20				77	2.53	Tr					.17	.03		Tr															Tr						Dp; mod silicif Tr suls
	369.3	378.5	9.2		.25				88	2.60						.03	.22														Tr						Mz	376.0	brkn	Dp; as above To 376.0, Then Mz; wk alt. Tr suls
	378.5	387.0	8.5		.37		.02		95	2.59						.03	.34									Tr							Tr							Mz; st silicif Tr suls
	387.0	393.5	10.5		.32				91	2.57							.32																							Mz; mod silicif; Tr suls

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ABARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows:
Trace (Tr); Sparce (Sp) < 3 %
Moderate (Md) 3-50 %
Strong (St) + 50 %

Note (3)
Tf - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 0-23
Page 2 of 3 Pages
Collar Elev. 6988.73 Final Depth 4630
Coords. N 36,956.08 E 16,851.12
Inclination Vert
Logged by SAA EFG
Date: Start 4/16/66 Finish 4/28/66

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
397.5	407.6	10.1		.30				93	2.58							.30		Tr	Tr						Tr					Tr	Tr	Tr	Tr					Mz; mod silicif, Tr sulf.
407.6	415.9	8.3		.34				91	2.60							.34		1	1						1					1	1	1	1					Mz, as above
415.9	423.7	7.8		.30				86	2.60							.30		1	1						1	Tr				1	1	1	1					Mz, " "
423.7	433.9	10.2		.31				73	2.60							.31		1	1						1					1	1	1	1					Mz, " "
433.9	443.5	9.6		.38		.03		87	2.61							.38			1						1	Tr				1	1	1	1					Mz, " "
443.5	451.4	7.9		.32		.02		95	2.62							.32			1						1					1	1	1	1					Mz, " "
451.4	460.0	8.6		.55		.01		81	2.73							.55			1						1	1				1	1	Sp	1					Mz, " "
460.0	463.0	3.0		.33		.01		100	2.65							.33			1						1	1				1	1	1	1					Mz, " "
									Aver	Rec. =		84%																										
					END	OF	HOLE																															

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Docite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-94
Page 1 of 2 Pages
Collar Elev. 3082.69 Final Depth 429.3
Coords. N 36643.47 E 13400.66
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 4/16/62 Finish 4/27/62.

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green	Cu SO4	Cc.	Cpy.	Born	Fe (2) Limo	Py	Mag	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JASPER	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	17.5	17.5		Rock	B.T			—	—																													Rock B.T
17.5	23.1	5.6		.39				34	2.91	.36	Tr	.01	Tr			.02		Tr								15 50 30		5		Tr	Tr	Tr		Tt	17.5	—	Tt, leached, wk limeit, mod Hf
23.1	29.6	6.5		.24				96	2.61	.15	1	.01				.08		1	Tr							15 30 40		5		5	1	1		Hf	24.0	grad	Tt, as above To 24.0, Then Hf, leached, wk silicif
29.6	39.6	10.0		.18	88.5	.16		81	2.91	.04	.21	.01	Tr			.12		Sp	1							10 35 50		Sp		Sp	1						Hf, leached, s.p. l.m, Mod w.s. Cu St Tt
39.6	49.4	9.8		.40	@	.35	@	95	2.46	.33	.01	.01	1			.05		1	1							10 30 60		1		1	1						Hf, as above, sp silicif. St Tt
49.4	59.4	10.0		.13	.62	.09	.55	84	2.64	.07		.01	.01			.04		Tr	1							15 10 70		1		Tr	1	Tr					Hf, " " " " patches Tt
59.4	68.4	9.0		.58		.53		100	2.58	.50		Tr	.03			.05		1	1							15 10 70		Sp	Sp	1	1						Hf, as above
68.4	78.2	9.8		.81		.74		95	2.59	.60		.01	.13			.07		1	1							15 15 60		5	Tr	1	1	Sp					Hf, " "
78.2	88.2	10.0		.13		.11		91	2.57	.09	Tr	.01	.01		Tr	.02		1	1							5 10 80	Tr	5	1	5	1			Mz	83.0	brkn	Hf, " " To 83.0, Then Mz, sT s.l.c.f, wk calcif, leached
88.2	96.7	8.5		.34				92	2.51		Tr	.01	.30		.03			1	1							Tr	Sp	1	Sp	1	Sp	1	Tr				Mz, as above, Tr Hf
96.7	105.8	9.1		.20				96	2.58	.02	Tr	Tr	.15		.01	.02		Sp	1							1	Tr	5	1	1	1	Sp	1				Mz " " "
105.8	115.9	10.1		.13		.09		83	2.60			Tr	.09		.04			1	1										1	1	1	1	1				Mz, leached, Alt, Tr Mal
115.9	123.0	7.1		.74		.68		83	2.55	Tr	.01	.02	.65		.02	.04		1	1							Tr	5	5	1	1	1	1	1		Tt	122.0	40°	Mz, as above To 122.0' Then Tt, leached
123.0	128.5	5.5		.51		.43		38	2.02	.08	Tr	.01	.34			.08		1	1							1	35	30		1	1	1	1				Tt, leached, sp chrys & Hf
128.5	138.5	10.0		.52		.47		86	2.55	.45	.01	.01	Tr			.05		1	1									Tr	1	Tr	1			Mz	128.5	Sern	Mz, leached Alt, Tr chrys & Mal
138.5	148.1	9.6		2.48		2.21		98	2.44	.50	.01	.01	1.69			.05	.22	1	1							5	30	20	1	1	1	Tr	1	Tt	142.5	45°	Mz, as above To 142.5' Then Tt leached, sp w.s. Cu
148.1	158.8	10.7		.53		.46		79	2.56	.20	.01	.02	.23			.07		1	1							10	45	20	1	1	1	1	1				Tt, leached, sp w.s. Cu, patches Mz
158.8	167.8	9.0		.27	142.7	.22	142.7	89	2.58	.21	Tr	.01			.05			Ts	1										1	1	1	1	1	Mz	158.8	Brkn	Mz, leached Alt, F.G. Text. wk w.s. Cu
167.8	172.8	10.0		1.03	@	.98	@	77	2.95	.02	1	.01	.95			.05		1	1							10	65	20	1	1	Tr	1	1	Tt	173.6	65°	Mz, as above To 173.6, then Tt, leached, sp w.s. Cu
172.8	185.0	7.2		.44	1.41	.21	1.08	78	3.07		1	.01	1.20			.23		1	1		Tr					10	65	20		1		Sp					Tt, leached, sp Mal, Tr chrys
185.0	194.8	9.8		1.12		.89		55	2.70	.10		.01	.73			.28		1	1							10	60	20	Tr	1		1	Tr				Tt, " " "
194.8	204.0	9.2		1.55		1.19		68	2.53	.30	1	.01	.88			.36	CUARTE	Sp	1							Sp	10	Sp	Tr	5	1		1	Mz	197.8	93°	Tt, Intense brx First 2 FT, then leached Mz at 197.8'
204.0	213.0	8.0		2.07		1.85		88	3.07		.02	.01	1.82			.22		S	1							10	75	10		Tr	Tr	Tr		Tt	205.0	Brkn	Mz, leached Alt To 205.0' Then Tt, leached mod Mal
213.0	223.0	10.0		1.91		1.44		87	3.26	.22	.01	.01	1.20			.47	Tr	Sp	1							10	70	15		Sp	1						Tt, leached but contains "pods" of St clay with lots of Mal
223.0	230.2	7.2		2.92		1.25		91	2.97		.02	.01	1.22			1.67		1	1		Tr					10	75	15		1	1						Tt, " " " " " "
230.2	238.3	8.1		2.16		1.87		53	2.82		.01	.01	1.85			.29		1	1							10	70	15		5	1	1					Tt, as above, St pTs lining
238.3	248.4	10.1		1.48		.74		67	2.92		.02	.01	.71		.24	.50	Tr	1	1							10	65	20		5	1	1					Tt, as above Mod cc. surrounded by pitch
248.4	258.6	10.2		1.81		1.34		81	3.05		.03	.03	1.28			.47		1	1							10	55	15	Tr	Sp	1	1	Tr	Da	254.8	brkn	Tt, " " To 254.8, Then Da, sp clay - silicif, Tr mal
258.6	268.7	10.1		.23		.12		42	2.52		.01	.01	.10			.11		1	1							Sp	Tr	10	1	5	1	1					Da, mod silicif, patch Hf
268.7	275.4	6.7		.36				79	2.61		.01	.01	.32			.02	Tr	1	1										1	10	1						Da, Mod silicif, leached. Tr mal
275.4	283.4	8.0		.37				69	2.54			.01	.34			.02	Tr		1										1	5	1						Da, sT silicif, leached
283.4	291.6	8.2		2.28		.66		73	2.58							2.25	.03	Tr	15		Tr					10	5	68		Sp		Tr		Hf?	288.6	brkn	Da, as above To 288.6, Then Hf, (?) int clay alt Sp suls
291.6	301.1	9.5		2.07	46.2	.03	46.2	89	3.15							2.05	.02		15							10	5	63				S					Hf, sT clay alt, ST suls; Sp Tt
301.1	310.7	9.6		1.06	@	.02	@	95	2.63							1.06			Sp					Tr				Tr	Tr			Tr		Mz	301.1	brkn	Mz, Sp clay alt Tr suls Fine-med gr facies
310.7	320.2	9.5		.60	.29	.02	.03	77	2.69							.60								Tr	Tr		SP										Mz, as above, Tr mafics
320.2	329.6	9.4		.59		.02		81	2.64							.59											5	40				Tr		Hf	322.4	brkn	Mz, as above To 322.4, Then Hf, sp silicif Tr suls.
329.6	336.9	7.3		.39		.02		26	2.63							.39											5	5	40					Mz	332.9	brkn	Hf, Sp silicif - chlor alt, To 332.9, Then Mz, sp clay alt
336.9	341.7	4.8		.12		.01		88	2.86							.12											Tr										Mz, wk clay alt Tr suls
341.7	351.7	10.0		.24				84	2.59							.24			1									Tr	1	1	1	1					Mz, F.G, Alt, Tr Hf, wk sws
351.7	360.8	9.1		.13				85	2.58							.13			1									Sp	Sp								Mz, as above.
360.8	368.4	7.6		.10				100	2.55							.10			1									Tr	Tr	1							Mz, Alt, ST mafics, Tr suls
368.4	379.1	10.7		.16				92	2.60							.16			1									Tr	1	Sp	1	Tr	1				Mz, " " ", Tr Hf (?) inclusion
379.1	386.3	7.2		.10				94	2.54	Tr					Tr	.10			1										1	1	1	1	1				Mz " " " "
386.3	394.4	8.1		.08				84	2.61							.08			1										1	1	1	1	1	Da	392.2	brkn	Mz, as above To 392.2 Then Da, mod silicif, Tr suls
394.4	404.3	9.9		.08				94	2.55							.08			1										1	Tr	1	1	1				Da, mod silicif, Tr suls, Tr Mz Text

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 3 %; Moderate (Md) 3 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-94
Page 2 of 2 Pages

Collar Elev. 3082.69 Final Depth 423.3
Coords. N 36643.47 E 19400.66
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 4/16/62 Finish 4/27/62.

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
404.3	413.6	9.3		.17				96	2.61							.17			Tr						Tr	Tr				Tr	Tr	Tr	Tr	Tr				Dp; mod silicif, Tr suls Tr ang. incl.
413.6	424.0	10.4		.17				94	2.62							.17			/						/	/				/	/	/	/	/				Dp; mod silicif; Tr chlor - feldspath. Tr suls.
424.0	428.3	4.3		.13				93	2.60							.13			/						/	/				/	/	/	/	/				Dp; mod silicif. Tr suls.
								Avr Rec. = 33 %																													
					END OF HOLE																																

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-95
Page 1 of 1 Pages
Collar Elev. 2870.60 Final Depth 372.5
Coords. N 35749.25 E 18399.25E
Inclination Vert.
Logged by SAA - CWH - FTG
Date: Start 4/17/62 Finish 4/24/62

	Depth From	Depth To	Intvl	Elev.	% Cu Total	% Cu Avg.	% Cu N.S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Cu SO4	Cc	Cpy.	Barn	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Mn Ox	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	40.0	40.0					Rock	R.T																													
NX → 1.875	40.0	50.2	10.2		.88	32.0 @	.85	32.0 @	78	3.28	.81	Tr	.01	.03			.13		Tr	Tr							10	50	35	Tr		Tr	Tr	Tt	40.0	?	Tt, leached; Patches Hf, sp chry & Mal, sp kin
	50.2	58.2	8.0		.84		.10		83	3.16	.09	Tr	.01	Tr			.42										10	50	35									Tt, " " " Tr sulfs
	58.2	67.6	9.4		.14		.05		94	3.21			Tr				.14									Tr	10	20	70				SP		Hf	60.2	grad	Tt as above To 60.2, then Hf, dense, Tr sulfs
	67.6	77.0	9.4		.59		.45		92	3.15	.40	.01	.02	.02			.14										10	35	50				Tr					Hf, Tr sulfs, Patches Tt, Tr chry & Mal
	77.0	85.2	8.2		.06		.05		95	3.18							.06										10	35	55									Hf, as above ST Tt
	85.2	94.5	9.3		.25				100	2.64	.15	.01	.01	Tr	.01		.07				Tr						10	15	60				10					Hf, wk chlor alt Tr sulfs Patches Tt
	94.5	103.6	9.1		.21				99	2.51			Tr				.21										10	15	60			8	5					Hf, mod-ST silicif Tr sulfs Mod Tt
	103.6	111.6	8.0		.06				82	2.70							.06										10	15	65				SP					Hf, ST silicif. Tr Tt
	111.6	121.5	9.9		.22				100	2.67	.10			.02	.04		.06		Tr								30	40	35			SP			Tt	116.3	grad	Hf, as above To 116.3, Then Tt, leached. Tr chry Tr mb
	121.5	126.4	4.9		.11				99	2.66				Tr			.11										10	25	55			5			Hf	121.5	grad	Hf, mod silicif - clay alt. Tr Tt
	126.4	133.1	6.7		.05				100	2.59	.01						.04										10	30	45			SP	10					Hf, Sp clay - chlor alt Tr feldspath Tr Tt
	133.1	142.5	9.4		.05				88	2.27	.02		.01	.02			Tr										10	10	80		Tr		SP					Hf, as above Sp v.s cc, No Feldspar
	142.5	151.2	8.7		.27				91	2.78	.16	Tr	.01	10			Tr			Tr							5	15	80									Hf " " "
	151.2	160.0	8.8		.10				100	2.64	.07		.01	.02													10	15	75			Tr	Tr					Hf, " " "
	160.0	169.6	9.6		.15				100	3.10	.09		.01	.05			Tr										5	20	75				SP					Hf, " " "
	169.6	179.0	9.4		.06				89	3.12	.09		Tr	.02													5	20	70		5							Hf " " "
	179.0	188.1	9.1		.06				100	3.16	.04		Tr	.02						Tr							10	20	70		Tr		Tr					Hf " " "
	188.1	198.0	9.9		.09				71	3.07	.05		.01	.03													15	10	70	S								Hf " " " Tr AND
	198.0	205.9	7.9		.08				100	2.58	.06			.02													Tr			Tr				AND	198.0	86°	AND, Post Min dike
	205.9	210.0	4.1		.32				100	2.45				.02			.30			Tr							30	5	65			Tr	SP		Hf	205.9	Brkn	Hf, Patches Mb, Mod chlor, Tr Sulfs & N.S. cc
	210.0	217.1	7.1		.38				95	2.56				Tr			.38			St							30	5	65									Hf as above
	217.1	226.6	9.5		.02				91	2.62	.02								Tr	Tr							5	10	60			25	Tr					Hf, dense, silicified
	226.6	236.6	10.0		.05				88	2.52	.02		.03	Tr													Tr							AND	226.6'	82°	AND, Post Min Dike
	236.6	246.0	9.4		.06				96	2.66	.04		.01	.01													SP	10	50			40		Tt	241.1'	70°	AND, To 241.1' Then Tr, Patches Hf, wk leached, ST SiO2
	246.0	256.4	10.4		.31		.12		75	2.91	.11		.01	Tr			.19			Tr							10	10	75	SP	SP	SP	SP	Hf	252.2'	grad	Tt To 252.2' Then Hf, leached
	256.4	266.0	9.6		.81		.29		94	2.73	.24	.01	.03	.01			.52										30	5	65		Tr	Tr						Hf, Patches Mb, wk leached
	266.0	275.9	9.9		.23	31.9 @	.11	31.9 @	93	2.59	.10		Tr	.01			.12										30	5	65	Tr								Hf, as above, Tr sulfs
	275.9	280.0	4.1		.27	.47		.22	100	2.82	.10		.01	.01			.15										20	5	75			Tr	Tr					Hf, " "
	280.0	288.3	8.3		.52		.33		96	2.87	.23	.01	.03	.06			.19							Tr	Tr	Tr	15	20	65									Hf, wk leach, patches Tt, wk sulfs, Tr Pb, Zn
	288.3	297.4	9.1		.21				97	2.54	.07	Tr	.03	.01			.10										10	20	45		5	20						Hf, as above Mod silicif
	297.4	307.1	9.7		.07				90	3.11	.02						.05										5	15	65		SP	15						Hf, wk silicif, Tr Tt
	307.1	316.6	9.5		.14				88	3.18	.05	Tr	.01	.04			.04										40	5	55			Tr	Tr		Mb	310.6	grad	Hf, as above To 310.6, Then Mb, wk clay alT, leached.
	316.6	325.9	9.3		.18				95	2.69	.01			.01			.16										75	Tr	25									Mb, as above Tr mal
	325.9	335.4	9.5		.26				99	2.73	.06		.01	.03			.16		Tr								75	5	20		Tr				Tt	334.3	60°	Mb, as above To 334.3, Then Tt, Sp clay alT
	335.4	345.2	9.8		.69		.60		73	3.09	.47	.01	.02	1.0			.04										60	5	35		SP	Tr						Tt, Sp clay alT, Sp mal, CuSO4, Tr Hf
	345.2	351.1	5.9		.14				79	2.93	.08		.01	.02			.03										55	5	40						Mz	349.0	Brkn	Tt, as above To 349.0, Then Mz. wk. alT
	351.1	361.5	10.4		.07				80	2.65	.02			Tr			.05										Tr				Tr							Mz, wk Alt
	361.5	367.3	5.8		.06				100	2.63	.02			Tr			.04																					Mz, as above
	367.3	372.5	5.2		.08				82	2.65	.02			Tr			.06																					Mz, " "

AVG. REC. = 92 %

END OF HOLE

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-60 %, Strong (St) + 50 %

Note (3): Tt - Toctite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-96
Page 1 of 2 Pages
Collar Elev. 2911.08 Final Depth 564.7
Coords. N 35576.15 E 18604.17
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 4/24/62 Finish 5/5/62

Depth From	Depth To	Int'vl	Elev	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sh. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	3.6	3.6					Rock		B.T																													Rock B.T
3.6	12.1	8.5		.09				89	2.81	.07		Tr				.02		Tr								5	10	70		Tr	5	Tr		Hf	3.6	—	Hf, mod silicif, leached
NX→ 1.875 12.1	21.3	9.2		.07				75	2.82	.07		I						I								5	5	75			1	5	I					Hf, as above
21.3	31.9	10.6		.05				55	2.83	.05		I						I								5	5	75		Tr	1	5	I					Hf, st silicif
31.9	36.0	4.1		.04				86	2.87	.04		I						I								5	5	75		I	1	8	I					Hf, as above
36.0	44.1	8.1		.02				92	2.83	.02		I						I								5	SP	75			1	10	I					Hf, intense silicif, wk leached
44.1	53.1	9.0		.03				78	2.78	.03		I						I								5	I	75				10	I					Hf as above
53.1	61.8	8.7		.02				92	2.84	.02		I						I								5	I	75		Tr	1	10	I					Hf " "
61.8	70.1	8.3		.11				92	2.96	.07	Tr	I				.04		I	Tr							8	I	75		I	1	5	SP					Hf, deck in Sr, wk leaching
70.1	79.9	9.8		.07				90	3.15	.06	I	.01						I								8	I	75		I	1	5	5					Hf, " " " "
79.9	88.3	8.4		.18				68	3.09	.17		.01						I	Tr							8	I	75		SP	I	SP	5					Hf, " " "
88.3	93.5	5.2		.10				81	3.01	.09		.01						I								10	I	75			1	1	5					Hf, brkn, leached; Mod calc veins, sp. [illegible]
93.5	102.0	8.5		.09				37	2.60	.08		.01						I								Tr			Tr	I		Tr	5		Mz	93.5	brkn	Mz; mod feldspath - silicif; Tr chrx
102.0	109.1	7.1		.13				92	2.63	.12		.01						I								I				I		I	5					Mz; as above
109.1	117.1	8.0		.17				66	2.64	.16		.01														I				Tr		I	5					Mz; " "
117.1	127.9	10.8		.19				71	3.11			.01	.02			.1		I	Tr							10	25	60					SP		Hf	117.1	brkn	Mz; " " To 119.8, Then Hf, wk silicif; Tr Tt
127.9	137.1	9.2		.20				92	3.19	.01		.01	.05			.13										5	15	55	Tr				Tr					Hf, wk alt Tr suls.
137.1	147.5	10.4		.38				92	2.72	.02		.01	.04			.21										10	20	70										Hf, " " Tr chrx, suls
147.5	156.3	8.8		.26				93	2.76	.01		Tr	.02			.23										15	10	75				SP	SP					Hf, wk chlor alt Tr suls
156.3	165.1	8.8		.17				91	3.08	.01		.01	.07			.08										10	20	70										Hf, wk silicif, Tr suls. 2.5' patch Tt.
165.1	174.5	9.4		.06				99	3.13				.01			.05										10	15	65				10						Hf, mod silicif Tr suls
174.5	184.9	10.4		.05				90	3.05	.01			.01			.03										5	15	70				10	Tr					Hf, as above Tr Tt.
184.9	194.7	9.8		.10				88	3.22	.01		Tr	.03			.06										10	20	60				10	SP					Hf, " " Mod Tt
194.7	203.2	8.5		.14		.09		100	2.77			.01	.08			.05										10	25	60				5						Hf, as above Tr mal
203.2	212.8	9.6		.51		.27		98	2.69	Tr	Tr	Tr	.27			.24								Tr		10	15	60		SP	I	SP						Hf, " "
212.8	222.3	9.5		.09		.07		88	3.17	I		I	.07			.02										10	15	70										Hf, " "
222.3	231.6	9.3		.02				100	2.93			I	.01			.01										10	10	70		Tr		Tr	5					Hf, wk silicif Tr Tt Tr suls
231.6	241.2	9.6		.36				81	2.81	.04		I	.20			.12							Tr	Tr		10	10	60		5	Tr	1	5	SP				Hf, wk chlor - clay - silicif, Tr suls. St clay - jaro alt, 237.4 - 241.2
241.2	249.8	8.6		.08				95	2.77				.05			.03										10	10	60		Tr	1	5	SP	Tr				Hf; wk chlor - silicif Tr suls
249.8	256.4	6.6		.05				92	2.87			I	.03			.02										10	5	70			I	5	I					Hf, as above
256.4	266.2	9.8		.06				91	2.88							.06										5	5	75			10		Tr					Hf, dense, silicif, wk suls
266.2	275.8	9.6		.06				91	2.99			I				.06		I								10	5	75			1	5	SP					Hf, silicif, Tr Tt, Tr suls, wk chlor
275.8	284.7	8.9		.06				92	3.13			I				.06		I								10	5	75				SP	I					Hf, as above
284.7	294.1	9.4		.06				84	2.67			I				.06		I								10	10	70				I	I	Tr				Hf, " " Tr Mz
294.1	304.0	9.9		.07				65	2.98			I				.07		I								10	5	70		SP	I	Tr	I	I				Hf, wk leached, Tr Suls, mod chlor
304.0	307.5	3.5		.05				91	3.01			I				.05		I								10	5	70			I	I	I					Hf, as above
307.5	317.7	10.2		.42		.35		74	3.01	.33	.01	.01	Tr			.07		I								10	35	45		I			I		Tt	313.1	brkn	Hf, leached, sp clay alt To 313.1, Then Tt, wk clay alt Tr mal
317.7	326.2	8.5		3.41	4.25 @ 1.19	1.87	48.5 @ 51	77	3.48	1.50	.01	.01	.05			1.54		S	I					Tr		SP	70	10		S	I	Tr						Tt, st leached; mod lim alt, Tr mal, gn.
326.2	335.8	9.6		.24		.13		84	3.51	.17	Tr	.01				.06		S	I							I	20	5		S	I	S		Tr				Tt, wk lim alt, Tr suls
335.8	345.8	10.0		1.04		.24		92	4.19	.17	I	.05	.02			.30		S	I							I	75	5		S	I	S						Tt, wk lim alt Tr suls Leached patches
345.8	353.7	7.9		.98		.08		50	3.61	.06	.01	.01				.90		SP	I							10	70	5		S	I	SP						Tt, wk clay alt Tr suls
353.7	356.0	2.3		1.82		.17		90	4.10	.05	.02	.10				1.65		Tr	40							SP	40	Tr		S			Tr					Tt, ant sulfide alt
356.0	360.5	4.5		—		—		—	—																													Old Drift
360.5	368.7	8.2		.17		.06		53	3.49			.01				.16		Tr	SP							10	50	25		S			Tr					Tt, wk clay alt Tr suls
368.7	376.8	8.1		.95		.18		60	2.89		.01	.01				.93		I	Tr							10	10	50		SP	Tr		20		Hf	368.7	brkn	Hf, mod chlor alt Tr suls
376.8	380.2	3.4		.09				97	2.95							.09										10	20	40		I	I		20					Hf, as above

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows:
Trace (Tr); Sparce (Sp) < 3 %
Moderate (Md) 3 - 30 %
Strong (St) + 30 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 0-90
Page 2 of 3 Pages

Collar Elev. 2911.08 Final Depth 564.7
Coords N 35596.15 E 18604.17
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 4/24/62 Finish 5/5/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Chrys.	Pitch.	Black	Blue Green	Cuprite	Cc.	Cpy.	Born	Fe (2) Lim.	Fe (2) Py.	Fe (2) Mag.	Fe (2) Hem.	Fe (2) Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sh. Qtz.	QUARTZ	CHLORITE	Mnzonite	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
380.8	388.8	8.6		.90	30.2 @	.04	30.2 @	100	3.36							.90			5	Tr			SP	2.4		5	10	40		Tr			5		Tt	382.0	Good	As above to 388.6 lots of suls (cpy, sph, gal, (py))
388.8	398.9	10.1		.53	2.70	.05	2.08	75	2.97							.53			Tr					SP	SP	10	20	60					SP					suls cont. @ 389.6. Some leaching. Sc Hbds Hf & Mb
398.9	402.7	3.8		.10		.02		97	2.71				Tr			.10		Tr	1							70	10	15		1		SP	SP		Mb	403.6	Good	Tt, Mb blk ox. Med S.L around ct. Mb blue w chlorite in Tt
402.7	415.5	7.8		.17		.04		100	2.94							.17		1	1					Tr		20	45	35		1			SP		Tt	410.8	Good	As above ex ct. Tt green-tea color. Practically barren.
415.5	425.1	9.6		.41	21.5 @	.02	21.5 @	89	2.75					Tr		.41		1	1					SP	5	10	30	55		1			8					Tt in mine Hf. Md ox-Pb to 420.3 - 421.3 Some leaching.
425.1	437.0	11.9		.42	.42	.05	.06	82	3.08			.02				.40		1	1					1	SP	10	15	60		1			15					Tt w sc. accs of Cu S.P. mine & S.L. Sc Pb-Zn-Cpy min, wk.
437.0	446.9	9.8		.13		.02		88	2.76							.13			1					Tr	Tr	20	35	35		1			10		Mb	442.3	Good	Tt w tr cpy. Mb blue in "buttons", wk chloritic veins.
446.9	454.6	7.7		.23				87	2.63							.23			1							70	10			1			15	Tr				Mb as above, effectively barren
454.6	459.1	4.5		.22				91	2.73							.22			1					Tr		70	8			1		Tr	15					" " " , Tr sph.
459.1	470.3	11.2		.48	31.1 @		31.1 @	98	2.68							.48			1	Tr					1	20	40	30		SP			5		Tt			Mb, blue, solid core, sc accs of gen. Hf visible sulfs
470.3	480.0	9.7		1.78	.86	.03	.01	100	3.08					Tr		1.78			1				Tr	SP		10	50	35		1			5					Tt w tr gen. Sc blebs of mass. mag + disc. Tr Pb, Zn, Cu
480.0	490.2	10.2		.40				86	3.62							.40			1					1	1	10	40	30		1			10					Tt as above but stronger mag. Sp-w/s total Fe-cpy.
490.2	501.8	11.6		.14		.02		88	3.08							.14			1						Tr	10	45	30		1			10	SP				Tt w sc Hf patches. No mag, no visa sulfs.
501.8	511.8	10.0		.17				85	2.79							.17			1							15	40	35		8			SP					As above to 506.9 where Hf patches become much stronger
																																						Rk type now actually a varying mixture of Tt & Hf.
511.8	518.3	6.5		.13				83	2.63							.13			Tr							10	50	30		5			SP	Tr				Tt-Hf as descr. above. Hf portion of core discolored by grease
518.3	526.0	7.7		.23				78	3.00							.23			1							10	30	50		SP			1	1	Hf	518.3	grad	Hf; sp clay - silicif, Tr suls, mod Tt patches
526.0	536.4	10.4		.28				74	2.77							.28			1							10	30	55		1		Tr	1	1				Hf, sp silicif, patches clay - jaro alT Tr suls ST Tt
536.4	545.9	9.5		.38				69	2.98							.38			1							10	35	50		1			1	1	Hf Bx	544.5	brka	Hf, sp silicif - chlor - clay alT Tr suls Hf bx from 544.5
545.9	555.3	9.4		.22				88	2.60							.22			1							5	5	15	Tr	1	Tr	1	Tr		Hf	545.9	brka	Hf, sp clay alT Tr Tt, mod leaching To 547.6, Then Dp; wk
																																			Dp	547.6	brkn	clay - jaro alT Tr suls
555.3	564.7	9.4		.13				80	2.60							.13			Tr										Tr	SP	Tr		Tr					Dp, wk clay alT Tr suls, CuOx

Av Rec = 84%

END OF HOLE

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-99
Page 1 of 2 Pages
Collar Elev 3004.00 Final Depth 423.3
Coords N 36799.85 E 19800.19
Inclination Vertical
Logged by SAB, PTG, Cook
Date: Start 4/28/82 Finish 5/10/82

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Xn. Qtz	QUARTZ	CHLORITE	URANIUM	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	4.0	4.0		ROCK BIT				—	—																													ROCK BIT
4.0	12.6	8.6		.21		.16		83	2.51	.21		Tr			Tr			Tr	Tr									Tr	SP	Tr		Tr		Dp	4.0	—	Dp, wk silic.f- clay alT leached
12.6	21.4	8.8		.99		.94		82	2.87	.93		.01	Tr		.05			SP	1							5	20	10	1	5	1		1	Tt	15.8	broken	Dp, as above To 15.8, Then Tt, wk-mod clay alT Tr mal
21.4	28.1	6.7		2.45		2.31		100	2.66		Tr	.01	2.30			.14		1	1		Tr					10	55	25		SP	1		1					Tt, leached wk clay- kem alT Tr mal.
28.1	36.6	8.5		1.44	31.8 @ 1.23	1.32	5.8 @ 1.03	93	2.76		1	.01	1.31			.12		Tr	1		1					10	50	35		1	1		1	Hf	34.8	grad	Tt, as above To 34.8, Then Hf, wk clay alT Tr mal
36.6	46.2	9.6		1.67		1.28		75	2.82		1	.01	1.27			.39		10	1							10	20	50		10			SP	10				Hf, as above To 41.6, Then Hf, int clay- jaro alT
46.2	54.9	8.7		.48		.30		58	3.41		1	.01	.29			.18		5	1							10	50	35		15			1	8				Hf, leached; mod clay alT, Tr mal To 50.3, Then Hf, st clay- lim- jaro alT
54.9	64.4	9.5		.62		.38		79	2.91		1	.02	.36			.24		8	1							10	10	55		8	Tr	Tr	8	5				Hf, st-int clay + lim- jaro. alT To 58.4, Then Hf, leached, mod clay alT
64.4	72.9	8.5		.22		.03		95	2.73			Tr	Tr		—	.22		Tr	1							10	10	50		SP		1	20	Tr	Meta sed	71.3	~15	Hf, mod chlor alT Tr suls, To 71.3, Then Meta sed; mod chlor
72.9	81.3	8.4		.05				99	2.77			Tr				.05		Tr	1							Tr	5	10		Tr	Tr	30	15					Meta sed, wk chlor alT, poss. feldspath, poss. patches Dp.
81.3	90.4	9.1		.06				97	2.72			1				.06		1	1							1	5	5		1	1	45	10					Meta sed; wk chlor alT. Patches Hf. Grad To dark Meta sed at 89.7
90.4	98.5	8.1		.06				95	2.77			1				.06		1	1							SP	5	5		1	1	35	10					Meta sed; dark, chlor - biotite alt Tr suls.
98.5	105.7	7.2		.05				97	2.79			1				.05		1	1							1	SP	SP		1	1	40	10					Meta sed; as above. Blebs light Meta sed.
105.7	114.1	8.4		.13				97	2.69			1				.13		1	1							1	1	5		1	1	20	10	Tr				Meta-sed " " "
114.1	123.7	9.6		.17				77	3.68		Tr	1	.07			.10		1	1							10	60	20		5			5	Tr	Tt	114.1	grad	Tt, Alt, spchlor, Tr suls
123.7	133.3	9.6		.09				98	2.72			1				.09		1	1		Tr					25	10	40		SP		Tr	8		Hf	123.7	grad	Hf, " " Mod calc
133.3	141.5	8.2		.75	27.5 @ .90	.05	27.5 @ .05	89	3.09							.75		1	1		1		SP	SP		20	15	50		5		1	10					Hf, Mod suls, sp clay, Tr Pb-Zn, sp chlor.
141.5	151.2	9.7		1.33		.05		92	3.03							1.33			1							10	5	60		15			5					Hf, " " Mod chlor.
151.2	160.8	9.6		.60		.06		95	2.82							.60		Tr	1							15	8	75		Tr		Tr	5					Hf, " " " Patches Mb
160.8	170.6	9.8		.12				96	2.71			Tr				.12			1							85		SP		Tr			5		Mb	160.8	grad	Mb, Tr chlor, Tr suls
170.6	179.2	8.6		.11				100	2.71			1				.11			1							90		Tr					SP					Mb; as above
179.2	189.1	9.9		.13				94	2.69			Tr	Tr			.13			1							90		1		Tr		Tr	1					Mb; " "
189.1	197.9	8.8		.11				95	2.66			1				.11			1							5	Tr	10		1	Tr		15		Mz	189.1	Erro	Mz, st. Porph. Text, Mod Mafics, wk-Int Alt, Snow Matrix
197.9	204.5	6.6		.08				100	2.62			1				.08			1							5	10	10		1	1		8		Tt	202.1	Sing	Mz as above to ct. then Tt as bec gra.
204.5	214.1	9.6		.05				92	3.46							.05			1							10	5	35		1			Tr					Tr solid, only a few veins.
214.1	223.5	9.4		.05				99	2.71			Tr				.05		Tr	1		Tr					10	25	40		1	Tr		20					As above to 216.6 then st chlor & Hf grp to a chlor & Hf.
223.5	232.0	9.5		.15				99	2.69			1				.15			1		1					50	15	25		1	1		10		Mb	227.3	Sing	Tr as bef for part wk chlor sp suls at ct. at. Mb, white, coarse
232.0	240.9	7.9		.14				100	2.78			1	Tr			.14			1							90	Tr	Tr		1			SP					Mb, white, coarse-granular. Some chlor & good veins. Tr suls.
240.9	250.4	9.5		.19				99	2.70			1				.19			1	Tr	Tr		Tr	Tr		60	SP	5		1			10					Mb as above, becoming chlor & Hf'ic at end. Tr suls
250.4	260.2	9.8		.23		.07		86	2.73			1				.23		SP		Tr	Tr					10	5	20		1		10	35		Hf	250.8	Grad	Mb, white w lim-stained Mgs, changing to Hf w chlor & spchlor
260.2	267.9	7.5		.49		.05		96	2.85							.49										10	5	30		1		SP	40	SP				Hf, blue, lim w mod chlor, weakly clay w a few veins. Wk disp suls.
267.9	275.3	7.6		.44		.06		90	2.90							.44	Tr			Tr						10	5	60				1	15					Hf as above but more lime.
275.3	280.7	5.4		.25		.05		92	2.63							.25										10	5	60		20			5					" " "
280.7	287.7	7.0		.65		.02		69	2.87							.65				Tr						10	5	70		SP			10	Tr				Hf as above w wk-mod clay or disp veins
287.7	292.4	4.7		.46		.05		89	2.98							.46										10	5	70		1			15	1				Hf as above.
292.4	301.9	9.5		1.44	89.6 @ 1.15	.02	.01 @ .02	87	2.98							1.44										10	55	15		10		Tr	Tr		Tt	293.4	25-30	Hf as above to 22. Tr soft, friable, w some Mb. wk suls.
301.9	310.6	8.7		1.18		.02		72	2.96							1.18										10	40	15		5		5	1					Tr w bed & soft areas, bec. good Patches Mb & qtz. wk suls?
310.6	318.3	7.7		1.42		.01		50	3.23							1.42										10	55	15		10		SP	1					Tr, becoming softer more friable, poss due to disperting cement
318.3	327.6	9.3		1.82		.02		87	3.29							1.82										10	50	10		20		1						Tr sandy, sample falls bec. some slight wk suls?
327.6	336.5	8.9		1.90		nil		90	3.06							1.90										10	55	10		15		1	1					As above @ start becoming less bec. @ end.
336.5	345.8	9.3		1.56		nil		93	3.05							1.56										10	60	20		5		1	1					Tr, bec. gra & wk core almost solid last 4 cm. suls wk?
345.8	355.4	9.6		.24		.02		86	3.28							.24									Tr	10	60	25		5		1						Tr, " " " becoming softer. Sp suls.
355.4	362.4	7.0		.14				89	3.18							.14										10	50	30		5		1			Hf	355.4	grad	Hf, bec & gra gen. & soft. Bec hot out. Sandy. Sp suls.
362.4	370.8	8.4		.17				85	3.40							.17										10	60	30		10		1						Hf st clay alT. Mod Tt Sp suls
370.8	380.1	9.3		.16				98	3.18							.16										10	60	30		10		1						Hf as above. To 373.5. Then Hf w clay alT. Sp suls

NX 1.875

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qf - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-97
Page 2 of 2 Pages

Collar Elev. 3004.05 Final Depth 637.3
Coords. N 26799.85 E 19800.14
Inclination Vert. 641
Logged by SAA, FTG, CWH
Date: Start 4/28/62 Finish 5/10/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JASPER	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
380.1	389.7	9.6		.91		.04		99	3.11							.91			Tr							10	30	50		5		Tr	Tr					Hf, sp clay alT, Mod sulf, Mod Tt
389.7	399.2	9.5		1.58		.05		90	3.13							1.58			1		Tr					10	35	40		5		1	1	Tr				Hf, mod clay-garo-chlor alT, Sp sulf, Patches inT clay alT
399.2	408.5	9.3		.95	399.9 .2	.05	399.9 .2	95	3.14							.95			1		1					10	40	45		5		1	1	1				Hf, sT clay alT, Sp sulf, Mod gar
408.5	416.0	7.5		1.64	1.51	.06	.06	96	2.90							1.64			1							10	10	50		5			20					Hf, sT clay-chlor alT, Mod sulf
416.0	425.8	9.8		1.39		.08		97	2.66							1.39			1							10	20	50		5			10					Hf, as above
425.8	435.0	9.2		1.43		.10		80	3.38							1.43			1							10	20	50		5		Tr	5					Hf
435.0	442.1	7.1		.13				89	3.36							.13			1						Tr	10	40	30		SP		1	Tr		Tt	435.0	b-Em	Tt, sp clay alT, wk sulf, Mod Hf
442.1	451.4	9.3		.15				99	3.38							.15			1					Tr	Tr	1	7	30	60		1		1	1		Hf	442.1	brkn	Hf, sp clay alT, Tr sulf, Mod Tt
451.4	461.1	9.7		.09				91	3.24							.09			1							5	30	60		1		1	1					Hf, sp clay-chlor alT, Tr sulf, SP Tt
461.1	470.0	8.9		.10				103	3.09							.10			1						Tr	10	15	65			Tr	1	5					Hf, as above, Mod Tt
470.0	479.1	9.1		.30				97	3.20							.30			1						1	10	25	60		1	1	1	5					Hf, as above
479.1	488.5	9.4		.33		.05		93	3.33							.33			1						1	10	20	65		1		1	5					Hf, wk clay alT, Sp sulf, SP Tt
488.5	497.8	9.3		.36		.05		100	2.99							.36			1						1	10	30	55		1			SP					Hf, as above
497.8	507.1	9.3		.32				95	3.14							.32			1						1	10	30	50		5			1					Hf, as above, St gar
507.1	517.5	10.4		.35				84	3.15							.35			1							10	20	50		SP		1	12					Hf, mod chlor alT, Tr sulf, Tr calc unit, Tr Tt
517.5	526.7	9.2		.24				99	2.77							.24			1							10	25	55		1			7					Hf, as above, Mod Tt
526.7	536.3	9.6		.17				95	3.11							.17			1							10	30	60		1			SP					Hf, wk clay alT, Tr sulf, Tr Tt
536.3	546.0	9.7		.30				98	3.14							.30			1							10	20	50		1			20					Hf, wk clay-chlor alT, Tr sulf, Chlor in 1/8" bands
546.0	552.4	6.4		.20				94	3.23							.20			1							10	15	60					10					Hf, wk clay-silicif, Tr sulf
552.4	560.1	7.7		.23				90	3.60							.23			1							10	20	60		1			10					Hf as above & wk gar, Sp sulf
560.1	569.4	9.3		.32				90	2.91							.32			1					Tr		10	20	60		1			10					Hf as above w/ banding in [illegible] at 40° dip
569.4	576.4	7.0		.27		.03		100	2.67							.27			1							10	15	60		5	Tr		10					Hf as above gar, [illegible], [illegible] "blotches" wk sulf
576.4	585.6	9.2		1.08		.04		98	3.01							1.08			SP							10	10	60		SP	Tr		10					Hf as above plus silicif banding first foot, Mod total sulf
585.6	591.1	5.5		.40	394 .2	.02	394 .2	92	3.01							.40			Tr							10	10	70					5					Hf, sp gar, specks silica, wk sulf
591.1	600.6	9.5		.93	.69	.03	.03	93	2.98							.93			1							10	10	65		1		Tr	5					Hf as preceding but w/ to more silica
600.6	607.9	7.3		.34		.03		94	3.32							.34			1							10	25	60				1	SP					Hf w/ more gar, [illegible] wk sulf
607.9	614.8	6.9		.44		.01		83	3.12							.44			SP					Tr		5	10	20	Tr			1	Tr		Dp	610.8	65°	Hf as above To 610.8, Then Dp, wk silicif, Tr sulf
614.8	624.4	9.6		.36		.02		95	2.66							.36			1										1	Tr								Dp wk alT, Tr sulf
624.4	632.7	8.3		.25		.02		98	2.55							.25			1										1									Dp, as above
632.7	637.3	4.6		.04				83	2.63							.04			1																			Dp,

Aver Recov 91%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %, or, as follows. Trace (Tr), Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Stong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-98
Page 1 of 1 Pages
Collar Elev. 2675.54 Final Depth 318.0
Coords. N 37097.46 E 15401.69
Inclination Vert
Logged by SMA - FTG - CWH
Date: Start 4/28/62 Finish 5/3/62

Depth From	Depth To	Int'vl	Elev	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys	Pitch	Black	Blue Green		Cc	Cpy	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	5.0	5.0		Rock	B.T	-	-	-	-																													Rock B.T
NX → 5.0	12.0	7.0		.03				70	2.46	.01					.02			Tr											SP	SP	Tr		Tr		AK	5.0	—	Ak, leached Mod clay alT
1875 12.0	21.7	9.7		.05				29	2.49	.01					.04						Tr																	Ak, brkn, as above
21.7	27.1	5.4		.06				59	2.39	.03					.03																							Ak, as above.
27.1	35.0	7.9		.04				41	2.48	.01					.03															5								Ak, " "
35.0	45.5	10.5		1.45		.08		52	1.84						1.45				Tr						Tr					15			Tr					Ak, brkn, leached, Alt
45.5	55.7	10.2		1.33		.10		57	2.48						1.30	.03														10								Ak, brkn, ST Alt,
55.7	65.7	10.0		.44		.08		68	2.43						.44															10								Ak, as above
65.7	74.0	8.3		.43		.09		89	2.38						.43															10								Ak, ST, Alt, Mod cc
74.0	81.8	7.8		.65	94.0	.06	94.0	95	2.49						.61	.04														7								Ak, " " Tr Moly
81.8	90.0	8.2		.76	8	.07	8	96	2.54						.76															5								Ak, as above
90.0	100.0	10.0		1.01	0.80	.08	0.08	66	2.56						1.01															12								Ak, brkn. ggy, ST Alt
100.0	110.0	10.0		.53		.07		86	2.42						.53															8			SP					Ak, " " ST chlor
110.0	118.3	8.3		.85		.09		79	2.58						.85			Tr												15								Ak, brkn, ST ggy + clay, Mod chlor
118.3	129.0	10.7		.42		.06		70	2.46						.42															20			Tr	Tr				Ak, as above
129.0	138.0	9.0		.18		.04		94	2.62						.12	.06														5								Ak, good core, Alt
138.0	147.2	9.2		.30				96	2.53						.15	.15								Tr						5								Ak, " " Alt, Sp cc
147.2	155.1	7.9		.10				88	2.52						.07	.03														7								Ak, as above
155.1	163.6	8.5		.14				84	2.54						.07	.07													Tr	SP								Ak, Sp clay alT. Tr suls
163.6	171.0	7.4		.15				51	2.57						.06	.09																						Ak, as above
171.0	181.6	10.6		.14				93	2.59						.05	.09																						Ak, wk clay alT Tr suls
181.6	190.0	8.4		.15				95	2.58						.08	.07																						Ak, as above
190.0	198.8	8.8		.13				77	2.55						.05	.08																						Ak, sp clay alT Tr suls
198.8	206.5	7.7		.12				80	2.53						.04	.08																						Ak, as above
206.5	213.2	6.7		.10				83	2.59						.02	.08																						Ak, " "
213.2	221.7	8.5		.24				84	2.60						.07	.17															Tr							Ak, wk clay - silicif. sp suls Patches mod st clay alT
221.7	228.7	7.0		.28				73	2.60						.10	.18														5								Ak, as above.
228.7	238.8	10.1		.15				87	2.60						.06	.09														SP								Ak, " "
238.8	248.0	9.2		.25				91	2.66						.12	.13													10	25								Ak, brkn, ggy + ST Alt, ST clay, Mod cc, py
248.0	255.8	7.8		.31				96	2.55						.05	.26													5	10								Ak, ST Alt, Mod py, Sp cc, Tr cpy
255.8	265.3	9.5		.21				82	2.77						Tr	.21													SP	5								Ak, as above
265.3	274.7	9.4		.39				92	2.55							.39														5								Ak, wk-Mod Alt, decr in Suls
274.7	283.0	8.3		.24				74	2.52							.24														10								Ak, Mod-st alt, badly br, ggy. wk suls.
283.0	295.1	12.1		.14				76	2.89							.14														SP								Ak, wk alt, more solid, sp suls.
295.1	304.6	9.5		.18				81	2.49							.18														5								Ak, mod alt, badly br, ggy. sp-wk suls.
304.6	313.8	9.2		.18				72	2.64							.18														8								As above
313.8	318.0	4.2		.20				87	2.60							.20														SP								Ak, wk alt, more solid, sp suls.
	END OF HOLE																																					
					Av. Rec 77%																																	

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Manzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-99
Page 1 of 1 Pages
Collar Elev 2733.81 Final Depth 246.5
Coords N 37368.24 E 15683.49
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 5/4/62 Finish 5/9/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JASPERITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NX → 1.875	0.0	5.0	5.0						—	—																													Rock bit
	5.0	16.3	11.3		.09				73	2.54	.04		Tr			.05			Tr	Tr		Tr								sp	sp	Tr		Tr	Tr		AK		AK, leached, wk Lim, wk-mod alt. bio, stain felds
	16.3	24.5	8.2		.12				100	2.66	.03			1		.09						1																	Ak as above
	24.5	31.9	7.4		.08				69	2.54	.02					.06																							" " " , wk Lim
	31.9	40.1	8.2		.08				100	2.48	.02					.06																							" " " , wk-mod lim
	40.1	45.9	5.8		.14				64	2.55	.13					.11																							" " " " " " , tr mafics
	45.9	56.0	10.1		.16				70	2.74	.09					.07																							Ak, leached, sp clay alT
	56.0	63.0	7.0		.18				94	2.54	.10					.02																							Ak, as above
	63.0	71.5	8.5		.14				77	2.44	.10		Tr			.04																							Ak, sp clay - jarp - chlor alT, leached
	71.5	80.0	8.5		.117		1.02		77	2.54	.12		1	.90		.15				Tr										Tr									Ak, as above, sp. Cu_Ox
	80.0	88.3	8.3		.11				96	2.54	.03					.08	Tr																							Ak, sp clay - chlor alT, leached
	88.3	98.2	9.9		.38		.18		75	2.63	.04			.08		.26															5				sp				Ak, as above To 95.2, Then mod clay - jasp alT
	98.2	106.7	8.5		.197		.120		94	2.72				.120		.27	Tr														sp		Tr		Tr				Ak, sp clay - jarp - silicif. Tr Cu_Ox
	106.7	115.6	8.9		.65		.43		77	2.76				.43		.20	.02																						Ak, as above Incr chlor
	115.6	123.5	7.9		.59		.18		86	2.63				.18		.40	.01																						Ak, as above
	123.5	133.7	10.2		.60	.70	.24	.78	85	2.63				.24		.10																							Ak, sp clay alT Tr azur, mal, suls
	133.7	142.5	8.8		.57	.84	.37	.48	89	2.59				.37		.20															Tr								Ak, sp clay - silicif. Tr suls. Cu_Ox
	142.5	152.0	9.5		.53		.24		96	2.54				.24		.27	.02																						Ak, Tr clay alT Tr suls, Cu_Ox
	152.0	161.5	9.5		.27		.37		82	2.58				.37		.20	.20																						Ak, as above
	161.5	169.0	7.5		.66		.47		79	2.57				.47		.49	.10														sp								Ak, brkn, sp clay alT Tr suls, Cu_Ox
	169.0	176.2	7.2		1.50		.99		53	2.51				.99		.51															5								Ak, brkn, mod clay alT Tr suls, Cu_Ox
	176.2	182.0	5.8		.31		.19		63	2.45				.19		.12	Tr														5								Ak, as above
	182.0	189.0	7.0		.10				79	2.34				Tr		.10															5								Ak, brkn, sp clay-ser alt Tr suls
	189.0	196.7	7.7		.10				99	2.50				1		.10															10								Ak, as above
	196.7	203.5	6.8		.12				75	2.5				1		.12															15								Ak, brkn, mod clay alT
	203.5	212.7	9.2		.20				91	2.57						.17	03														sp								Ak, wk clay - feldspath Tr suls f.g. areas
	212.7	221.5	8.8		.34				91	2.61						.30	.04																						Ak, as above, sp. alT.
	221.5	231.9	10.4		.16				66	2.87						.08	.08																						Ak, as above, brkn
	231.9	241.0	9.1		.09				94	2.63						.04	05														Tr								Ak, as above
	241.0	246.5	5.5		.16				76	2.61						.07	.09																						Ak, " " plus wk mafics.
															An Rec. = 21 %																								
				END		OF	HOLE																																

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-100

Page 1 of 2 Pages

Collar Elev. 3107.17 Final Depth 433.4

Coords. N 36497.04 E 19397.14

Inclination Vert.

Logged by SAA - CWH - FTG

Date: Start 5/7/62 Finish 5/24/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N.S.	% Cu Avg.	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch.	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NX 1815	0.0	6.0	6.0		—	2.00	—	3.15	—	—																													ROCK BIT
	6.0	14.9	8.9		.233				97	2.62			Tr	33					Sp			Sp				15	10	50	Sp		Sp	15			Hf	6.0	—	Hf, leached, Mod chlor, wk silicif., Tr CuOx
	14.9	25.0	10.1		.31				72	3.02	.05			26								Tr				10	30	50	Tr			10						Hf, leached, Mod chlor, sp silicif. Tr CuOx
	25.0	32.5	7.5		.35		0.30		96	3.28				30			.05									10	45	30				5			Tt	28.0	grad	Hf, as above to 28.0, Then Tt, leached Sp clay - hem alt
	32.5	41.6	9.1		.47	33.3 @ .20	.44	38.2 @ .44	96	2.92				44			.03									10	30	30					Sp	Tr				Tt, leached Sp clay - hem alt Tr CuOx
	41.6	51.4	9.8		.53		.47		91	2.53				47			.06									10	55	25	5									Tt, leached, sp hem, med silicif; Tr CuOx
	51.4	61.1	9.7		.52		.45		92	2.48				45			.05					5				10	60	20	Sp		Tr							Tt, leached, sp silicif To 55.5, Then mod - st hem alt Tr CuOx
	61.1	70.7	9.6		.49		.40		80	2.69				40			.08					Tr				5	5	Sp	Tr	5	Tr	Tr	Tr	Tr	Mz	63.6	broken	Tt, leached, med hem - chlor alt Tr CuOx To 63.6, Then Mz sp clay - silicif, very fg
	70.7	78.5	7.8		.16				76	2.49	.05			Tr			.11		Tr			Tr							Tr	Sp	Tr	Tr	Tr	Tr					Mz, fg wk clay - silicif
	78.5	85.7	7.2		.18				100	2.61	Tr			.09			.03																					Mz, as above
	85.7	95.3	9.6		.14				99	2.60				.07			.07																					Mz, fresh, leached, wk pyrite mass
	95.3	102.6	7.3		.27		.16		70	2.61				.16			.11									Tr	Tr									Tt	102.5	broken	Mz as above, but [illegible] at 101.7, Tt leached
	102.6	110.2	7.6		.47		.45		91	3.17		Tr	Tr	45			.02		Sp	Tr							10	50	30	5		Tr	5					Tt, as at 102.6 & calc. Mz [illegible] at 101.7, Tt leached
	110.2	119.0	8.8		.217		.201		62	3.07				201			.16		Sp								10	60	20	5		Tr	5					Tt, leached st hem Very sp [illegible]
	119.0	128.9	7.9		.203		.168		62	2.77				168			.35		5								5	70	10	Sp		5	5					Tt, as above
	126.9	135.2	9.3		.220		.202		45	2.91				202			.18		5								5	70	10			5	5					Tt as above plus some clay
	135.2	142.9	6.7		.248		.234		77	2.85				234			.14		20									25	Sp	30		5						Tt completely leached to [illegible] sat. acc. clay. wk P pro sulfs
	142.9	148.2	5.5		.113		.116		100	2.29				116			.27		30									20		40		5						Tt, as above
	148.2	158.4	10.2		.197		.165		85	2.84				165			.32		30									35	1	30		5						Tt as above
	158.4	167.2	8.8		2.76	3.8	2.35	3.8	85	2.27				235			.41		35									35	1	25		5						Tt " "
	167.2	175.7	8.5		5.26	2.04	4.82	1.88	86	2.55				482			.44		15									45	1	45		15						Tt, " " Solid patches 1 foot qtz. vnlt
	175.7	184.9	9.2		1.15		1.06		67	2.47				1.06			.09		Sp								Tr	Sp	1	Tr	5	Tr	Tr	Tr	Mz	176.3	broken	Tt, as above To 176.3, Then Mz, st silicif, Tr CuOx
	184.9	190.2	5.3		2.20		1.92		80	2.41		Tr	Tr	192			.28		1								10	15	30	Tr	5	1	1		Hf	186.0	broken	Mz, as above To 186.0, Then Hf, leached mod clay alt Tr CuOx
	190.2	197.4	7.2		.73		.66		85	2.43				66			.07		Tr								10	10	60		5	1	1	Sp				Hf, leached, mod clay - wk chlor alt Sp CuOx
	197.4	206.8	9.4		1.05		.90		75	2.54				90			.16		1								10	10	60		5	1	5					Hf, leached Sp clay - chlor alt Sp CuOx
	206.8	214.8	8.0		1.60		1.45		67	2.59				1.45			.15		1								10	10	60		5	1	3					Hf, as above
	214.8	220.1	5.3		2.09		1.97		80	3.26				197			.12		10								10	60	10		5	5	Sp		Tt	214.8	broken	Tt, leached, mod lim alt. P CuOx
	220.1	225.4	5.3		4.36		4.09		51	2.96				409			.27		10								10	50	10		5	Sp	Tr					Tt, as above
	225.4	230.0	4.6		—		—		0	—																												Cavity, no core
	230.0	240.7	10.7		2.47		2.15		54	2.98	Tr		Tr	215			.32		10								10	50	20		5	5						Tt, leached, st gar. lim alt Mod CuOx
	240.7	247.0	6.3		3.51		3.01		75	3.20	1		1	301			.50		5	Tr							10	60	20		Sp	5						Tt, as above
	247.0	257.0	10.0		3.44		3.11		74	3.06	.20	.01	1	2.90			.33		5	1							10	60	15		5	5						Tt, " "
	257.0	263.0	6.0		2.40	7.99	1.98	7.99	20	3.18	.07	.01	1	1.90			.42		5								15	50	10		20	Sp						Tt, " " a patch int. clay alt
	263.0	268.7	5.7		2.51	2.03	2.39	1.57	50	2.92	.09	Tr	1	2.35			.18		5								15	60	10		10	1						Tt, " "
	268.7	277.5	8.8		3.03		2.33		63	2.66			1	2.33			.70	CHALCOPYRITE	5								10	60	10		15	5						Tt, leached, st gar. lim. Gar. sand Mod CuOx
BX 1888	277.5	285.5	8.0		.71		.56		58	2.66		Tr	.01	54			.35	.01	5								10	30	50		Sp	Sp	5		Hf	277.5	broken	Hf, leached, st clay - lim alt To 282.5, Then wk clay alt Tr sulfs
	285.5	295.0	9.5		.55		.10		89	2.81				10			.95			Tr							10	10	60		1	5	5					Hf, sp clay - chlor alt Sp sulfs
BX 1875	295.0	309.9	14.9		.23		.06		14	2.57							.73			1							10	50	30		1	Tr	5		Tr	295.5	broken	Tr w/ [illegible] wk wood sulfs. Never rec'd.
	309.9	314.4	4.5		—		—		0	—																												Hf rec'd.
	314.4	319.5	5.1		.25		.03		83	2.97							.25			Tr							10	10	60		5	Tr	5					Tt w/ patches of Hf. [illegible] sulfs decr. a end.
	319.5	324.4	4.9		.12				89	3.23							.12										10	10	30		5	Tr	1	5				Tt as above. Sp sulfs.
BX 2038	324.4	332.6	8.2		.33		.01		80	3.14							.33			1		Tr		Tr			10	50	30		Sp	1	1	5				Tt, wk - mod. [illegible], [illegible] Hf, + calc. & qtz veins
	332.6	338.5	5.9		.42		.03		78	2.84							.47			1		1					10	10	30		1	1	1	10				Tt, st clay - chlor alt Patches Hf wk sulfs
	338.5	347.9	9.4		.60		.02		72	2.73							.60										10	10	25		1	1	1	15				Tt, as above Incr. Hf

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr), Sparce (Sp) < 5 %, Moderate (Mo) 5-50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qz - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-100
Page 2 of 2 Pages
Collar Elev 3107.17 Final Depth 433.4
Coords N 36477.04 E 19397.14
Inclination Vert
Logged by SAA - CWH - ETO
Date: Start 3/7/62 Finish 3/24/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Chrys	Pitch	Black	Blue Green		Cu	Cpy	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz	QUARTZ	Chlorite		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
347.9	355.5	7.6		1.00	1.03	.05	1.06	31	3.09							1.00			Tr		Tr					10	35	30		5	Sp	Sp	20					Tt, wk clay alt. Tr suls. 3 ftbes Hf, mod chlor alt
355.5	366.4	8.9		.41	Tr	.04	.03	74	2.90							.41										10	20	45		Sp	Tr	Tr	20		Hf	362.0	grad	Hf, mod chlor - wk clay alt Tr suls. Mod Tt
366.4	376.0	9.6		.81	.70	.02		94	2.65							.81										10	20	40					20					Hf, mod chlor alt Tr suls. Sp Tt
376.0	385.5	9.5		.58		.04		79	2.56							.58										10	40	30		5			15		Tt	381.2	grad	Hf, as above to 381.2, Then Tt, Sp clay - hem alt Tr suls.
385.5	392.2	6.2		1.20		.02		76	3.10							1.20					Tr			Tr		10	40	30		5			5					Tt, wk clay alt Sp suls
392.2	401.6	8.9		1.50		.03		88	2.90							1.50			Sp							10	10	40		Sp		10	20		Tt	397.0	brkn	Tt, mod chlor - sul alt To 392.0, Then Da, mod silicif
401.6	410.6	9.0		.35		.02		96	2.59							.35									Tr	Sp						5	Tr					Da, Sp - mod clay alt Tr silicif
410.6	419.9	9.3		.44		.04		75	2.62							.44										Tr						Sp						Da, Sp clay alt
419.9	425.1	5.2		.45		.03		72	2.59							.45																						Da, " " Sp clay alt
425.1	432.4	8.3		.47		.03		19	2.59							.47																						Da, " Bxn, Tr clay
				Av. Rec. = 35 %																																		
				End of Hole																																		

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral % Cu as follows: Trace (Tr), Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (Str) + 50 %

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Do - Docite, Mz - Monzonite, AA - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-181
Page 1 of 1 Pages
Collar Elev. 2727.79 Final Depth 250.0
Coords. N 37238.95 E 15517.58
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 5/9/62 Finish 5/14/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu N S	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green	Cc	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	23.5	23.5		ROCK BIT		—	—	—	—																												ROCK BIT
23.5	33.0	9.5		.06				89	2.52				6		.06					Tr							Tr	SP	Tr			Tr	Ak	23.5	—	Ak, leached, sp - mod clay alt
33.0	42.4	9.4		.31		.15		66	2.50	15					.16												SP					SP				Ak, leached, mod clay - jarc alt
42.4	51.7	9.3		.92	.86	.73	.86	77	2.43			Tr	.73		.19																					Ak, leached sp clay alt Tr CuOx
51.7	61.0	9.3		.60	.73	.41	.57	76	2.32				.41		.19					Tr												Tr				Ak, as above
61.0	70.0	9.0		.23		.10		81	2.52				.10		.13													5								Ak, " " Mod liv lim
70.0	78.1	8.1		.16				91	2.54				.10		.06		5	Tr										10								Ak, leached Mod lim - clay alt Tr suls
78.1	88.4	10.3		.12				97	2.41						.12		SP											5								Ak, sp clay alt Tr suls
88.4	97.3	8.9		.07		.01		74	2.41						.07		Tr											SP								Ak, as above
97.3	105.3	8.0		.13		.02		100	2.41						.13													5								Ak, " "
105.3	114.2	8.9		.12		.02		54	2.41						.12													10								Ak, " "
114.2	123.8	9.6		.26		.05		53	2.44						.26													15								Ak, mod clay alt Tr suls
123.8	133.4	9.6		.28		.15		62	2.29						.28													15				SP				Ak, as above
133.4	143.1	9.7		.56		.24		41	2.50				.24		.32													10								Ak, as above Tr CuOx
143.1	152.8	9.7		.22		.02		90	2.56				Tr		.02	.20											Tr	Tr								Ak, wk alt Tr suls
152.8	159.5	6.7		.24		.02		89	2.60						.08	.16															Tr					Ak, as above
159.5	168.7	9.2		.17		.02		93	2.59						Tr	.17																				Ak, " "
168.7	178.0	9.3		.19				85	2.66							.19																				Ak, " "
178.0	186.8	8.8		.28				96	2.58							.28							Tr													Ak, " "
186.8	194.9	8.1		.21				59	2.57							.21	Tr											SP								Ak, Sp clay alt Tr sulf
194.9	204.5	9.6		.17				96	2.59							.17												Tr								Ak, wk clay alt Tr sulf
204.5	212.4	7.9		.30				98	2.57							.30																				Ak, as above
212.4	220.0	7.6		.32				77	2.54							.32	Tr											SP								Ak, Sp clay alt Tr sulf
220.0	226.8	6.8		.33				94	2.56							.33												Tr								Ak, Tr clay alt Tr sulf
226.8	236.3	9.5		.27		.02		74	2.59							.27																				Ak, as above
236.3	245.0	8.7		.16		.02		93	2.55							.16																				Ak, " "
245.0	250.0	5.0		.15		.01		97	2.58							.15																				Ak, " "

Av Rec. = 80%

END OF HOLE

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) + 50 %

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-102
Page 1 of 2 Pages
Collar Elev. 3051.60 Final Depth 615.0'
Coords N 36,646.98 E 19,791.84
Inclination VERT
Logged by SAA - CWH - PTG
Date: Start 5-11-62 Finish 5-28-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chys	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JASPEROIDE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NX 1.875 0.0	24.8	24.8		ROCK BIT				—	—																														ROCK BIT
24.8	33.9	9.1		20		.11		66	3.37			.01	.10			.11		Tr							10	40	30	Tr	SP	Tr		Tr			Tt	24.8	—	Tt, leached, wk clay alt, Tr CuOx To 28.5, Then Mz; sp clay - cal alt
																																			Mz	28.5	brkn	
33.9	39.9	6.0		.59		.46		95	2.88	Tr		.01	.45			.13		Tr							SP	5	SP	Tr	SP	Tr	SP	Tr			Tt	37.9	brkn	Mz, Sp clay - cal - silicif To 37.9, then Tt leached, wk clay alt
39.9	46.7	6.8		.59		.51		74	2.51	Tr		.01	.50			.08		1			Tr				10	60	20		1		Tr	1							Tt, leached, sp silicif Tr CuOx
46.7	52.3	5.6		.27		.22		81	2.87	Tr		.01	.21			.05		1							10	20	55				SP	SP			Hf	46.7	grad	Hf, leached, Sp chlor - silicif, Tr CuOx
52.3	61.3	9.0		.72		.65		94	3.02	.30		Tr	.35			.07		1							10	20	50		1		5	1							Hf, leached Tr hem - silicif - chlor alt Tr CuOx Tr Mb, Tt.
61.3	70.7	9.4		.80	2.9 / .71	.73	2.09 / .63	89	2.90	.40		1	.33			.13		1							10	20	40		1		5	1							Hf, as above Sp Mb.
70.7	79.9	9.2		1.06		.97		84	2.87	.10	Tr	1	.87			.09		1			Tr				10	30	40		1		5	5							Hf, as above Sp Tt
79.9	86.5	6.6		.83		.81		80	2.65	.50	1	1	.31			.02		1							5	10	30	Tr	1	Tr	SP	Tr			Mz	83.6	brkn	Hf, " " To 83.6, Then Mz; sp clay alt
86.5	96.2	9.7		.21		.18		40	2.76	Tr		1	.18			.03		1							SP				SP	1			Tr						Mz brkn, sp clay alt
96.2	104.3	8.6		.31		.28		58	2.76	1		1	.28			.03		1							1				10	1		Tr	1						Mz, as above. Pa Tchs Hf
104.8	114.8	10.0		1.42		1.25		95	2.68	1	.01	.01	1.23			.17		SP			Tr				20	25	45		5	1		5			Hf	104.8	brkn	Hf, mod chlor - hem alt, Tr CuOx To 111.7, Then Mb; sp clay
																																			Mb	111.7	grad	
114.8	121.6	6.8		.05				97	2.69				.05					Tr							90				Tr			SP	Tr						Mb, sp clay alt
121.6	130.8	9.2		.12				84	2.68			Tr				.12		1							90				1			Tr	1						Mb, as above
130.8	140.8	10.0		.18				00	2.67			1				.18		1	Tr						20	SP	70				5	5	SP						Mb " " Sp Hf, chlor alt
140.8	150.0	9.2		.16				85	3.00			1				.16		1	1		Tr			Tr	40	1	SP		SP	SP	10								Mb as above
150.0	159.9	9.9		.07				91	2.68			1				.07		1	1						90				1			SP							Mb sp clay alt
159.9	170.6	10.7		.09				96	2.67			1				.09		1	1					Tr	Tr	90			1			Tr		SP					Mb as above
170.6	179.6	9.0		.17				100	2.64			1	Tr			.17		1	1		Tr				90	SP	Tr		1			1							Mb " "
179.6	187.6	8.0		.90	6.9 / 2	.72	1.69 / 2	96	2.70			1	.72			.18		1	1						20	10	40					10			Hf	181.1	brkn	Mb " " To 181.1, Then Hf, wk hem - chlor alt Mod Mb
187.6	196.5	8.9		.55	.72	.07	.38	100	2.76				.07			.48		1	1		SP				10	20	50		Tr			15							Hf, wk hem - chlor alt, Tr Mb, To 193.8, Then Hf sp silicif
196.5	205.5	9.0		.20				93	3.23							.20		1	1		Tr			Tr	10	30	40		1		Tr	5							Hf, sp chlor - silicif, Mod Tt, Poss. slide be from 196.5 - 198.8
205.5	212.4	6.9		.08				85	3.31							.08		1	1						10	35	35		1			20							Hf w patch: wk Mb. Some chlor @ ends. Hem in veins & edges
212.4	221.8	9.4		.33				62	2.61				.15			.18		1	1						40	15	30		SP	1	5	Tr							Hf w mod chlor & Mb. wk clay. Less patch hem @ start
221.8	230.1	8.3		.37		.27		98	2.81		.01	Tr	.26			.10		1	1						15	30	45		1		SP	5	1		Mb	229.9	grad	Hf w wk gar & clay. Patches Mb @ end leached. Sp wk sulfs in Hf
230.1	236.2	5.5		1.31		1.14		84	3.00		Tr	.02	1.12			.17		1	1						20	30	30		1		15	5							Mb, st. fe staining on hem & lim. Mod-st. Sulfs (Cal, pb, cu?). Vuggy
236.2	245.8	9.6		1.67	3.33 / 3	1.29	3.33 / 3	92	2.66				.29			1.35		1	1						30	SP	10		1		Tr	5							Mb, vuggy, st. leaching but veins of leaching. Poss @ end.
245.8	254.0	8.2		.55		.08		99	2.64							.55		1	1						80	1	10				5	1							Mb, wk leaching, sc vuggy veins. To CuOx
254.0	264.0	10.0		.41	.96	.07	.31	86	2.67							.41		1		Tr	Tr				85						5	5							Mb, wk leaching, patches st chlor alt Tr hem
264.0	273.9	9.9		.16				79	3.10							.16		1	1						50	10	30		Tr		5	5			Hf	269.5	grad	Mb, wk alt To 269.5, Then Hf, wk silicif - chlor. Tr suls.
273.9	280.4	6.5		.17				100	2.19							.17		1	1						10	25	55			Tr	5	5							Hf, mod chlor, wk silicif - clay alt
280.4	290.0	9.6		.17				98	2.26							.17		1	1						15	20	55				10	SP							Hf, mod chlor alt. Sp cal veinlets, Sp Tt
290.0	299.6	9.6		.12				97	2.74							.12		1	1						5	20	55				20								Hf, Sp clay - silicif. Tr suls. Mb; mod chlor alt 290.0 - 295.5
299.6	308.9	9.3		.11				89	3.03							.11		1	1			Tr			20	10	55				15	Tr							Hf, wk clay alt. Tr suls. Mb, mod chlor alt, 301.5 - 305.5
308.9	317.1	8.2		.41		.03		73	2.78							.41		1	1						25	5	55		5		10	SP							Hf, as above
317.1	325.8	8.7		.14		.02		97	2.97							.14		1	1		Tr				30	5	50		10		5	1							Hf, Mod clay Alt, Mod cpy - py, Mod chlor, wk Mb
325.8	335.5	9.7		.42		.03		100	2.55							.42		1	1						20	10	60		5		5	5							Hf, sp clay Alt, st Mb, Mod chlor veins, sp. suls
335.5	346.4	10.9		.60		.05		91	2.71							.60		1	1						25	5	60		10			SP							Hf, as above, wk Bx Texture, sp suls
346.4	354.0	7.6		.95		.02		76	2.58							.95		1	1						15	15	40		5			5			Tt	351.6	brkn	Hf, as above to 351.6. Then Tt, mod clay alt Sp suls
354.0	362.5	8.5		2.01	13.00	.01	13.00	91	3.07							2.01		1	1						15	50	10		15			Tr							Tt, st clay alt Mod suls. Patches garnet sand
362.5	371.3	8.8		4.03	1.30	.04	.04	100	2.77							4.03		1	1						15	50	5		20			1							Tt, as above
371.3	380.0	8.7		.38		.02		94	3.49							.38		1	1						15	60	10		10			1							Tt " " st gar sand
380.0	387.9	7.9		1.97		.04		100	2.81							1.97		1	1					Tr	15	50	10		10	Tr		SP							Tt, decr in Alt, Mod-st cpy. Patch gar Sand

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparse (Sp) < 5 %; Moderate (Mod) 5-50 %; Strong (St) + 50 %

Note (3): Tr - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. DD-[illegible]
Page 2 of 3 Pages
Collar Elev. 3051.68 Final Depth [illegible]
Coords. N 36,648.98 E [illegible]
Inclination Vert
Logged by [illegible]
Date: Start 5-11-62 Finish [illegible]

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg.	% Core Recov.	Sp Gr.	Cu (1) Carys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim	Py	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
387.9	395.9	8.0		.06		.06		79	3.40						Tr	.06			Tr							15	60	10	10	Tr		Tr					Tr, ALT, wk-sp suls, St gar, sp gar sand
395.9	402.9	7.0		.23		.05		68	2.95							.23										15	50	20	10								Tr, v. v. brkn, wk-Mod spy, Mod gar sand
402.9	410.3	7.3		.52		.06		77	3.00							.52										15	60	10	5		5						Tr, ALT, "pods" cpy, v. wkly chert, pk calcite, sp gar sand
410.3	420.8	10.5		.03		.06		74	2.82							.03										15	60	10	5		SP						Tr, as above
420.8	430.2	9.4		.97		.03		91	2.84							.97										35	10	30	5		10	10		Mb	420.8	good	Mb, Patches of Hf, Tr, with Pods of cpy & Magnetite py
430.2	438.9	8.7		.81		.03		94	3.08							.81										20	10	50	5		10	5		Hf	430.2	good	Hf, very str. Pods of chlor, py + cpy, dec in Mb
438.9	447.0	8.1		.12		.04		79	3.03							.12										10	10	70	SP		5	SP					Hf, Mod clay, ALT, sp suls, decr in chlor + Mb
447.0	458.6	11.0		.36		.05		92	2.96							.36										10	10	60	1		5	5					Hf, Mod chlor, sp calc vnlts, sp-mod suls
458.6	468.7	10.1		.76		.05		95	2.61							.76										10	20	50	5		5	5					Hf, as above, Mod pods cpy
468.7	479.5	6.8		.61		.05		84	2.85							.61										15	50	45	5		SP	SP					Hf, ALT, patches Tr, + Mb, sp-Mod suls
479.5	485.8	8.3		.75	.53	.03	.03	84	3.17							.75								Tr		10	30	50	5		1						Hf, as above
483.8	485.5	9.1		.52		.03		86	3.16							.52					Tr		Tr	1		10	40	45	SP		1						Hf, " "
485.5	499.8	6.3		.29		.04		93	3.14							.29							1	1		10	35	45	1		1						Hf, " "
499.8	510.2	10.4		.55		.05		96	3.12							.55			5	Tr			SP	1		10	30	40	Tr		1	15					Hf, " " increas in sulf
510.2	520.9	10.7		.32		.04		89	3.01							.32			SP							8	35	60		SP	10	Tr					Hf, dense, St silica, wk suls, Tr sliST (?)
520.9	530.7	9.8		.22		.04		81	3.29							.22										10	10	65		1	10						Hf, as above
530.7	539.7	9.0		.30		.01		90	3.11							.30										5	5	70		1	15						Hf, wk clay-silic, Tr suls, Tr sliST, Pedding (?) [illegible]
539.7	549.1	9.4		.43		.01		88	3.20							.43										5	5	70		1	15						Hf, wk clay alt, Tr suls, Sp sliST, Mod Tr
549.1	557.2	8.1		.22		.02		100	2.79							.22								Tr		10	60	20	SP		SP	SP		Tr	549.1	good	Tr, wk clay alt, Tr suls, Mod Hf
557.2	566.2	9.0		.58	.280	.04	.280	82	3.04							.58										5	20	55	Tr	Tr	20	Tr					It as above
566.2	576.2	10.0		.15		.03		93	2.65							.15										5	15	55			25						Tr, SE. Silicification, sp suls
576.2	585.2	9.0		.61	.54	.04	.04	90	2.63							.61										10	20	60	SP		10			Dp	584.5	Brkn	Tr, S.S. above Tr [illegible], show dp, intense silicification
585.2	593.6	8.4		.28		.03		99	2.65							.28								Tr	Tr	SP	Tr				50						Dp, wk clay ALT, St silica, Tr spy, py
593.6	601.0	7.4		.31		.04		62	2.69							.31			Tr						Tr			Tr			30	SP					Dp, as above
601.0	610.7	9.7		.23				71	2.67							.23													Tr		Tr						Dp, wk ALT, Tr suls, Mdy
610.7	615.0	4.3		.20				41	2.70							.20																					Dp, Mod clay ALT, Tr suls + Mdy

Avg Rec = 87 %

End of Hole

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 3 %, Moderate (Md) 3-50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-124
Page 1 of 1 Pages
Collar Elev. 2808.43 Final Depth 307.4
Coords. N 36,800.53 E 15,178.69
Inclination VERT
Logged by SAA - FTG
Date: Start 5-17-62 Finish 5-25-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cc	Cov.	Born	Fe (2) Lim.	Py	Mag	Hem.	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NX → 1.875"	0.0	10.1	10.1		ROCK BIT				—	—																												ROCK BIT
	10.1	21.0	10.9		.13				81	2.53	.12		.01			Tr			Tr			Tr							Tr	Tr	Tr			Tr	Ak	10.1	—	Ak; leached, sp. clay - ser alt
	21.0	29.2	8.2		.25		.20		100	2.50	.18		.02			.05																						Ak, as above
	29.2	39.0	9.8		.60	.47	.52	.47	89	2.55	.50	Tr	.02			.08																						Ak; sp clay - jaro alt. Tr CuO_x
	39.0	48.9	9.9		.48	.54	.43		77	2.55	.46	Tr	.02			.05																	Tr					Ak, as above
	48.9	55.1	6.2		.16		.10		92	2.53	.10	Tr	Tr			.06																						Ak; " "
	55.1	64.6	9.5		.11				93	2.57	.08		.01			.02			Sp			Tr							Sp									Ak; " "
	64.6	72.4	7.8		.07				95	2.55	.06		Tr			.01																						Ak; " "
	72.4	80.8	8.4		.21				100	2.55	.13	.01	.01			.06																						Ak; " "
	80.8	87.0	6.2		.10				83	2.52	.08		.01			.01						Tr							Tr									Ak; " "
	87.0	100.0	13.0		.08				84	2.48	.07		Tr			.01			Tr																			Ak; " "
	100.0	110.2	10.2		.17				95	2.55	.01					.16				Tr						Tr			Sp				Tr					Ak, Mod Alt, sp ox, c.s., Tr Molyb
	110.2	119.1	8.9		.59		.06		97	2.53						.59																		Tr				Ak, as above, Catch of Aplite, cont sp suls
	119.1	128.8	9.7		.50		.09		92	2.67	.02					.57																						Ak, Alt, Mod c.s., Ox
	128.8	137.5	8.7		.85	.21	.08	.21	65	2.54						.85			Sp							Tr				Sp									Ak, sp - mod clay alt Sp suls
	137.5	146.4	8.9		.40	.51	.06	.07	55	2.79						.40														.10									Ak, as above
	146.4	155.8	9.4		.33		.06		63	2.65						.33														.20									Ak; " "
	155.8	163.9	8.1		.47		.07		95	2.54						.47				Tr						Tr				.15									Ak, sp clay - jaro - chlor alt Sp suls.
	163.9	172.3	8.4		.47		.05		97	2.56						.47														Sp									Ak; sp clay alt Tr. suls
	172.3	181.7	9.4		.17				92	2.60						.17													Tr	Tr	Tr								Ak, as above
	181.7	190.0	8.3		.17				94	2.61						.17																	Tr					Ak " "
	190.0	200.1	10.1		.14				90	2.61						.10	.04									Tr												Ak, wk alt
	200.1	209.1	9.0		.13				98	2.61						.08	.05																					Ak, wk clay - silicif Tr suls
	209.1	218.2	9.1		.27				95	2.60						.07	.20																Tr					Ak; as above Tr suls
	218.2	226.5	8.3		.34				82	2.59						.04	.30																					Ak; as above
	226.5	236.7	10.2		.20				100	2.60							.20																					Ak; " "
	236.7	245.5	8.8		.16				95	2.60							.16																					Ak, wk Alt, Tr Ser + suls, wk silicif
	245.5	254.4	8.9		.20				100	2.58							.20																					Ak, as above
	254.4	261.2	6.8		.16				91	2.61							.16																					Ak, " " sp - Tr Matrix
	261.2	272.8	11.6		.19				92	2.59							.19																Tr					Ak, " "
	272.8	280.0	7.2		.21				93	2.60							.21															Tr						Ak, " "
	280.0	288.3	8.3		.20				90	2.60							.20																					Ak, sp clay, wk Tr suls
	288.3	292.0	3.7		.11				100	2.56							.11																					Ak, as above
	292.0	300.0	8.0		.15				94	2.58							.15																Tr					Ak; as above
	300.0	307.4	7.4		.07				94	2.61							.07																					Ak; Tr clay - chlor alt Tr suls
						Av. Rec. = 89 %																																
					END OF HOLE																																	

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 3 %; Moderate (Mod) 3-50 %; Strong (St) > 50 %

Note (3)
Tr - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-103
Page 1 of 1 Pages
Collar Elev. 2733.66 Final Depth 227.9
Coords. N 36,958.17 E 15,320.96
Inclination Vertical
Logged by SAA-FTA-CWH
Date: Start Finish

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Chrys.	Phch.	Black	Blue Green	Cu Sol	Cu	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vs. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	23.8	23.8		ROCK		BIT		—	—																													ROCK BIT
23.8	32.2	8.4		0.08				85	2.69						.08			Tr	Tr									10	Tr	Tr				Ak	23.8	—	Ak, mod ser alt Sp. py
32.2	41.7	9.5		.10				79	2.58				.02		.03			1			Tr							5	Sp								Ak; as above To 39.5, then Ak, leached; sp clay alt
41.7	49.7	8.0		.05				89	2.51				.02		.03													Sp					Tr				Ak, leached, sp - mod clay alt
49.7	58.4	8.7		.07				95	2.54				.02		.05																			Mz	49.7	trkn	Mz; sp clay alt, Aplite Tor. To 56.6; then Mz Tor. Tr Ak.
58.4	67.7	9.3		.25				95	2.57				.10	.05	.10																	Tr		Ak	64.7	5°	Mz; wk alt To 64.7, Then Ak, wk clay alt; Tr CuOx, suls.
67.7	77.3	9.6		.17				97	2.57				.05	.08	.04																						Ak; wk clay alt. Aplite dike 72.6-74.0. Tr CuOx, suls.
77.3	84.2	6.9		.22				95	2.57					.15	.07														Tr								Ak, Tr clay alt Tr CuOx, suls
84.2	95.8	11.6		.15	.35	.04	.35	95	2.56					.04	.30	.09	CUPRITE															Tr					Ak; sp clay alt Tr suls.
95.8	103.2	7.4		.34	.65	.04	.04	93	2.57					Tr	.30	.04	Tr																				Ak; as above
103.2	111.4	8.2		.79		.03		88	2.51					1	.75	.04	1																				Ak; sp - mod clay alt Tr suls
111.4	119.9	8.5		1.01		.07		93	2.55					1	1.01	Tr													S								Ak, as above
119.9	125.8	5.9		.39		.07		95	2.55					1	.37	1													S								Ak, " "
125.8	135.2	9.4		.35				91	2.56						.35	1													Sp								Ak " "
135.2	145.8	10.6		.33				89	2.58						.20	.13																					Ak; Sp clay alt Tr suls
145.8	155.7	9.9		.32				83	2.60			Tr			.20	.12																					Ak; Tr clay alt Tr suls
155.7	163.8	8.1		.20				85	2.61						.08	.12													Tr				Tr				Ak as above
163.8	173.5	9.7		.13				99	2.57							.13		Tr																			Ak " "
173.5	183.7	10.2		.21				95	2.60							.21																					Ak; " "
183.7	191.0	7.3		.23				84	2.54							.23																					Ak Sp clay alt
191.0	200.0	9.0		.26				92	2.57							.26																					Ak, fresh, wk alt. Tr. py & cpy
200.0	207.8	7.8		.19				90	2.57							.19																					Ak, as above
207.8	216.3	8.5		.23				95	2.60							.23																					Ak, as above plus tr. cc.
216.3	223.1	6.8		.12				98	2.60							.12																					Ak w/ wk substance on bit. first half run which washes off 2nd half as preceding.
223.1	227.9	4.8		.13				100	2.61							.13												Sp									Ak, fresh, one ¼" py vein. Tr dis. py & cpy.
END OF HOLE																																						

Av. Rec. = 92%

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparse (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-165
Page 1 of 1 Pages

Collar Elev. 3018.34 Final Depth 1841.0
Coords. N 130,439.26 E 18996.77
Inclination Vert
Logged by SAA - CWH - PTG
Date: Start 5/25/62 Finish 5/31/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vs. Qtz.	QUARTZ	CHLORITE	ANGLESITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	5.0	5.0		2.48		2.15		—	—																													ROCK BIT
NX 1375 5.0	14.0	9.0		1.48	2.63	1.54	2.63	36	2.45	.40	Tr	.04	1.00		.61			SP		Tr	Tr					S	10	80		S			Tr		Hf	5.0	—	Hf leached, wk clay - chlor alt To 9.7 Then st. lim. alt. Tr CuOx
14.0	22.2	8.2		1.10	1.51	.62	.41	54	2.48	2.5	Tr	.2	.50		.43			10	Tr							10	5	65	Sp	10	Tr				Sp Qt	16.6	?	Hf leached, st lim alt, To 16.6, Then Da (?), wk clay - jarosite
22.2	31.3	9.1		1.36		1.19		93	2.60	.48	1	.01	.70		.17			5								SP			SP	K	1	30	5	Tr	Qtzite	27.1	Brow	Da (?) leached, A.A.I. unleaches To 27.2, Then Qtzite, with Tr Hf & Cu
31.3	42.4	11.1		.24		.20		77	2.63	.01		.01	.18		.04			SP								Tr				Tr		35						Qtzite, sp clay alt, st qtz veg with Tr sp. lim/Hf
42.4	49.0	6.6		.16				93	2.63			.01	.15		Tr			Tr											Tr	SP	Tr	80	Tr					Qtzite, as above, Features A.A.I. Mz
49.0	57.5	8.5		.10				91	2.64	.05	Tr	Tr	.02		.03				Tr						Tr					Tr		80						Qtzite, patches Mz C.Ox
57.5	66.4	8.9		.15				95	2.63	.11	Tr	.01	.03		Tr																	20	Tr					Qtzite, Tr disseminated
66.4	76.1	9.7		.10				92	2.58	.03		Tr	.01		Tr				Tr						Tr				Tr			30						Qtzite, " " Ox patches
76.1	83.7	7.6		.12				100	2.62	.09		Tr	.02		.0																	30						Qtzite, as above
83.7	90.1	6.4		.14				93	2.61	.16	Tr	.01	.01		.02										Tr							85	Tr					Qtzite, " "
90.1	99.7	9.6		.20				92	2.53	.11	.01	.01	.02		.05																20	70						Qtzite, " Qtz veins w molyb Patches silic'd Da
99.7	105.8	6.1		.25				100	2.62	.12	.01	.02	.04		.06																5	70						Qtzite, clay along fractures
105.8	112.1	6.3		.23				69	2.62	.14	Tr	.02	.03		.04																SP	85						Qtzite, as above
112.1	122.2	10.1		.39				79	2.58	.31	Tr	.01	.01		.06																	60						Qtzite " "
122.2	132.4	10.2		.60		.52		84	2.62	.48	.01	.01	.02		.08										Tr						Tr	30			Da	124.0	brk-	Qtzite, " " To 124.0 Then Da (?) st silic'd to
																																			Mz	128.4	brka	128.4 then Mz, leached, mod clay alt To CuOx
132.4	142.0	9.6		.27		.18		83	2.58	.16	.01	.01	Tr		.09										Tr							Sp	Tr					Mz; leached, sp clay - wk silic'd Tr CuOx
142.0	151.7	9.7		.23				75	2.58	.14	.01	.02			.06																							Mz, as above
151.7	162.3	10.6		.29				71	2.59	.16	.01	.02			.10																	1						Mz; " "
162.3	170.2	7.9		.26				86	2.46	.14	.01	.03			.09															SP								Mz; mod clay alt Tr CuOx
170.2	177.3	7.1		.29				20	2.53	.10	.01	.01			.17															S								Mz; as above To 174.5, then pebble bx w/ st clay alt
177.3	184.0	6.7		.10				51	2.55	.05	Tr	.01			.04															S		SP						Mz, patches pebble bx w st clay alt, patches Mz wk clay alt
					Av. Rec = 78%																																	
				END OF HOLE																																		

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparse (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif Igneous

Hole No. D-106

Page 1 of 3 Pages

Collar Elev. 3794.24 Final Depth 406.3

Coords. N 86 514.19 E 15 442.75

Inclination VERT

Logged by SAA PTG

Date: Start 5-25-62 Finish 6-2-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov.	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	5.6	5.6		ROCK		BIT		—	—																													ROCK BIT
NK → 5.6	15.7	10.1		.05				80	2.49	.03		.01			.01			Tr			Tr								S	SP	Tr		Tr		AK	5.6	—	Ak; leached Mod - st clay - ser alt
15.7	25.1	9.4		.07				93	2.92	.04		.01			.02														SP					Tr				Ak; leached; Sp clay alt
25.1	35.2	8.1		.04				93	2.47	.03		Tr			.01																							Ak; as above St live Lm
33.2	40.3	7.1		.04				81	2.54	.03					.01															S								Ak; brkn, leached Mod clay alt
40.3	50.0	9.7		.06				90	2.51	.05		Tr			.01															SP				SP				Ak; leached Sp clay - jaro alt
50.0	56.2	6.2		.06				72	2.54	.05		Tr			.01																			Tr				Ak; as above
56.2	61.3	5.1		.05				81	2.54	.04					.01															S								Ak; " "
61.3	69.7	8.4		.06				75	2.50	.04					.02															S				SP				Ak; " "
69.7	78.0	8.1		.04				93	2.53	.04					Tr															SP				Tr				Ak; " "
78.0	85.3	7.3		.06				97	2.52	.04					.02															S				SP				Ak; " "
85.3	94.7	9.4		.04				90	2.67						.04				Tr											SP								Ak " " Tr sulfs, bornite
94.7	104.1	9.4		.24		.01		91	2.76						.24									Tr						S				Tr				Ak; leached to 99.4 then sp clay alt Tr sulfs
104.1	114.0	9.9		.67		.07		71	2.76						.63														S	10								Ak; sp clay alt To 110.5, then mod - st clay alt. Tr sulfs
114.0	124.1	10.1		.52	.52	.05	.05	88	2.70						.52														S	10								Ak; mod clay alt Tr sulfs
124.1	128.8	4.7		.29	.36	.03	.03	89	2.62						.29														SP	10								Ak; sp clay alt Tr sulfs
128.8	136.5	7.7		.55		.02		100	2.46						.55															10								Ak; mod clay alt. Tr sulfs.
136.5	142.4	10.9		.38		.01		95	2.45						.38															S								Ak; as above
142.4	156.9	7.5		.57		.01		84	2.91						.57															S								Ak; " "
156.9	166.2	9.3		.34		.03		91	2.50						.30	.04														10								Ak; sp clay alt, Tr Sec. Th sulfs
166.2	175.3	9.1		.29		.01		99	2.53						.28	.05														S								Ak; as above
175.3	185.9	10.6		.31		.01		94	2.55						.25	.06														S								Ak; " "
185.9	189.0	8.1		.38		.01		100	2.55						.30	.08														10								Ak; " "
189.0	203.5	9.5		.35		.01		96	2.53						.27	.08														S								Ak; " " Sp sulfs, Py
203.5	212.2	8.7		.34		.01		100	2.46						.24	.10														10								Ak; as above
212.2	218.3	6.1		.72		.01		96	2.52						.50	.22																						Ak; " " Spec
218.3	227.8	9.5		1.12	1.07	.06	.05	74	2.95						.90	.20																						Ak; " "
227.8	234.1	6.3		.78	.71	.05	.05	96	2.57						.68	.10																						Ak " "
234.1	243.2	9.1		.57		.05		89	2.65						.57	.07																						Ak " "
243.2	252.9	9.7		.40		.05		88	2.58						.35	.05																						Ak; " "
252.9	259.9	7.0		.38		.03		98	2.50						.30	.08																						Ak; " "
259.9	268.7	8.8		.19				96	2.59						.10	.09												Tr					T				Ak; " "
268.7	277.7	9.0		.16				99	4.55						.10	.06																						Ak; " "
277.7	285.2	7.5		.37		.04		88	2.75						.20	.17																						Ak; " "
285.2	293.8	8.6		.44	.19	.05	.03	98	2.56						.30	.14																	T					Ak; " "
293.8	304.4	10.6		.46	.43	.04	.04	100	2.60						.35	.11															Tr							Ak, wk Alt, Mod Sio2, Mod py, Tr cc, Tr Mal
304.4	311.8	7.4		.24		.04		90	2.56						.10	.14																						Ak; as above
311.8	321.5	9.7		.21				92	2.61						.03	.18																						Ak; " "
321.5	329.2	7.7		.19				94	2.58						.04	.15																						Ak; " "
329.2	340.1	10.9		.60	.28	.02	.02	92	2.61						.45	.15												Sp										Ak; Brkn, ggy w pyT, sp sem Alt Sp Sio2, ak sulf
340.1	350.1	10.0		.63	.62	.03	.02	91	2.56						.50	.13																						Ak; as above
350.1	357.8	7.7		.62		.01		95	2.58						.55	.07														10								Ak; " "
357.8	367.9	10.1		.24				83	2.29						.20	.04														S								Ak " "
367.9	377.8	9.9		.13				97	2.58						.07	.06												Tr	Sp									Ak; sp clay alt Tr sulfs
377.8	387.8	9.9		.19				78	2.73						.03	.16																Tr						Ak; as above Sp silicif

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %, or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Docite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. [illegible]
Page 2 of 2 Pages

Collar Elev. 2794.24 Final Depth 406.5
Coords. N 36,514.14 E 15,512.75
Inclination Vert
Logged by SAA - [illegible]
Date: Start 5-23-62 Finish 6-2-62

Depth From	Depth To	Depth Intvl	Elev	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cc	Cov	Born	Fe (2) Lim.	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Mn Ox	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
387.7	397.2	9.5		.09				12	2.44						.02	.02			Tr					Tr					Sp	md	Tr	Tr	Tr					Ak; mdd clay alt Tr sulf Patches st clay alt
397.2	406.5	9.3		.13				86	2.53						.10	.03													Sp									Ak; as above
						AVG	REC	89%																														
				END	OF	HOLE																																

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by sooo mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Mo) 5-50 %; Strong (St) > 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. M-102
Page 1 of 3 Pages
Collar Elev. 5122.13 Final Depth 531.7
Coords. N 36 499.72 E 19 593.86
Inclination Vert
Logged by JAA - CWH - FTG
Date: Start 5-28-62 Finish 6-8-62

Depth From	Depth To	Int'l	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cc	Cpy	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	Magnetite	Fluorite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	6.5	6.5						Poor	Est																														
6.5	18.9	7.5		.18				85	2.52	.15	.01	.02			Tr			Tr										Tr	Tr	Tr		Tr	Tr			Mz	6.5	?	Mz, Coarse grained, wk Bit, leached, mod silic, To ms cu
14.0	28.6	8.0		.24				89	2.82	.15	.01	.02	.05		01				Tr							5	10	40		10						Hf	18.4	Dark	Hf, as above To 18.4' then ssy cont with Hf wk carb + Mal
22.6	33.6	9.0		.36				97	2.70	.07	.01	.02	.28		Tr	.02										5	15	80		Sp									Hf, leached, Sp ms cu, patches To Mz cu's wing
32.8	40.1	7.5		.17		.16		76	2.58	Tr	.01	.02	.14													5	10	70		Sp	P	5							Hf, " " " " " To 40.1 "
40.1	50.0	9.9		.37		.36		90	3.10	1	.01	.02	.34			Tr					Tr					10	10	70				Sp	5						Hf, " " " To 50.0 Mod silic
50.0	58.8	8.8		.73	.258	.68		91	3.07	.05	.01	.02	.65													10	15	70					Sp						Hf, Tr leached, Mod-St silic, Mod-St Mal, To Sulf, Mod Tt
58.8	65.6	6.8		.57	.24	.55	.54	98	2.80	Tr	.01	.01	.40			.15										15	10	70					5						Hf, as above
65.6	75.8	10.2		.43		.10	.54	91	2.81	1	.01	.02	.37			.08										15	10	65				5	5						Hf, " " " wk silic wk Sp chlor
75.8	88.2	7.4		.38		.31		96	2.66	1	.01	.01	.36			Tr										0	5	70				5	Sp			Sltst	88.2	grad	Hf, leached, Sp chlor & Mz cu To 88.2 then sltst, wk cu
88.2	92.5	4.3		.14		.09		100	2.56	01	Tr	.01	.12													5	Sp	40		Tr	Tr	Sp	5			Hf	88.7	"	Sltst, St silic, To Mz cu To 88.2' then Hf, leached
92.5	102.3	9.8		.92		.79		91	3.05	.01	1	.01	.75			.05					Tr					10	5	70				Tr	10						Hf, leached, St Hem, St Mz cu, Sp cpx
102.3	109.8	7.5		.16		.12		97	2.70	Tr		.01	.15			Tr										10	5	60					20						Hf, as above, Mod chlor
109.8	116.1	6.3		.75	30.8 .45	.58	30.8 .40	98	2.56	.15	.01	.02	.40		.10	.07		5			.15					10	10	20	Tr	5		Tr	5			Mz	109.2	grad	Hf, " " To 109.2' then Mz leached & wk Bit
																																				Hf	115.0	"	To 115.0' then Hf, intense Sp ms cu To End
116.1	125.3	7.2		.72		.49		89	2.67	.30	.02	.03	.115		.05	.19		5			.20					10	10	45		Sp			5			Mz	122.0	65°	Hf, intense Mz, leached, Mod ms cu To 122.0' then Hf
125.3	132.0	6.7		.23		.16		100	2.57	.05	.01	.02	.08		.04	.03		Sp			Tr					Tr								Tr	Tr				Mz, wk leached, Sp-Mod qtz wing, large Potential Mz ms
132.0	139.6	6.6		.17				98	2.58	.05	Tr	.01	.08		.03	Tr		Tr								Tr				Tr									Mz, " " " To zone of meta Sed(?)
139.6	149.1	9.5		.32				75	3.12	.08	.01	.01	.10		.02	.10										5	5	40				Tr				Hf	145.3	broken	Mz, as above To 145.3' then Hf, st chlor, wk leached
149.1	158.0	8.9		.38		.05		89	2.94							.30									Tr	0	10	20		5			Sp						Hf, wk chlor - clay alt Sp suls
158.0	166.0	10.0		.279		.02		85	2.96						.04	2.75										0	10	70		5			5						Hf, st clay alt, mod suls To 158.6, then sp chlor - silic & Tr suls
166.0	174.0	8.0		1.37	.335	.09	.335	98	3.07						Tr	1.37								Tr		0	0	90		Sp			Sp						Hf, mod clay alt; grad from above Sp suls
174.0	183.8	9.8		1.72	.196	.05	.08	96	2.94							1.72		Tr								0	10	70					5						Hf, sp clay - chlor alt Sp suls
183.8	193.5	9.7		1.85		.17		86	2.53	.16		.01				1.68										5	5	30	Tr	Tr	15	5	Tr			Mz	188.6	broken	Hf, as above To 188.6, then Mz; st silic & Hf incl
193.5	201.9	8.4		.20		.13		92	2.58	.11		.02				.07															10	5							Mz, mod silic & Tr CuO_2
201.9	209.7	7.8		.17	.196		.196	79	2.57	.12		.01				.04															15	5							Mz, as above
209.7	216.5	6.8		.03	.03		.09	77	2.51	.02		.01																			20	5							Mz, " "
216.5	225.6	9.1		.44		.16		96	2.51	.08		.01	.07		.20	.03										Sp	Sp	5		Sp	5	Sp			Hf	224.2	broken	Mz, " " To 224.2, then Hf, leached st chlor alt
225.6	235.5	9.9		1.16		.45		87	2.99	.01		.01	.43			.71					Tr					0	25	40		Tr	Tr	5	10						Hf, mod silic & Mod Tt, Mb Sp suls
235.5	246.0	10.5		1.82		.05		100	2.88							1.88										10	15	60		Sp		Tr	10						Hf, mod chlor alt Silic & Tt patches Sp suls
246.0	255.9	9.9		2.13	.195	.05	.195	100	2.71						.03	2.0					Tr					10	40	30					10			Tt	249.5	grad	Hf, st clay alt To 249.5, then Tt, sp chlor alt Sp suls
255.9	265.5	9.6		1.20	.120	.05	.11	93	3.19							1.20										10	40	30					10						Tt, mod chlor - silic & Mod suls Mod Hf, Mb
265.5	275.2	9.7		.93		.03		99	3.09							.93										25	30	20					10			Mb	272.5	grad	Tt, st silic & Mod suls To 272.5, then Mb; Tr chlor alt, Sp suls
275.2	284.9	9.7		.72		.03		95	2.88							.72								Tr	Tr	30	20	40					5						Mb, Tr chlor - hem alt Sp suls Tr Qz, Sl
284.9	290.6	5.7		.82		.04		93	2.83							.82										60	10	20					5						Mb, as above
290.6	297.2	6.6		.24				86	2.69							.24		Tr								70	20	0					5						Mb; Tr chlor alt
297.2	308.5	9.3		.18				98	2.70							.18										85	5	0					5						Mb, Tr chlor - hem along fractures Tr suls
308.5	317.2	8.7		.15				100	2.72							.15										90	5	5					5						Mb, as above
317.2	326.6	9.4		.26				99	2.70							.26								Tr	Sp	85	5	5					5						Mb, " " Tr qz, sl, fluor
326.6	336.2	9.6		.09				98	2.60							.09										95	Tr			Tr			5						Mb, dkr chlor - hem. Tr suls
336.2	345.8	9.6		.09				90	2.70							.09										90						Sp	5		Sp				Mb, f.g. Tr chlor - hem alt Tr suls, Tr Asbestos
345.8	354.8	9.0		.11				100	2.54							.11										50	Sp	10		Sp		15	10						Mb, Sp chlor - chlor alt Tr suls.
354.8	364.4	9.6		.12				93	2.69							.12										10	1	5				10	10						Mb, as above
364.4	372.8	8.4		.19		.04		91	2.60							.19										85	1	5				5	5						Mb, " "
372.8	380.2	7.4		.77		.05		94	2.58							.77										40	5	15				5	35						Mb, " " Patches blk chlor w sec st suls

NC → 5.400

NC → 139.5

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral % by eye, as follows: Trace (Tr); Sparse (Sp) < 5%; Moderate (Md) 5-50%; Strong (St) > 50%

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Oo - Oocite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. U-107
Page 2 of 2 Pages
Collar Elev. 3122.13 Final Depth 531.4
Coords. N 86,499.72 E 19593.36
Inclination Vert
Logged by SAA - CWA - FTG
Date: Start 5-28-62 Finish 6-8-62

Depth From	Depth To	Depth Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1): Chrys.	Pitch.	Black	Blue Green	Cc	Cov	Born	Fe (2): Lim.	Py	Mag.	Hem.	Spec.	Other (2): Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
380.2	387.4	7.2		.10		.02		89	2.04						.10										40	60	30		Sp		5	Sp	Tr	Tt	380.2	grad	Tt, sp, mod clay alt Tr suls. Incr Hf in depth
387.4	392.6	5.2		.87		.04		93	2.34						.87										20	20	30		5		Sp	25	Sp	Mb	387.4	brkn	Mb, sp chlor to 389.4, then Hf(?), solid core, wet blk chlor - clay - pare alt St suls. No calcite
																																		Hf(?)	389.4		
392.6	403.8	10.6		.23	.09	.02	.02	90	2.59						.23			Tr							30	15	20		5		Tr	20	Tr	Mb	394.0	grad	Hf, as above to 394.0, then Mb, sp clay - chlor alt. Tr suls
403.2	412.9	9.7		.27	.08	.10	.03	97	2.68						.27										30	10	25		5			25					Mb mod clay - chlor alt. Sp suls Tr Tt, Mod Hf
412.9	421.0	8.1		.49	.14	.13	.04	100	2.64						.49										25	10	40		Sp			10		Hf	412.9	grad	Hf, sp clay - chlor alt Sp suls. Sp (?)
421.0	431.0	10.0		.25		.02		92	2.34						.25										15	10	60					10					Hf, as above Mod Mb
431.0	440.3	9.3		.49		.01		100	2.89						.49										15	10	65					10					Hf, as above St Tt 431.0 - 435.7 Sp suls.
440.3	450.0	9.7		.40		.01		95	2.76						.40										10	10	60					18					Hf, st blk chlor alt Sp suls
450.0	457.0	7.0		.97		.05		85	2.95						.97					Tr					15	10	50			Tr		20					Hf, mod clay - chlor alt Sp suls Mod Tt.
457.0	463.1	6.1		.16		.05		89	2.87						.16										10	10	60					20					Hf, as above Decr Tt
463.1	471.0	7.9		.12				99	3.00						.12										10	10	45				Tr	20					Hf, mod chlor - silicif St Tt Tr suls
471.0	479.8	8.8		.27		.03		88	3.08						.27										10	15	50					20					Hf, as above
479.8	486.0	6.2		.40		.05		87	2.58						.40										10	30	35					10					Hf, as above Decr chlor
486.0	494.3	8.3		.32		.02		100	2.95						.32										10	50	30					5		Tt	493	brkn	Hf, as above to 493, then Tt, sp clay alt
494.3	503.0	8.7		.37				65	2.70						.37										5	20	10	Tr			Tr	5		Dp	499.0	brkn	Tt, sp clay alt, mod Hf to 499.0, then Dp, sp silicif Tr suls
503.0	510.3	7.3		.37				64	2.58						.37										Tr							Tr					Dp, sp clay - silicif Tr suls.
510.3	519.1	8.8		.34				95	2.61						.34									Tr								Sp					Dp, sp silicif Tr suls.
519.1	526.6	7.5		.25				92	2.62						.25																						Dp, mod silicif Tr suls
526.6	531.9	4.8		.31				88	2.58						.31																						Dp, sp clay - silicif Tr suls
						Avg Recov		82%																													
				END OF HOLE																																	

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undifferentiated Igneous

Hole No. D-108

Page 1 of 2 Pages

Collar Elev. 3118.56 Final Depth 4362

Coords. N 26350.77 E 17212.64

Inclination Vert

Logged by SHA - CWH - FTS

Date: Start 5-[illegible]-62 Finish 6-8-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green	$CuSO_4$	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	KAOLINITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	9.2	9.2						Rec	B.T.																														
9.2	12.7	3.5		.2		.06		45	2.57	.26		.01			.05			Tr							Tr			Tr	Tr	Tr	Tr	Tr	Tr		Mz	9.2	?	Mz, leached, wk ALT, Bxd
12.7	19.6	6.9		.14				82	2.61	.08		.01			.05																								Mz, wk leached, wk ALT, Mod sil
19.6	29.1	9.5		.15				95	2.58	.08		.01			.04												Tr		Sp		Sp		Sp						Mz, as above, Sp calc veins, Tr Hf frags
29.1	38.2	9.1		.13				88	2.53	.08		.01			.04																		Tr						Mz, " " " "
38.2	48.2	10.0		.09				89	2.58	.05		.01			.03														Tr										Mz, as above
48.2	59.6	11.4		.12				91	2.55	.06		.01			.05														Sp										Mz, " "
59.6	69.3	9.7		.10				92	2.56	.07		.0			.02																								Mz, " "
69.3	76.7	7.4		.08				87	2.55	.05		.01			.02																								Mz, " "
76.7	84.9	8.2		.06				96	2.57	.04		.01			.01																Tr								Mz, " " Tr feldspath
84.9	94.9	10.0		.08				85	2.54	.05		.01			.03																								Mz, as above
94.9	103.7	8.8		.09				90	2.55	.05		.01			.03																								Mz, " "
103.7	110.6	6.9		.10				91	2.55	.05		.01			.04																								Mz, " "
110.6	121.1	10.5		.10				88	2.56	.04	.01	.01			.04																								Mz, sp feldspath - silicif. Tr calc
121.1	130.2	9.1		.17				99	2.57	.04	.01	.01	.06		.05						Tr					5	Tr	30				10		5	Hf	126.0	brkn	Mz, as above to 126.0, then Hf, leached, sp chlor alt, Sp Tt
130.2	140.1	9.9		.07				93	2.90	.01		.01	.04		.01											10	20	60				5							Hf, tr leaching, sp clay alt, Tr Tt
140.1	144.8	4.7		.45	223'	.32	223'	78	2.89	.05		.01	.26			.13			Tr							5	30	45					Sp						Hf, as above
144.8	154.3	9.5		1.15	@ 73	.39	@ 36	95	3.08	.20		.01	.13		—	.76										10	50	40		Tr		10							Hf, wk leached, Mod Tt, pods [illegible]
154.3	163.4	9.1		.49		.36		100	2.93	.05		.01	.30			.08					Sp					10	20	50				10							Hf, as above, patches Mb, Tt
163.4	172.9	9.5		.08		.07		94	2.57	.01		.01	.06								Tr					Sp	Sp	40		Sp		5			Mz	165.0	70°	Hf, as above to 165.0, then Mz, leached wk ALT
172.9	182.0	9.1		.10				93	2.60			.01	.04			.05										10	10	50		Sp		5		5	Hf	172.9	75°	Hf, Leached, ALT, Tr Mz
182.0	191.0	9.0		.43		.33		86	3.25	.15		.01	.17			.10					Tr					10	10	65		Sp		5		Sp					Hf, " " Sp-Mod Lim, Sp Mz Cm
191.0	200.4	9.4		.91		.82		97	2.85	.05		.01	.76			.09										10	10	60				10							Hf, Leached, patches Tt + Mb, Tr sulfs
200.4	209.2	8.8		.18	572' @ 53	.10	572' @ .31	93	2.58			.01	.07	.02		.08										Tr			Tr	Tr			Tr	Tr	And	201.0	80°	Hf, as above to 201.0, then And, post mod
209.2	214.6	5.4		.34		.20		92	2.59	.07		.01	.12	—	.04	.60										5	Tr	10		Sp				5	Hf	212.0	~80°	And, post mod dike to 212.0, then Hf, leached, sp chlor - clay alt
214.6	220.1	5.5		.56		.02		76	2.54					—		.56										35	5	50		5				10	Mb	215.5	grad	Hf, to 215.5, then Mb, sp chlor - clay alt Tr sulfs Sp Hf
220.1	229.7	9.6		.50		.22		94	2.66	.10		.01	.11	—		.28		Tr								40	5	30		5				Sp					Mb, leached, Tr chlor alt.
229.7	239.2	9.5		.40		.28		64	2.69	.12		.01	.15			.12										40	5	40		5									Mb, pods hem - qtz Tr CuOx St chlor alt from 235.0
239.2	249.2	10.0		.15		.03		77	2.59			Tr		Tr	- .15											Tr			Tr	Sp					Dp	239.2	brkn	Dp, sp clay - cal alt leached
249.2	257.0	7.8		.07				93	2.53	.05				.02																		Sp		Tr					Dp, sp silicif Sp chlor
257.0	265.7	8.7		.20		.18		80	2.59	.16	Tr	.01		.01	.02																								Dp, as above
265.7	275.6	9.9		.49		.21		68	2.62	.13		.01	.06	—	.28																								Dp, " "
275.6	285.3	9.7		.38		.01		80	3.18						Tr	.38										10	10	50											Dp, wk leached to 279.4, then Hf, sp sulfs, Mod Tt
285.3	295.1	9.8		.38		.02		93	3.11							.32										10	25	50						10					Hf, Mod calc veins, sp sulfs, Tr Mb - Qtz Mo'x, Mod Tt
295.1	304.8	9.7		.46	751' @ .03			94	2.83							.46								Tr		10	30	20						30	Tr	295.1	grad	Tr, " " , Mod cpy - Py, Tr Mo'x, Mod Hf, Mod chlor
304.8	314.5	9.7		.27	.51	.03	.05	98	2.15							.27										10	15	45	30					10					Tr, Mod cpy - Py, Mod chlor
314.5	323.4	8.9		.29		.03		100	2.76							.29										10	30	25						35					Tr, as above, incr in Hf, patch Mb
323.4	332.0	8.6		1.40		.01		82	3.72							1.40			Sp							15	10	40						30	Hf	323.4	grad	Hf, dk, St Py & chlor, Sp Mod cpy
332.0	340.8	8.8		.45		.02		92	2.97							.45			Tr							10	20	40						20					Hf, Mod calc veins, Mod chlor, Tr sulfs
340.8	349.2	8.4		.28		.02		99	3.04							.28										10	35	35						10					Hf, as above, incr in Tt
349.2	358.2	9.0		.17				95	3.18							.17					Tr					10	55	25						10	Tt	349.2	grad	Tt, Mod cpy, Py, Mod chlor
358.2	368.6	10.4		.33				92	3.22							.33										5	60	20				5		10					Tt, dense, incr in 2ber ISR sulfs
368.6	377.3	8.7		.23		.02		84	3.51							.23					Tr					10	50	20				Sp		20					Tt, " " " incr in Cpy
377.3	386.0	8.7		.47		.02		87	3.28							.47			Sp							10	50	25						15					Tt, St gar, Mod cpy-sulfs, Tr chlor
386.0	396.4	10.4		.30		.02		87	2.65							.30			Tr							Sp	10	45	Tr			5	Sp		Dp	389.9	Bxd	Tt, as above, to 389.9 then silicified Dp

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral % or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tf - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Dc - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-108
Page 2 of 3 Pages
Collar Elev. 3118.56 Final Depth 436.0
Coords. N 36350.74 E 19212.64
Inclination Vert
Logged by JAA - CWH - FTG
Dates Start 5-21-62 Finish 6-8-62

Depth From	Depth To	Int'vl	Elev	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Bnch	Black	Blue Green		Cc	Cpy	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sil. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
396.4	405.6	9.2		.70	.55	.01	.55	100	2.60							.70			Tr										Tr	SP	Tr	5	Tr					Dp, dense, silicified, patches of Mete sed, sp cpy
405.6	414.9	9.3		.02	.01	.01	.01	75	3.11							.02										5	65	5				5	5		Tf	405.6	3.2N	Tf, dense, mod spy, sp calc veins, patches Dp
414.9	423.8	8.9		.44	.53	.02	.02	61	2.61							.44										Tr			Tr			5	Tr		Dp	414.9	" "	Dp, silicified, sp cpy - ox
423.8	430.4	6.6		.54		.06		69	2.64							.54																5						Dp, silicified, wk spy - ox
430.4	436.0	5.6		.24		.01		88	2.61							.24																5						Dp, as above, Tr Mz Test
						Avg. Recov.		58%																														
				END - OF		HOLE																																

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by sooth mineral
(2) Est. mineral %, or, as follows: Trace (Tr); Sparse (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) > 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-109
Page 1 of 1 Pages
Collar Elev. 2741.61 Final Depth 334.3
Coords. N 36449.07 E 15603.04
Inclination Vert
Logged by SAB - CWA - RTG
Date: Start 6-4-62 Finish 6-7-62

Depth From	Depth To	Infrl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Cuprite	Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	4.9	4.9						Rock	Ar																													
4.9	13.2	8.3		.06				85	2.52	.06								Tr			Tr								5	5	Tr		Tr	Tr	AK	4.9	?	AK, leached, ALT, 33y, Med-St lim & "lime" lm
13.2	20.6	7.4		.05				88	2.27	.05											S								10	5								AK, St leached & ALT, st clay & lim
20.6	29.2	8.6		.07				88	2.49	.04					.03						Tr								5	5								AK, as above deep in lim
29.2	40.7	11.5		.05				86	2.41	.03					.02														Sp	5								AK, leached, ALT, 33y
40.7	50.4	9.7		.05				95	2.42	.03					.02															5	Sp							AS, as above
50.4	59.1	8.7		.65		.03		98	2.46						.63	.02			Tr											Sp	Tr							AK, ALT, wk leached, st "clay" (?) wins, Tr se, py
59.1	70.9	11.8		.63		.02		95	2.57						.63															5								AK, St ALT, Sec & clay, sp py wins
70.9	78.3	8.4		.51		.04		100	2.48						.51															Sp								AS, as above
78.3	84.9	5.6		.67		.02		92	2.58						.67																							AK, " "
84.9	93.1	8.2		.66		.03		100	2.45						.66																		Tr					AK, " "
93.1	102.5	9.4		.70		.01		100	2.46						.70														Tr									AK, wk ALT, sp sec & clay, Tr cc, py
102.5	110.0	7.5		.69		.03		95	2.58						.69																		Tr					AK, " " Med py wins sp sulfides
110.0	118.7	9.7		.56	.1450	.03	.010	92	2.56						.56									Tr														AK, " " Tr chlor, Moly
118.7	128.2	9.5		.69	.18	.02	.01	96	2.49					Tr	.69	Tr													Sp	5								AK, as above, 33y in part
128.2	137.5	9.3		1.32	.15	.03	.01	93	2.57						1.32														5	8								AK, Mod. ALT, brkx, 33y, sp cc, py
137.5	143.9	6.4		.77		.03		86	2.65						.77														Sp	Sp								AK, as above
143.9	152.9	9.0		.66		.01		95	2.52						.66														Tr	Sp								AK, " "
152.9	164.6	8.7		1.05		.01		89	2.74					Tr	1.02	.03													10	10								AK, Mod ALT, Tr cc, py, moly
164.6	170.0	5.4		.64		.05		98	2.50						.60	.04													5	8								AK, " " , brkx, 33y, cont cc, py
170.0	177.0	7.0		1.34		.05		94	2.49						1.32	.02													5	5								AK, " " sp cc, py
177.0	186.3	9.3		.60		.05		97	2.56						.60														10	8								AK, as above
186.3	195.4	9.1		.47		.03		93	2.74						.46	.01													Sp	5								AK, " "
195.4	203.7	8.3		.38		.01		100	2.66						.38															Sp								AK, Sp ALT, Tr cc, py wins
203.7	211.5	7.8		.19				89	2.55						.19														Tr									AK, ALT, Mod py, Tr cc
211.5	221.3	9.8		.32				92	2.41						.32															5								AK, as above
221.3	226.0	4.7		.22				100	2.41						.22															5								AK, Sp ALT, 33y zones, wk py wins, Tr cc, Moly
226.0	232.3	6.3		.31				86	2.49						.31															5								AK, as above
232.3	238.7	6.4		.35		.03		79	2.62						.35															5								AK, ALT, wk sws, Mod clay
238.7	247.1	8.4		.23				98	2.40						.23														Sp	8								AK, as above
247.1	251.2	4.1		.15				89	2.48						.15															5								AK, " "
251.2	265.2	7.0		.15				100	2.51						.15															5								AK, " "
265.2	275.4	10.2		.17				86	2.54						.17															5		Tr						AK, Sp ALT, Mod silica, Sp sws
275.4	283.6	8.2		.32				95	2.65						.32															5								AK, as above
283.6	292.4	8.8		.30				88	2.61						.30															5								AK, " "
292.4	305.3	6.9		.25				100	2.48	Tr					.25															5								AK, wk ALT, Mod silica, Tr chlor
305.3	309.1	3.8		.25				98	2.51						.25														Tr	6								AK, as above
309.1	314.6	5.5		.19				96	2.45						.19														1	Sp								AK, " "
314.6	322.1	7.5		.37		.02		100	2.61						.37	Tr													1									AK, wk ALT, Tr sws
322.1	330.5	8.4		.56		.06		92	2.69						.56														Sp	5								AK, as above, small ex "Pipe", last foot Mod cc
330.5	334.3	3.8		.29		.03		38	2.58						.29															5								AK, ALT, Mod sec, 33y in part
				Avg Rec.				93%																														
			End of Hole																																			

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral.
(2) Est. mineral %, or as follows: Trace (Tr); Sparce (Sp) < 5%; Moderate (Md) 5-50%; Strong (St) > 50%.

Note (3): Tt - Toctite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-110
Page 1 of 2 Pages
Collar Elev. 2741.69 Final Depth 395.1
Coords. N 26,202.79 E 15,741.39
Inclination Vert
Logged by SAA - FTG
Date: Start 6-7-62 Finish 6-10-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chalc	Pitch	Black	Blue Green		Cc	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Cobalt	Garnet	Silicate	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	ARGILLITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	5.0	5.0		Tr		→		Rock	2.5																													
5.0	10.9	5.9		.03				64	2.43	.03								Tr			Tr								Tr	S	Tr		Tr	SP	Ak	5.0	?	Ak. leached, Alt, sp. ser, mod "lime lim"
10.9	16.2	5.3		.02				99	2.56	.02																				S				Tr				Ak, as above, decr. lime lim
16.2	25.9	9.7		.01				91	2.58	.01																			SP	SP								Ak; as above
25.9	34.6	8.7		.01				100	2.39	.01									Tr																			Ak, leached, Sp clay - lim alt
34.6	43.9	9.3		.01				91	2.48	.01																												Ak; as above
43.9	53.3	9.4		.01				96	2.38	.01																												Ak; " "
53.3	62.6	9.3		.01				98	2.39	.01																												Ak, leached Mod clay alt
62.6	72.5	9.9		.06				89	2.74	.02					.04				Tr										S									Ak, as above to 66 ft. then Mod ser-clay alt Tr suls
72.5	81.1	8.6		.08				55	2.50	.02					.20														S									Ak; mod clay alt Tr suls. Fg patches
81.1	90.0	8.9		.23				53	2.68	.02					.21														SP			SP						Ak; as above
90.0	97.5	7.5		.24		.01		81	2.50						.24														Tr			Tr						Ak, " "
97.5	102.1	4.6		.89		.01		87	2.61						.89																							Ak, sp clay alt. Silicif patches Tr suls.
102.1	112.3	10.2		.72		.04		87	2.68						.72																							Ak; as above
112.3	122.2	9.9		.43		.03		94	2.51						.40	.03																						Ak, sp clay alt, tr suls. Sp clay alt. 117.5 - 120.5
122.2	130.6	8.4		.59	89.9	.04	89.9	99	2.51						.57	.02																						Ak; sp clay - silicif. Tr suls
130.6	138.7	8.1		.55		.05		90	2.8						.55									Tr						Tr		SP						Ak, mod silicif, fg areas. Tr suls.
138.7	147.6	8.9		.35	.55	.04	.04	92	2.61						.35	Tr													SP	SP								Ak as above. Decr cc
147.6	158.0	10.4		.45		.04		100	2.56						.42	.03													Tr									Ak, as above
158.0	165.3	7.3		.71		.04		100	2.53						.69	.02														Tr								Ak, fg mod silicif. Tr suls.
165.3	170.5	5.2		.49		.04		91	2.61						.47	.02																						Ak, as above. Sp clay alt
170.5	177.8	7.3		.38		.03		91	2.61						.35	.03																						Ak; as above " " sp cc
177.8	187.4	9.6		.58		.04		99	2.52						.55	.03														SP								Ak, " "
187.4	197.9	10.5		.25		.02		96	2.56						.23	.02																Tr						Ak, " "
197.9	206.2	8.3		.26				94	2.56						.22	.04													SP									Ak, incr IN Alt, (sect clay), sp cc
206.2	215.7	9.5		.39				98	2.49						.29															S					Mz	213.0	65°	Ak, as above to 213.0' then Mz, mod ser, Tr suls
215.7	225.2	9.5		.31		.04		99	2.53						.31	Tr													S	S					AK	220.4	brkn	Mz, mod Alt, Ser, Tr chlor. Tr suls to 220.4' then Ak
225.2	234.6	9.4		.55		.04		95	2.53						.50	.05													S	S					Mz	228.2	brkn	Mz, brkn, Alt, Mod ser & chlor. Tr suls, Patches Ak
234.6	244.0	9.4		.23		.03		97	2.50						.23	Tr													SP	S					AK	237.0	brkn	Mz, as above to 237.0' then Ak, Alt. rice
244.0	251.2	7.2		.08				77	2.55						.05	.03													Tr	SP								Ak, sp clay alt. Tr suls.
251.2	260.2	8.8		.32				100	2.34						.31	.01													10	10								Ak; mod - st clay alt Tr suls. Flt zone?
260.0	266.0	6.0		.11				77	2.55						.08	.03													SP	SP								Ak; sp clay alt. Tr suls
266.0	273.8	7.8		.14				83	2.64						.12	.02																						Ak; mod clay alt. Tr suls. Possib. Flt zone
273.8	280.2	6.4		.32				99	2.49						.31	.01																						Ak; mod clay alt. Tr suls.
280.2	288.6	8.4		.12				75	2.53						.1	.01													S	10								Ak; mod - st clay alt Sp suls. Possib. Flt zone
288.6	298.7	10.1		.29				86	2.49						.26	.03													SP	S								Ak, mod clay alt Tr suls.
298.7	306.4	7.7		.18				86	2.59						.16	.02														S								Ak, brkn, as above
306.4	314.0	7.6		.32				93	2.54						.29	.03														SP								Ak, as above. Tr gn.
314.0	319.9	5.9		.26				91	2.60						.24	.02																						Ak; sp clay alt. Tr suls
319.9	322.0	2.1		.20				94	2.57						.18	.02																						Ak, as above
322.0	334.8	12.8		.37				99	2.57						.33	.04													SP	Tr					Aplite?	327.0	brkn	Aplite?, mod ser alt Tr suls. Ang ind of Ak and Mz
334.8	342.8	8.0		.23				100	2.55						.21	.02																						Aplite, (?) as above
342.8	351.1	8.3		.23				100	2.53						.20	.03																			AK	342.8	brkn	Ak, sp clay alt Tr suls
351.1	361.0	9.9		.27				95	2.58						.22	.05													Tr	S								Ak; as above
361.0	367.9	6.9		.32				96	2.57						.28	.04														SP								Ak; " "

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %, or, as follows: Trace (Tr), Sparce (Sp) < 5 %, Moderate (Mo) 5-50 %, Strong (St) + 50 %

Note (3)
Tr - Tactite
Hf - Hornfels
Mbr Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-110
Page 2 of 2 Pages
Collar Elev 2741.60 Final Depth 395.1
Coords N 36,202.49 E 15,741.39
Inclination Vert
Logged by SAA - RTG
Date Start 6-1-62 Finish 6-14-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N.S.	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	·	Cc	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	ANDESITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
362.9	372.1	9.2		.30				92	2.67						.10	.20			Tr					Tr					Tr	Sp	Tr	Tr	Tr	Tr				Ak; sp clay alt Tr sulf.
372.1	385.9	8.8		.30				98	2.58						.10	.20																						Ak; as above
385.9	392.0	6.1		.22				95	2.56						.08	.14																						Ak; " "
392.0	395.1	3.1		.26				100	2.51						.05	.21																	Tr					Ak; " "
						Avg	Rec =	91	%																													
				END OF HOLE																																		

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparse (Sp) < 5% Moderate (Md) 5-50% Strong (St) + 50%

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. U-111
Page 2 of 2 Pages
Collar Elev. 3147.26 Final Depth 550.0
Coords N 36,358.62 E 19,402.98
Inclination + Vert
Logged by SAA, PTG
Date: Start 6-8-62 Finish 6-23-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vs. Qtz.	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
361.4	369.3	7.9		1.33		.07		96	2.71							1.33			SP	Tr	Tr			Tr	Tr	10	35	30		5		15					Tt, mod clay - chlor. Sp sulf. Sp. Hf
369.3	379.0	9.7		.09		.02		46	3.24							.09									1	10	50	25		SP		10					Tt, sp clay alt. Sp. sulf.
379.0	388.8	9.8		.16		.04		95	3.00							.16		Tr			Tr				1	10	40	35		1		15					Tt, as above. Patches st chlor w. tr. bx. text
388.8	395.8	7.0		.69		.03		100	2.74							.69										10	40	35		1		15					Tt, sp clay alt. Sp sulf. St Hf
395.8	404.7	8.9		.64		.04		93	2.67							.64				Tr						10	20	55		1		15	Hf	398.8	grad	Hf, sp clay - chlor. Tr sulf. Tr Tt. Mod Mb
404.7	414.3	9.6		.70		.06		98	2.84							.70										10	65	20		SP		SP	Tt	406.0	" "	Hf, as above to 406.0. Then Tt, gar sand, mod sep
414.3	423.8	9.5		1.51	141.6	.02	141.6	87	3.15							1.51				Tr						10	40	30		5		1	Hf	417.1	" "	Tt, st gar sand to 417.1. Then Hf, mod chlor. Sulf.
423.8	434.8	11.0		1.45	18	.05	18	87	2.60							1.45								Tr		10	65	10		15		Tr	Tt	423.8	" "	Tt, st gar sand, mod sep, sparkles
434.8	444.1	9.3		.90	101	.04	.03	85	2.41							.90				Tr						10	60	15		5		Tr					Tt, " " " mod sep
444.1	454.1	10.0		.85		.02		49	3.14							.85					Tr					10	65	20		5		Tr					Tt, mod gar sand. Tr sulf.
454.1	463.3	9.2		.23		.02		91	3.11							.23			Tr							10	30	50		SP		5	Hf	455.5	brkn	Tt, massive gar to 455.5, then Hf, sp clay alt. Tr sulf.
463.3	470.4	7.1		.86		.02		77	3.42							.86			3	5				SP		5	40	40		1		SP	Tt	466.6	grad	Hf, as above to 466.6, then Tt, st chlor - sul alt
470.4	480.0	9.6		1.43		.02		54	2.62							1.43			8	Tr						10	60	10		5		5					Tt, massive sul - chlor alt. Patches massive gar.
480.0	489.6	9.6		1.47		.01		52	2.77					Tr		1.47			SP	Tr						10	30	50		SP		5	Hf	484	brkn	Tt w. mod st pp to ct. Hf w. mod. cay, wk chlor. Sub sulf.
489.6	497.0	7.4		1.57		.01		100	2.54							1.57										10	10	65	Tr	5	Tr	SP	8	Mz	495.1	60°	Hf as above. Total sulf st Hf long ct. Mz. fresh, sp. sulf.
497.0	507.0	10.0		1.79		.02		66	2.26							1.79										10	10	65	1	5	1	1	5	Hf	498.1	brkn	Mz, as above to ct. Hf now long, now chlor. Sulf wk, spotty.
507.0	513.8	6.8		.23		.01		92	2.92							.23										10	10	70		SP	Tr	5					Hf, white, Sp. sil., Sp. sulf.
510.8	521.3	7.5		.53		.03		98	2.88							.53			Tr						Tr	10	20	60		1	Tr	1	5				Hf as above, becoming more dense @ end. Sulf mostly py.
521.3	530.4	9.1		.88		.02		79	3.13							.88									1	10	30	50	Tr	1	1	SP	5	Da	525.8	60°	Hf, sp silicif. Tr sulf. Mod Tt to 525.8, then Da, wk alt
530.4	539.2	8.8		.20		.01		34	2.56							.20									1	Tr			1	1	1	Tr	SP	Mz	536.5	brkn	Da, sp silicif. Tr sulf. To 536.5, then Mz, sp clay alt
539.2	550.0	10.8		.19		.02		52	2.59							.19									1	Tr			1	1	1	SP	1	Da	542.1	brkn	Mz, as above to 542.1, then Da, mod silicif. Tr sulf.

Av. Rec. = 80%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral % ; on, as follows:
Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Docite
Mz - Manzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 2-73
Page 1 of 2 Pages
Collar Elev. 3105.22 Final Depth 583.6'
Coords. N 26,494.78 E 19,782.53
Inclination VERT
Logged by SAA, CWH, RTG
Date: Start 6-9-62 Finish 6-23-62

Depth From	Depth To	Depth Int	Elev.	% Cu Total	% Cu Avg.	% Cu N.S.	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	$CuSO_4$	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Mnyb	Calcite	Garnet	Silicates	Sericite	Clay	Un. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	10.0	10.0						Rock Dit																														
10.0	17.6	7.6		.70	.243	.64	.243	99	2.69	.35	.01	.02	.30	.02				.5								.45	.10	.30		.5	Tr		Tr	Tr	Mb	10.0	?	Mb, leached, patches vuggy Tt, Md lim, Sp NS Cu
17.6	24.6	7.0		1.11	@	1.02	@	85	2.88	.70	.01	.02	.38	Tr				SP								40	25	25		5								Mb, " to patches as above
24.6	30.3	5.7		.44	.71	.40	.67	97	2.55	.20	.01	.01	.22													10	20	40	Tr	5		SP		5	Hf	24.6	grad	Hf, leached, sp Tt, Sp Mb, Sp NS Cu to 31.6' then
																																			Mz	31.6	brkn	Mz, leached wk Alt
34.3	43.0	10.7		.10				75	2.57	.09	.01	.01						SP								Tr		Tr	SP	Tr	Tr	Tr	Tr					Mz, leached, wk Alt, brkn, Md Silica
43.0	53.4	6.4		.14				88	2.55	.10	.01	.01	.02																5									Mz, as above, brkn
53.4	61.2	7.8		.06		.02		100	2.50	.08	.01	.02	.95								Tr					15	45	30	Tr	5	Tr			5	Tr	52.4	Bgy	Mz, " " " to 52.4' then Tr, leached, Md NS Cu
61.2	66.1	4.9		.21	.08	.29	.08	91	2.85	.05		.01	.70	.5												5	20	45		10				5	Hf	61.2	grad	Hf, leached, Md calc, Md Mal + Lim
66.1	73.3	7.2		.16	.00	.12	.08	100	2.60	.90		.01	.25	Tr												10	10	60		10				10				Hf, " " " " " dense in Lim. Poss diopside
73.3	80.2	6.9		.22		.78		90	2.84	.50	.01	.02	.20	.05		.09										15	30	45		5	Tr		Tr	5				Hf, " " as above
80.2	89.7	9.5		.27				84	2.78	.05	Tr	.01	.21					Tr			Tr					15	30	50		SP				5				Hf, dense, silicified, Tr NS Cu
89.7	99.4	9.7		.18				87	2.54	.05		.01	.12													Tr			Tr			Tr	SP		Mz	89.7	Brkn	Mz, leached wk Alt, Tr NS Cu
99.4	110.4	11.0		.18				98	2.54	.04		.01	.12																									Mz, as above
110.4	120.8	10.4		.24				98	2.59	.03		.01	.20																									Mz, wk leached, wk Alt, Md Silica
120.8	130.3	9.5		.59		.24		99	2.59	.04	.01	.01	.18			.10					Tr					5	5	20						10	Hf	126.3	gy	Mz, as above, To 126.3 then silicified Hf, wk NS Cu
130.3	140.0	9.7		.64		.51		95	2.78	.01	.01	.01	.48			.13			Tr							15	10	55						10				Hf, leached, Alt, Md bem, patches silst, Md calc
140.0	149.8	9.8		.65		.56		89	3.6	Tr	Tr	.01	.55			.09										15	10	60						SP				Hf, as above to 142.0, then sp clay alt. Tr CuO_x
149.8	156.4	7.6		.41		.37		82	2.57		Tr	.01	.36			.04										10	0	70							Tt	153.9	brkn	Hf leached, sp clay alt to 153.9, then Tt leached, Md alt
156.4	163.2	6.8		.20		.12		70	2.62			.01	.11			.08										SP	Tr	10		Tr	Tr	50			Silst	157.0?	brkn	Tt as above to 157.0, then Silst, leached Poss Mz dike, from 157.0 - 159.0
163.2	172.3	9.1		.14	.075	.09	.075	86	3.30			.01	.08			.05		Tr	Tr							SP	15	5		Tr	Tr	55	5	Tr	Tt	169.8	brkn	Silst, strong alt, Md Mz (?) text throughout, to 169.8, then Tt Md alt
172.3	182.1	9.8		.58	.51	.57	.56	85	3.20			.01	.56			.01										15	50	20		SP		10	SP					Tt, sp chlor - hem alt Tr CuO_x, Md Hf
182.1	188.9	6.8		.42		.18		89	2.83		.01	.01	.16			.24										15	50	15				10	5					Tt, leached, sp silicif - chlor. Tr CuO_x
188.9	199.4	10.5		.51		.10		89	3.22			Tr	.10			.41					Tr					15	30	50		5			Tr		Tt	191.8	grd	Tt as above To 191.8 then Hf, Md chlor + col. Tr sulf
199.4	210.0	10.6		.29		.07		100	2.72							.29			Tr							15	15	60		5			5					Hf, wk Alt, Md chlor, Md calc walls, sp sulf
210.0	219.2	9.2		.43		.29		90	2.63			.01	.28			.14		5								85	Tr	5		Tr			Tr		Mb	210.0	grad	Mb, leached, sp lim, Tr sulf, Y NS Cu
219.2	227.8	8.6		.48		.32		94	2.69			.01	.31			.16		SP								90	1	5										Mb, as above, vuggy in part
227.8	237.6	9.8		.11		.06		98	2.71				.03			.08		Tr								90		SP										Mb, dense, blue, Tr chlor
237.6	247.0	9.4		.09				97	2.68				.04			.05										90												Mb, as above, Tr spx
247.0	256.6	9.6		.07				100	2.59				.02			.05					Tr		Tr			90							5					Mb, Tr leaching, Tr spx
256.6	266.4	9.8		.14				99	2.55				.05			.09										80	SP	5		SP	Tr		10					Mb, Brkn, sp lim, Md chlor, Tr Hf at end
266.4	275.6	9.2		.09				90	2.66				.03			.06										90	1	SP		5			5					Mb, as above, sp lim. Mz dike from 266.6 to 271.2
275.6	284.9	9.3		.10				95	2.66				.04			.06									Tr	90	Tr		SP				Tr						Mb, Tr leach, Tr Alt, Tr sulf
284.9	289.0	9.1		.14		.16		97	2.63			Tr	.16			.02					Tr					90	1						SP					Mb, sp " " " "
290.0	299.5	9.5		.48		.15		92	2.64			Tr	.15			.33		5						Tr	Tr	60	SP	5					10					Mb, Tr leach, patches Hf, Tr Hem, sp sp, Tr Pb-Zn
299.5	309.2	9.7		.53		.03		100	2.79							.53		Tr								50	1	30		1			10					Mb, as above, incr in sulf + Hf
309.2	318.2	9.0		.76		.02		95	2.77							.76										15	10	50		Tr			15		Hf	309.2	grad	Hf, Md chlor, Tr calc walls, sp - Md spx
318.2	328.0	9.8		.50		.03		92	2.74							.50										65	SP	20		1			5					Hf, St patches Mb
328.0	337.6	9.6		.28		.02		99	2.73							.28										70	5	50		SP			SP					Hf, St, chlor, sp sulf, wk Tt
337.6	347.2	9.6		.30		.03		87	2.82							.30										10	5	65		5			15	Tr				Hf, as above
347.2	356.7	9.7		.94		.02		100	2.55							.94										15	10	60		8			5					Hf, mod chlor - clay, Sp sulf, Tt, st clay 350.2 - 353.5
356.7	364.3	9.4		.33		.03		92	2.72							.33										15	10	65		SP			15					Hf, mod chlor - clay, Sp sulf, Incr Mb
364.3	374.1	9.8		.34		.02		97	2.80							.34										15	10	60		1			10					Hf, mod chlor - clay, Tr sulf.
374.1	383.7	9.6		.46		.05		96	2.79							.46										15	5	65		1			10					Hf, as above

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %, or, as follows: Trace (Tr), Sparse (Sp) < 3%, Moderate (Mod) 3-50%, Strong (St) > 50%

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Dp - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-112
Page 2 of 22 Pages
Collar Elev. 3103.22 Final Depth 593.8
Coords: N 36,494.78 E 18,787.58
Inclination VERT
Logged by: JAR - CWH - PTG
Date: Start 6-8-62 Finish 6-23-62

Depth From	Depth To	Int	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chryc	Pitch	Black	Blue Green		Cu	Cu	Born	Fe (2) Lim	Py	Mgt	Hem	Spec	Other (2) Gersdorf	Sphal	Molyb	Calcite	Gypsum	Silicification	Sericite	Clay	Sil. Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
325.7	395.4	9.3		.64		.06		100	2.62							.64			Tr							15	5	20		SP			20				Hf, mod clay - chlor alt. Tr suls.
395.0	402.7	9.7		.22	.23	.05	.03	99	2.79							.22										15	5	60					15				Hf, as above. Chlor. - free areas
402.7	410.4	7.5		.91		.05		92	3.03							.91										15	5	35					5				Hf, as above
410.4	419.4	9.2		.25	.24	.03	.04	100	2.79							.25										20	5	65					10				Hf, " "
419.4	429.4	10.0		.53		.04		87	2.90							.53										15	5	70		5			5				Hf, mod clay - wk chlor alt. Tr suls.
429.4	437.0	7.6		.58		.06		94	2.78							.58				Tr						15	5	65		SP			10				Hf, wk clay - st chlor alt. Sp suls
437.0	446.8	9.8		1.87		.05		77	3.75							1.87			SP							15	40	25		5			5		Tt	439.7	good	Hf, as above to 439.7, then Tt mod clay alt. Patches st suls.
446.8	456.4	9.6		.68		.07		76	3.18							.68										15	35	50		15			5				Tt, patches st clay alt. Patches st suls
456.4	466.2	9.8		.67		.05		97	2.99							.67										15	40	35		15			5				Tt, as above
466.2	471.1	4.9		1.80		.03		94	3.32							1.80										15	40	35		10			5				Tt, as above
471.1	480.4	9.3		1.37		.02		87	3.06							1.37										15	30	20		10			SP				Tt, st clay alt, mod suls
480.4	489.2	8.8		.15		.02		88	2.64							.15			Tr							5	30	25		25			1				Tt, st silicification, pat suls
489.2	498.0	8.8		.35		.04		34	2.79							.35									Tr	5	35	30		20			1				Tt, as above, patches sulfat
498.0	503.3	5.3		.84		.04		100	2.71							.84										3	35	25		30			1				Tt, st. silica, resembles sulfat, sp suls
503.3	512.4	9.1		.35		.04		95	2.66							.35										5	5	65		SP		5	1		Hf	503.3	good	Hf, mod chlor alt. Tr suls. Tr Tt, Tr Dp?
512.4	521.1	8.7		.52		.02		92	2.81							.52										10	5	70		1		5	1		Tt	515.0	good	Hf, as above to 515.0, then Tt sp silicif - chlor. Tr suls
521.1	531.0	9.9		.18		.02		88	2.68							.18										10	5	75	Tr	1		SP	1		Hf	521.0	good	Hf, mod chlor - Tr silicif, Tr suls. Tr Dp. Tr sulfat
531.0	536.2	5.2		.48		.01		81	2.71							.48										10	20	60									Hf, broken, Tr silicif. Tr suls. Mod Tt. Tr Dp
536.2	542.8	11.6		.13		.03		84	2.65							.13													Tr	Tr	Tr	Tr	Tr		Dp	536.1	broken	Dp, fresh w spots wk alt, sp gb - poly calts, sp suls
542.2	555.4	8.3		.41		.02		97	2.68							.41																					Dp, as above, core broken in pieces
555.4	564.6	9.2		.25		.03		91	2.75							.25																					As above
564.6	573.9	9.3		.20		.03		54	2.65							.20																					As above
573.9	580.0	6.1		.24				91	2.76							.24																					As above
580.0	583.6	3.6		.15				65	2.42							.15														SP							Dp as above

Avg. Rec. = 88%

End of Hole

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Mo) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Ht - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-111
Page 1 of 2 Pages
Collar Elev. 3147.06 Final Depth 550.0
Coords. N 26,358.63 E 19,402.98
Inclination VERT
Logged by SAA, PTG
Date: Start 6-8-62 Finish 6-23-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	6.0	6.0						Rak	alt																												
N C → 6.0	15.0	9.0		.31				77	2.51	.24	.02	.03			.02			SP								Tr	SP	10	Tr	Tr		Tr		Mz	6.0	?	Mz leached AKT, To 12.3' Then Hf, leached Alt, Tr MS Cu
2.400																																		Hf	12.3	brkn	Mod Chlor, Mod scale vuing
15.0	24.2	9.2		.33		.26		88	2.94	.16	.01	.02	.10		.01			SP	Tr								5	5	80	Tr	10	Tr					Hf, leached, as above
24.2	28.1	3.9		1.15		1.05		90	2.50	.47	.01	.02	.55		.03	.01		Tr	Tr		Tr						10	5	73	10							Hf, " " " "
28.1	32.5	9.4		2.14		1.90		88	2.51	1.44	.02	.09	.40		.04	.20		10	Tr	15							Tr	30	40		SP		S				Hf, leached, mod clay - sericite alt Mod CuOx
32.5	42.3	9.8		2.17		1.94		96	3.28	1.00	.01	.03	.70		.03	.40		5		Tr	10						5	50	20		Tr		10		Tt	37.5	grad	Tt, leached mod hem - silicif, Sp CuOx
42.3	52.8	10.5		1.79		1.58		95	3.01	1.00	.02	.06	.50		.01	.20		SP			10						5	50	15				20				Tt, mod leaching Sp hem - silicif Mod CuOx, sulf
52.8	67.2	9.9		.32	1.05	.30	1.16	86	3.09	.07	.01	.02	.50			.02		Tr			50						5	70	20				5				Tt, leached Sp silicif, Tr CuOx
67.2	74.6	6.9		.33	@	.31	@	89	2.85	.10	.01	.02	.17			.03					Tr						5	65	25				5				Tt, leached, Sp silicif - clay alt Tr CuOx
74.6	83.0	8.4		.72	2.21	.67	1.88	99	3.6	.21	Tr	.01	.75			.05											SP	65	10				15				Tt, as above
83.0	90.3	7.3		1.55		1.49		95	3.08	.40	.01	.01	1.07			.06		SP	Tr									60	30		Tr		5				Tt, leached, mod silicif, Tr clay alt Sp CuOx
90.3	99.4	9.1		4.57		4.40		84	2.97	.30	.02	.05	3.73			.47		Tr	Tr									60	35				S		Ht	93.6	brkn	Tt, as above to 93.6, then Hf, leached, mod clay alt Sp CuOx
99.4	106.6	7.2		2.59		2.26		59	2.67	.26	.03	.07	2.16			.33												55	30		S		10				Hf as above Patches Tt
106.6	116.5	9.9		4.86		4.33		93	2.53	.33	.02	.05	3.73			.53												15	45	30		S		S		Tt	106.6		Hf, as above, mod CuOx to 112.5, then Tt, leached, mod clay - lim alt Sp silicif Tr CuOx
116.5	124.3	7.8		1.12		1.00		91	3.22	.40	.02	.03	.55			.12												10	55	25		Tr		10				Tt, leached, mod silicif Tr CuOx
124.3	134.2	10.4		2.77		2.42		73	2.65	.60	.02	.05				.35												10	50	35				S				Tt, as above, Sp CuOx
134.2	145.4	10.2		.22		.15		80	2.57	.11	.01	.03	Tr			.07										Tr	Tr			Tr			Tr		Mz	134.7	brkn	Mz, leached, bleb, AKT, Mod lim, MS Cu
145.4	154.9	9.5		.14				76	2.50	.08	.01	.02				.03																					Mz, as above, Tr Sen
154.9	164.4	9.5		.13				66	2.60	.08	.01	.02				.02																					Mz, " "
164.4	174.4	9.0		.12				50	2.57	.08	.01	.01			Tr	.02																					Mz, " " " " silica
174.4	183.3	8.9		.18				93	2.52	.10	.01	.02				.05														SP							Mz, " " " "
183.3	186.7	3.4		.09				91	2.55	.06	Tr	.01				.02															Tr						Mz, as above
186.7	193.3	6.6		.15				100	2.57	.07	.01	.02				.05														Tr							Mz, " "
193.3	201.8	8.5		.13				57	2.55	.09	Tr	.01				.03																					Mz, " "
201.8	209.7	7.9		.17				82	2.53	.10	.01	.02				.04																					Mz, " "
209.7	218.3	8.6		.15				77	2.48	.08	Tr	.01	.02			.04																					Mz, " "
218.3	225.0	6.7		.15				96	2.50	.08	.01	.01	.01			.04																					Mz, " "
225.0	232.3	7.3		.19				68	3.17	.10	.01	.02	.01			.03										Tr											Mz, " "
232.3	241.6	9.3		.37		.31		100	3.05	.02		Tr	.29			.06												20	70	20								Tt, leached, sp calc veins, Tr chlor, Sp CuOx
N C → 241.6	246.6	5.0		2.29		2.00		100	2.89	.50	Tr	Tr	1.70			.24		S		Tr								5	30	5	S	Tr		Tr				Tr, as above
1.875	246.6	4.2		3.47	3.49	3.22	3.94	49	2.81	.50	Tr	Tr	2.72			.25		S										5	70	5	15							Tr, ST leached, brkn, gry, mod. MS Cu, Tr Lim, Tr sulf
246.6	267.6	10.8		1.06	1.87	.99	1.69	40	3.34	.10	.01	.02	.86			.02		10										10	50	25		S						Tt, " " gry, gar sand, Sp CuOx, mod cpy
267.6	276.0	8.4		.79		.56		99	2.56	.05	Tr	.01	.50			.23		SP										25	10	65	10	Tr	Tr		Hf	270.0	gry	Tt, as above to 270.0, then Hf, Mod chlor, Tr sulf
276.0	283.9	7.9		.55		.06		96	2.53							.55												15	5	20		Tr	SP					Hf, Mod chlor - scale vuing, sp sulf
283.9	292.9	9.0		.11		.07		90	2.68							.11			SP		Tr							10	5	80				S				Hf, ST chlor, mod scale, Tr sulf
292.9	300.0	7.1		1.66		.08		87	2.59							1.06												15	50	10	5			10				Hf, brkn, gry, St chlor, sp scale, Tr cpy, Mod py
300.0	309.6	9.6		.48	2.35	.06	2.35	100	2.47							.48												15	5	60	10		Tr	10				Hf, as above
309.6	318.6	9.0		1.43	.72	.01	.09	69	2.92							1.43					Tr							15	50	25	50			10				Hf, Mod chlor, Pods cpy
318.6	324.6	6.0		.12		.02	.05	88	2.98							.12												5	30				60	5				Hf, Mod silica, patches, ssf, wk cpy
324.6	334.0	9.4		.98		.03		52	2.98							.98					Tr							8	1	45			35	5				Hf, mod silicif, Patches mod clay alt Tr sulf
334.0	344.5	10.5		.35		.01		91	2.59							.35			Tr									10	1	55	5		10	15				Hf, mod chlor, Patches Tt, Possib Da text? Tr sulf
344.5	351.2	6.7		.38		.04		90	2.95							.38											Tr	10	55	30	SP			SP	Tt	341.5	grad	Tt, mod clay - sp chlor alt Tr sulf
351.2	361.4	10.2		.14		.08		95	3.00							.14					Tr							1	10	40	35			10				Tt, sp clay - chlor Tr sulf Mod Hf Tr Da text?

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5%, Moderate (Mo) 5-50%, Strong (St) > 50%

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Oo - Oocite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif Igneous

Hole No. Q-113
Page 1 of 1 Pages
Collar Elev. 2467.48 Final Depth 240.0
Coords N 36,319.53 E 15,681.43
Inclination VERT
Logged by SAA - PTG
Date: Start 6-19-62 Finish 6-19-62

	Depth From	Depth To	Depth Int	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Chrys	Pitch	Black	Blue Green		Cc	Cov	Barn	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Manyb	Calcite	Garnet	Silicates	Sericite	Clay	Sil Qtz	Quartz	Chlorite	Limonite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	8.3	8.3						ROCK	BIT																													ROCK BIT
HQ-4	8.3	12.6	4.3		.24		.03		90	2.66						.24			Tr	Tr					Tr					SP	5	Tr		Tr	SP	Ak	8.3	—	Ak, wk clay - ser alt to 114, then mod wkcf sp sulf
1.875	12.6	26.5	13.9		.42		.08		77	2.52						.42															5								Ak, Mod Ser, clay Alt, sp silica, Tr sulf
	26.5	37.9	11.4		.45		.08		73	2.41						.45														5	10								Ak, as above
	37.9	48.1	10.2		.48		.04		88	2.54						.48														SP	5								Ak, " "
	48.1	57.6	9.5		.36		.04		71	2.56						.36															5								Ak, " "
	57.6	67.0	9.4		.37				92	2.55						.37															5								Ak, Med Ser, Tr-spec, Py, wk silica
	67.0	76.6	9.6		.33	.370	.04	.370	95	2.49						.33															5								Ak, as above
	76.6	85.0	8.4		.42	@ .46	.04	@ .05	92	2.61						.42															5								Ak, " "
	85.0	92.5	7.5		.35		.04		95	2.60						.35															5								Ak, " "
	92.5	100.5	8.0		.35		.04		85	2.57						.35															5								Ak, bxe, ggy, Med ser, tr cc
	100.5	109.3	8.8		.41		.02		99	2.54						.41	Tr													Tr	SP								Ak, as above
	109.3	118.0	8.7		.27		.01		96	2.54						.27																							Ak
	118.0	126.1	8.1		.50		.05		81	2.56						.50														SP	8								Ak, Med Alt, Tr Sulf
	126.1	132.1	6.0		.46		.09		81	2.83						.46														5	5								Ak, Bxe, ggy, Med Alt, Ser, Tr Sulf.
	132.1	145.0	7.9		.22		.07		92	2.62						.22														SP	5								Ak; Alt, Tr cc, Med Py veins
	145.0	154.6	9.6		.136		.04		81	2.73						.136	Tr														5								Ak, as above
	154.6	163.3	8.7		.13				90	2.68						.13															5								Ak, sp clay alt, Sp sulf
	163.3	171.0	7.7		.20				77	2.58						.20															5								Ak; as above Lg patches Tr sulf.
	171.0	181.0	10.0		.25				87	2.73						.25														SP	5								Ak, as above
	181.0	190.3	9.3		.29				91	2.57						.29			Tr											10	10								Ak; med clay - ser alt Tr sulf
	190.3	200.1	9.8		.21				73	2.54						.21														SP	5								Ak; med clay alt Tr sulf
	200.1	205.5	5.4		.23				95	2.53						.23															5								Ak; sp clay alt Tr sulf Patches of clay alt
	205.5	212.5	7.0		.22				79	2.56						.22														5	5								Ak; " "
	212.5	223.9	11.4		.29				93	2.75						.29														25	5								Ak; med clay alt Tr sulf
	223.9	233.4	9.5		.21				66	2.68						.21														5	5								Ak; as above
	233.4	240.0	6.6		.27				87	2.56						.27														Tr	SP								Ak " " wk silica
						AVG	RECO		83%																														
					END	OF	HOLE																																

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-114
Page 1 of 2 Pages
Collar Elev 2910.47 Final Depth 702.8
Coords. N 32442.99 E 17204.21
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 6/23/62 Finish 7/13/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	$CuSO_4$	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	6.5	6.5		—	ROCK	BIT		—	—																												ROCK BIT
NC 2400	6.5	15.8	9.3		.12		.12		100	2.54	.09	.01	.02						Sp										Tr	Sp	Tr	Tr	Tr		Dp	6.5	—	Dp, leached, Tr clay-jara-silicif
	15.8	23.9	8.1		.22		.15		87	2.52	.12	.01	.02			.07				Tr															Mz	20.0	brkn	Dp; as above to 20.0, then Mz; leached, Sp clay alt
	23.9	32.3	8.4		.21				95	2.56	.15		.01			.05																			Dp	26.5	brkn	Mz; as above to 26.5, then Dp; tr feldspath - clay alt
	32.3	41.5	9.2		.10				88	2.56	.07		.01			.02																						Dp; leached, tr feldspath - clay alt Mz text Sheared areas
	41.5	51.1	9.6		.07				97	2.53	.05		.01			.01																		Sp				Dp; leached; Tr clay alt Sheared areas
	51.1	59.7	8.6		.11				85	2.55	.08		.01			.02																						Dp; leached Tr clay - feldspath
	59.7	69.2	9.5		.10				96	2.53	.06		.01			.03																	Tr					Dp; leached Tr silicif
	69.2	78.0	8.8		.16				83	2.55	.09		.01	Tr		.06			Tr	Tr																		Dp; as above Tr Mz
NX 1875	78.0	85.8	7.8		.18				86	2.55	.13		Tr			.05																						Dp; leached Tr feldspath
	85.8	94.9	9.1		.16				91	2.78	.10					.06																						Dp; as above
	94.9	102.6	7.7		.20				88	2.58	.15					.05																						Dp, leached, Tr feldspath - chlor.
	102.6	109.2	6.6		.20				94	2.58	.15					.05																						Dp; as above
	109.2	115.7	6.5		.14				95	2.57	.11					.03																						Dp; " " Tr dk incl
	115.7	123.4	7.7		.29				86	2.56	.20		.01	.03		.05																						Dp; " "
	123.4	131.8	8.4		.13				87	2.54	.06		.01	.04		.02																	SP					Dp; leached; Tr clay - chlor - feldspath Tr CuOx
	131.8	140.0	8.2		.24				65	2.54	.12		Tr	.09		.03																						Dp; leached Sp clay - chlor, gry patches; Sp CuOx
	140.0	148.6	8.6		.13				86	2.57	.06		1	.06	Tr	.01																						Dp; leached Tr clay - chlor - feldspath Tr CuOx
	148.6	158.3	9.7		.23				75	2.57	.17		1	Tr		.06																	Tr					Dp; leached Sp chlor - feldspath on vnlts. Tr Mz text, dk incl.
	158.3	165.2	6.9		.18				100	2.55	.10		1			.08																						Dp, as above
	165.2	173.0	7.8		.14				84	2.59	.08		1			.06																						Dp; " "
	173.0	183.1	10.1		.16				100	2.58	.05		1			.11	Tr																						Dp, leached Sp feldspath - silicif Mod Mz text Tr dk incl
	183.1	191.1	8.0		.13				99	2.60			1			.10	.03								Tr														Dp; as above
	191.1	201.7	10.6		.10				100	2.56						.10	Tr																						Dp; " "
	201.7	211.5	9.8		.18				92	2.61						.18	1																						Dp; leached Tr feldspath - sp silicif Tr dk incl
	211.5	219.0	7.5		.14				99	2.58						.10	.04																						Dp, as above
	219.0	228.7	9.7		.16				92	2.58						.04	.12								Tr														Dp, wk leached on shears, Tr sen, Tr cpy, cpy
	228.7	237.4	8.7		.22				99	2.59						.05	.17															Tr							Dp, wk alt, Tr sen, silicif, Tr cpy, cpy
	237.4	245.9	8.5		.21				97	2.60						Tr	.21																						Dp, as above, incr in silicif
	245.9	255.0	9.1		.18				88	2.56							.18																						Dp, as above
	255.0	258.0	3.0		.11				75	2.60							.11																						Dp, " "
	258.0	266.7	8.7		.15				96	2.59							.15																						Dp, as above Incr Mz text
	266.7	273.7	7.0		.12				94	2.60							.12		Tr																				Dp; as above
	273.7	282.3	8.6		.16				97	2.59							.16													Tr									Dp, sp clay Tr silicif Tr suls Tr Mz text
	282.3	289.0	6.7		.18				49	2.52							.18									Tr			Sp	Sp					And	288.7	brkn	Dp, mod clay - col alt. Tr suls to 288.7 then And, postmin'd
	289.0	299.7	10.7		.21				93	2.62							.21																		Dp	292.4	brkn	And; as above to 292.4, then Dp; sp clay alt. Tr suls
	299.7	306.8	7.1		.10				95	2.57							.10												Tr										Dp; sp clay - feldspath Tr suls
	306.8	314.7	7.9		.10				97	2.58							.10												Sp										Dp; as above
	314.7	323.9	9.2		.12				94	2.62							.12												Tr										Dp, sp feldspath - silicif Tr suls Brkn patches
	323.9	332.8	8.9		.13				95	2.62							.13													Tr									Dp, as above, Mod Mz text
	332.8	341.8	9.0		.14				94	2.60							.14																						Dp " " Tr Moly
	341.8	350.4	8.6		.15				96	2.60							.15																						Dp " " Tr suls Tr Moly
	350.4	360.3	9.9		.18				49	2.61							.18																						Dp " "
	360.3	367.8	7.5		.16				97	2.58							.16																Tr					Dp INCR IN SILICA
	367.8	373.6	5.8		.11				76	2.60							.11																						Dp " "

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5% Moderate (Md) 5-50% Strong (St) +50%

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif Igneous

Hole No. D-114
Page 2 of 2 Pages
Collar Elev. 2910.47 Final Depth 702.8
Coords. N 32,442.99 E 12,204.21
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 6/23/62 Finish 7/13/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
373.6	384.9	11.3		.17				68	2.60							.17			Tr						Tr				Tr	Tr	Tr		Tr					Dp; wk Alt, sp Ser, sp silica, sp dk inclusions, Tr suls
384.9	393.8	8.9		.13				96	2.60							.13																						Dp; " " Mod silica, sp cpy as veins, Tr moly
393.8	403.2	9.4		.18				95	2.60							.18																						Dp, as above
403.2	412.2	9.0		.17				93	2.62							.17																						Dp, wk Alt, Tr Ser, sp suls
412.2	421.2	9.0		.19				96	2.59							.19														SP								Dp, as above
421.2	430.8	9.6		.12				77	2.63						.04	.08																						Dp; " "
430.8	440.4	9.6		.13				95	2.59						.04	.09																						Dp; " " Patches bx
440.4	450.6	10.2		.38		Tr		89	2.58						Tr	.38																SP						Dp; brkn Tr clay-silicif Tr suls.
450.6	460.0	9.4		.35		Tr		99	2.61							.35																						Dp; Sp silicif St biotite Mod Mz text Tr suls.
460.0	467.3	7.3		.15				96	2.62							.15														Tr		SP	Tr					Dp; Sp silicif Tr suls
467.3	476.0	8.7		.11				97	2.59							.11																						Dp; wk alt Tr suls
476.0	484.5	8.5		.21				92	2.58							.21																						Dp; as above
484.5	494.3	9.8		.13				95	2.59							.13																SP						Dp; " " Sp dk incl w mod chlor
494.3	503.1	8.8		.12				96	2.58							.12																Tr						Dp; " " Tr dk incl
503.1	510.6	7.5		.12				94	2.60							.12																						Dp; as above
510.6	519.4	8.8		.15				97	2.59							.15																						Dp; " "
519.4	529.5	10.1		.15				92	2.59							.15																						Dp; " "
529.5	536.1	6.6		.18				100	2.55							.18																						Dp; Tr silicif Tr suls
536.1	546.5	10.4		.16				86	2.62							.16																						Dp; wk alt Tr suls Tr dk incl.
546.5	555.2	8.7		.13				94	2.59							.13																						Dp; as above
555.2	561.8	6.6		.13				76	2.60							.13																						Dp; " "
561.8	568.6	6.8		.18				57	2.60							.18																						Dp; " "
568.6	577.6	9.0		.17				97	2.59							.17																						Dp; " "
577.6	584.8	7.2		.15				76	2.60							.15																						Dp; " "
584.8	593.5	8.7		.32		.02		100	2.59							.32																						Dp; As above to 592.0 grad to mod chlor alt banded w mod mafics
593.5	602.1	8.6		.41	16.5 @	.02	16.5 @	100	2.69							.41																SP						Dp; patches chlor. St mafics Tr alt Sp suls. Mz text
602.1	610.0	7.9		.56	.48	.02	.02	95	2.66							.56																						Dp; as above. Decr bio. Incr bleaching Tr suls. Ct brkn
610.0	613.7	3.7		.25		.02		94	2.55							.25														SP			Tr					Dp; wk clay-silicif Tr suls Tr dk org incl
613.7	623.8	10.1		.17				87	2.62							.17														Tr								Dp, as above
623.8	633.3	9.5		.11				96	2.62							.11																						Dp; wk silica, dk Aug frags, Tr cpy & Moly
633.3	643.7	10.4		.15				87	2.60							.15																	Tr					Dp; as above
643.7	652.3	8.6		.13				63	2.64							.13																						Dp; " "
652.3	660.0	7.7		.14				41	2.62							.14																						Dp; " "
660.0	669.1	9.1		.14				87	2.62							.14			Tr											SP								Dp; " "
669.1	677.5	8.4		.26				94	2.60							.26														Tr								Dp; " "
677.5	686.9	9.4		.18				90	2.61							.18																						Dp " "
686.9	696.7	9.8		.18				92	2.61							.18																						Dp; mod silicif Tr suls
696.7	702.8	6.1		.15				82	2.61							.15														SP								Dp; as above

Av Rec. = 90%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-115
Page 1 of 2 Pages
Collar Elev 3001.02
Final Depth 509.7
Coords. N 37247.48 E 19401.35
Inclination Vert
Logged by SAA - CWH - FTG
Date Start 6/25/62 Finish 7/5/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Cu2O	Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	11.7	11.7						Rect	Sp.G																													R.B
N.C. → 2.400	11.7	19.8	8.1		.35		.30		72	2.69	.15	.01	.02	.12			.05		.5								10 40 30			.5	5	5	Tr	SP	Tt	11.7	?	Tt, leached, Alt, Mod silica, Sp gtz veining, Sp Brn
	19.8	28.9	9.1		.48	13.7 @ .86	.40	18.7 @ .54	46	3.04	.05	.01	.02	.32			.08		10								10 40 20			15	Tr	Tr	Tr	5				Tt, Brn, ggy, leached, Sp NS Cu
	28.9	38.5	9.6		.82		.67		80	2.95	.05	.01	.01	.60			.15		10								10 40 20			15			Tr	5				Tt, as above
	38.5	49.3	10.8		.30		.25		82	2.90	.02	.01	.01	.21			.05		SP								10 40 20			10	Tr	10	5	SP				Tt, "
	49.3	59.3	10.0		.39		.25		90	2.70		.01	.01	.23			.14		10	Tr		Tr					10 30 10			20	1	5	10	5				Tt, leached, Mod Alt, Tr sulfs, Sp NS Cu
	59.3	66.9	7.6		.75		.58		83	2.75	.04	.01	.03	.50			.17		5								10 35 20			5	1	5	15	SP				Tt, as above, Incr in Silica
	66.9	77.0	10.1		.52	46.4 @ .69	.43	46.4 @	80	3.02	.09	.01	.02	.31	Tr		.09		SP	Tr		Tr					10 45 20			5	1	10	10	1				Tt, leached, Brn, Mod ox Cu, Tr Sulfs
	77.0	86.8	9.8		.87		.69		75	2.99	.05	.01	.02	.61			.18		5								10 35 15			15		5	10	Tr				Tt, as above
	86.8	95.8	9.0		.43	.62	.35	.46	69	2.54		.01	.02	.32			.08		SP								10 25 20	SP		15		SP	15		Tt-Bx AND	89.2	Brn	Tt " " To 89.2 Then Tt-Bx with AND veins
																																			Tt	94	65°	fit zone. To 94.0 Then Tt, leached
	95.8	105.7	9.9		.54		.29		79	2.92	.05	.01	.01	.22	Tr		.25		Tr	Tr							10 40 25			15			5	Tr				Tt, Brn, leached, Mod NS Cu
	105.7	115.7	10.0		.35		.01		98	3.05							.35					Tr		Tr	Tr		10 15 50			SP			10		HF	105.7	grad	Hf, good Cu, End of leaching, wk sulf, Mod chlor
NX → 1.875	115.7	125.6	9.9		.06		.03		88	2.90							1.06				Tr						10 10 65			1		SP	10					Hf, Patches Tt, xMb, Sp Sulfs
	125.6	135.4	9.8		1.91		.04		90	3.02							1.91							SP			20 10 60			1		Tr	5					Hf, St Patches Mb, Mod "pods" Cpy, Tr Bn
	135.4	145.1	9.7		.45	56.3 @ .81	.02	56.3 @	91	2.90						Cuprite	.45		Tr								75 5 5			1		SP	5		Mb	135.4	grad	Mb, Patches, Hf, Sp sulfs, Mod chlor, Tr Hem
	145.1	154.7	9.6		.29		.02		96	2.72							.29		1		1						80 5 5			1		1	5					Mb, as above
	154.7	164.7	10.0		.38		.02	.02	92	2.71							.38		1		1						80 5 5			1		1	5					Mb, Patches Tt, Hf, Sp sulfs, Tr chlor
	164.7	172.0	7.3		.75		.01		91	3.21						Tr	.75				1						80 8 5			1		1	5					Mb, as above
	172.0	181.5	9.5		.37		.01		99	2.71							.37				1						85 SP 5			1		5	5					Mb, dark in Sulfs
	181.5	190.0	8.5		.10				97	2.71							.10				1						95 Tr			Tr		Tr	SP					Mb, " "
	190.0	199.4	9.4		.20		.03		99	2.69							.20		Tr		1						90 SP			SP		1	5					Mb, wk Leached, Tr Sulfs
	199.4	209.1	9.7		.92	19.4 @ .77	.02	19.4 @ .02	100	2.46						Tr	.92		1		1					Tr	55 10 20			1		5	5					Mb, patches Tr, Hf, Sp-Mod cpy, Tr Brn, Tr Hem
	209.1	218.8	9.7		.61		.01		98	2.72							.61				1				Tr		45 20 20			1		5	10					Mb, as above, No born
	218.8	228.4	9.6		.30		.01		96	2.73							.30				1		SP				95 Tr			1			5					Mb, patches Hf, Sp chlor, wk sulfs, Sp hem
	228.4	237.7	9.3		.10		.03		98	2.71							.10				1		Tr				90 1			1			5					Mb, as above
	237.7	247.3	9.6		.40	27.5 @ .75	.01	27.5 @ .01	93	2.76							.40				1						70 5 15					5	5					Mb, " "
	247.3	256.1	8.8		.105		.01		100	2.72							.105				1						40 5 35			1		5	10					Mb, Str. Patches Hf, Mod cpy as "pods" & units
	256.1	265.2	9.1		.84		.01		55	2.69							.84				1						40 5 35			1		Tr	10					Mb, cont. Incr in Hf & Hem, Mod cpy as above
	265.2	273.9	8.7		.22		.01		74	2.76							.22				1						35 5 35	Tr		1			15		AND	268.5	Brn	Mb, as above To 268.5 Then small 1ft post M.N. AND dike
																																			Hf	269.5	30°	Following this Hf, Mod-St chlor, Mod py, Sp cpy
	273.9	280.6	6.7		.24				79	2.57							.24				1						5 15 65			10	Tr	SP	5					Hf, brkn, ggy, Sp Alt, Mod clay, Sp-Mod sulfs
	280.6	290.0	9.4		.32				86	2.64							.32				1						5 15 60			5		5	10					Hf, as above, St. chlor.
	290.0	297.2	9.2		.15				98	2.66							.15				1						5 20 55			SP		15	5					Hf, Incr in Silica, Tr Sulfs, Sp chlor
	297.2	307.3	8.1		.04				97	2.65							.04				1						10 15 60			1		5	5					Hf, as above
	307.3	315.1	7.8		.19		.01		61	2.74							.19				1						10 10 65			1		SP	10					Hf, Alt, Mod chlor, Mod calc units, wk sulfs
	315.1	324.6	9.5		.51		.01		85	2.77							.51				1	Tr	Tr				10 20 60			5	1		5					Hf, as above
	324.6	334.9	10.3		.26		.01		82	2.66							.26				1						10 10 60			SP	1		10					Hf, " "
	334.9	342.9	8.0		.46		.01		82	2.63							.46				1				Tr	Tr	10 50 10			10	1		5		Tr	339.7	grad	Hf, as above To 339.7' Then vuggy leached Tt, Sp Sulfs, Hem
	342.9	347.5	4.6		.88		.02		75	3.39							.88				1				39	61	10 50 10			10	1	Tr	5					Tt, vuggy, Str Pb + Zn, wk cpy, Mod Hem, + chlor
	347.5	357.5	10.0		.72	81.6 @ .63	.03	81.6 @ .02	90	2.88							.72				1				Tr	Tr	10 60 10			10	1		SP					Tt, ggy, vuggy, Sp Sulfs, Sp Hem
	357.5	364.2	6.7		.88		.01		85	2.88							.88				1		Tr				5 50 20			10			1					Tt, as above
	364.2	373.4	9.2		.61		.02		82	2.54							.61				1	Tr					10 20 50			5			5		Hf	365.0	brkn	Hf, sp chlor alt Tr sulfs.
	373.4	381.5	8.1		.361		.02		79	3.09							.36				1					Tr	15 50 15			20			SP		Tt	381.0	brkn	Hf, as above to 381.0, then Tt, st gar sand Mod clay
	381.5	390.0	8.5		.105		.02		92	2.66							.105				1						15 55 20			10			Tr					Tt, mod clay alt. Sp hem-chlor alt Sp Hf Tr sulfs

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-115
Page 2 of 2 Pages
Collar Elev. 3001.02 Final Depth 509.7
Coords. N 37247.48 E 19401.35
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 6/25/62 Finish 7/5/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Hem. Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
390.0	396.7	6.7		.84		.02		87	2.97							.84			Tr	Tr						10	10	60		10			10		Hf	392.9	bx	Tt, mod clay alt, patches gar sand to 392.9, then Hf, mod chlor alt
396.7	404.0	7.3		.24		.01		100	3.08							.24					Tr					10	35	25		5			20		Tt	398.7	grad	Hf, mod chlor - clay, Tr suls, Tr Tt, to 398.7, then Tt, sp chlor.
404.0	412.6	8.6		.11				75	3.08							.11										10	40	30		SP		SP	10					Tt, mod chlor - Sp clay. Tr suls Patches Hf.
412.6	422.6	10.0		.11				91	3.01							.11										10	40	30		1		1	10					Tt, sp chlor. Tr suls. 6" chlor bx at 418.7
422.6	431.1	8.5		.09				88	3.21							.09										10	60	20		5			SP					Tt, sp clay - chlor. Tr suls
431.1	436.0	4.9		.22				91	3.04							.22									Tr	10	60	15		5	Tr		5					Tt, as above
436.0	444.4	8.4		.09				67	2.80							.09										10	60	10		SP	1		15					Tt, st chlor carded ~ gar. Tr suls
444.4	447.2	2.8		.09			-	100	2.40							.09									Tr	10	50	20		1	SP		5					Tt, as above to 446.1 then sp clay alt. Tr suls.
447.2	457.3	10.1		.78	10.1	.02		48	2.62							.78									1	10	20	50		5	1		5		Hf	447.2	brkn	Hf, brkn, mod chlor - silicif. Sp suls.
457.3	466.9	9.6		.23		.02		76	2.62							.23									1	10	10	60		SP	1	Tr	5					Hf, as above. Mod Tt.
466.9	474.2	7.3		.28				70	2.66							.28									1	10	10	50		1	1	1	10					Hf, as above.
474.2	483.9	9.7		.25		.01		71	2.60							.25				10					1	10	10	40		1	1	1	20					Hf, as above. Patches Tt
483.9	489.1	5.2		.47		.01		49	2.66							.47				Tr					1	10	15	60		1	1		10					Hf, mod-st chlor. Tr suls
489.1	496.0	6.9		.22		.01		95	2.61							.22									1	SP			SP	5	1		SP		Dp	489.1	brkn	Dp, sp clay - sgl alt. Tr suls
496.0	502.9	6.9		.17				100	2.61							.17									1	Tr			Tr	SP	1		1					Dp, as above. Sp qtz veining
502.9	509.7	6.8		.15				88	2.62							.15									1	Tr			Tr	1	1		1					Dp, as above.

Av. Rec. = 84%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 2-116
Page 1 of 1 Pages
Collar Elev. 3010.19 Final Depth 632.2
Coords. N. 37113.21 E 19821.94
Inclination Vert
Logged by SHA - CWH - FTG
Date: Start 7/5/62 Finish 7/17/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	$CuSO_4$	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	13.3	13.3		ROCK BIT		—	—	—	—																													ROCK BIT
NC →	13.3	22.3	9.0		.09				84	2.57	.05		Tr			.04			Tr										Tr	SP	Tr		Tr	Tr	Dp	13.3	—	Dp; leached, brkn, sp clay alt
2.400	22.3	31.1	8.8		.09		.02		47	3.09	.02	Tr	Tr		—	.07													1	1	1		1	1					Dp; as above
	31.1	41.3	10.2		.33		.18		30	2.93	.09	Tr	.01	.08		.04	.11		5								5	40		20	1	5	1	1	HF?	31.1	brkn	Hf?, st lim - silicif alt. No cal. Tr CuO_x
	41.3	50.3	9.0		.57		.38		63	2.65	.25	1	.02	.11		.05	.14		5								5	40		30	Tr		SP	5				Hf(?) as above, DR - Hf. cont zone, jgx. brkn, st lim
	50.3	61.4	11.1		.34		.22		24	3.28	.10	1	.01	.11		.03	.09		Tr	Tr						10	20	45		10	1		1	5				Hf, leached FrT 8' Then Sp sulf, Mod chlor
	61.4	70.0	8.6		.12				93	3.06	Tr		Tr	Tr	—	.04	.08		1	1						10	70	10		SP	SP		1	Tr	Tt	61.4	grad	Tt, dense, ST gar, patches silica, Sp sulf, Tr chlor
	70.0	78.4	8.4		.45		.29		78	2.65	Tr		Tr	.29		.03	.13		1	1						10	40	10	Tr	5	SP	5	1	1				Tt, Brkn, jgx, Leached, Patches st lim (Cu?) Tr. wk cu
	78.4	88.0	10.6		.41		.31		91	2.77	.05		.01	.25			.10		1	1		Tr				10	65	10		SP	Tr	Tr	1	SP				Tt, leached, sp-Mod, CuO_x, Tr sulf, st lim
	88.0	97.9	8.9		.43		.28		100	2.64	.04	Tr	.01	.23			.15		1	1						10	50	25		5	1	1	1					Tt, as above, Patches st calc, wk CuO_x
	97.9	104.2	6.3		.20	Avg .56	.05	Avg .38	81	3.32		1	Tr	.05	—		.15		1	1						10	50	20		5	1	SP	1					Tt, " " "
	104.2	106.8	2.6		1.04		.37		91	2.71			1	.31	—	.05	.68		1	1						10	40	20		SP	1	10	1					Tt " " "
N ↓ →	106.8	116.0	9.2		1.09		.09		95	2.72			.01	.86		.02	.20		5	1		Tr				35	15	10		5	1	Tr	5		Mb	106.8	brkn	Mb, wk leached, sp chlor, patches Hf, Tr Sulf
1.875	116.0	125.8	9.8		.42	28.1 @	.09	28.1 @	95	2.72				.09	—		.33		Tr	1						15	10	65		SP	1		10		Hf	118.0	grad	Mb as above to 118.0, then Hf, sp chlor, Tr sulf
	125.8	134.4	8.6		.32	.41	.02	.04	88	3.02							.32			1						15	10	70		1	1		SP					Hf, Mod color, sp sulf,
	134.4	144.1	9.7		.42		.01		84	3.00							.47			1		Tr			Tr	15	10	60		5	1		5					Hf, Patches of Tr + High Pb zn
	144.1	154.0	9.9		.29		.05		95	2.67							.29			1						45	5	25		5			5		Mb	148.0	grad	Hf, as above to 148.0' Then Mb
	154.0	162.6	8.6		.16		.06		98	2.69			Tr	.06			.10		Tr	1						90	SP	SP		SP			SP					Mb, Tr lim along veins, Tr sulf
	162.6	173.2	10.6		.06				91	2.71							06		1	1		Tr				90	1	Tr		1			1					Mb, as above
	173.2	179.2	6.0		.09				100	2.73							.09		1	1		1				90	1	5		1			1					Mb, wk patches Hf, Tr Sulf + chlor
	179.2	188.8	9.6		.23				96	2.72							.23		1	1		1				70	10	10		1			1					Mb, as above, Tr lim
	188.8	198.3	9.5		.15				94	2.82							.15		1	1		1			Tr	90	SP	SP		1			1					Mb; wk, patches Hf, Tr-Sp cpy, Pb-zn, wk chlor
	198.3	208.0	9.7		.28		.06		99	2.70							.28		1	1		1				90	1	1		1			5	Tr				Mb, as above, wk chlor veins
	208.0	216.7	8.7		1.67	3.7	.05		88	2.72							1.67		1	1		1		SP		75	5	10		1			SP					Mb, Mod Patches Hf, Md-ST cpy + Pb-zn in vuggy areas
	216.7	224.9	8.2		.08		.04		96	2.74							.08		1	1						95		Tr		Tr			Tr					Mb, wk sulf, Tr chlor + Hem
	224.9	234.4	9.5		.03				97	2.72					Tr		.03		1	1						98	SP	1		1			1					Mb, as above
	234.4	244.0	9.6		.05				96	2.71						CuFeS	.05		1	1						98	Tr	1		1			1					Mb, " "
	244.0	253.3	9.3		.05				97	2.71							.05		1	1						95	1	1		1			SP					Mb, " "
	253.3	262.8	9.5		.04				99	2.71							.04		1	1		Tr				90	1	SP		1			5					Mb, " "
	262.8	272.6	9.8		.07				96	2.72			Tr	.02		Tr	.05		1	1		1				95	1	Tr		1			SP					Mb, " "
	272.6	282.3	9.7		.35				86	2.73							35		1	1		1			Tr	Tr	90	1	S		1		S	Tr					Mb, " "
	282.3	292.1	9.8		.17				91	2.71							.17			1		1					95	1	5		1	Tr	SP						Mb, " "
	292.1	301.6	9.5		.08				99	2.69							.08		Tr	1		1		Tr			45	50	25		1		Tr			Tt	296.5	grad	Mb, as above to 296.5, then Tt, mod clay alt
	301.6	311.2	9.6		.39				88	2.74							.39			1		1					90	5	S			Tr	SP	Tr		Mb	302.0	grad	Tt, as above to 302.0, then Mb, veins chlor, w. sp. sulf
	311.2	319.3	8.1		.05				96	2.53							.05			1		1					90	5	5		1								Mb, as above Vuggy patches lace chlor
	319.3	328.3	9.0		.10				90	2.72							.10			1		1					85	5	5				5						Mb, wk alt Tr chlor, sulf
	328.3	337.8	9.5		.09				93	2.71							.09			1		1					90	5	5				Tr						Mb, as above
	337.8	346.9	9.1		.07				96	2.65							.07			1		1			Tr		90	5						SP		Hf	340.8	25°	Mb, " " to 340.8, then Hf mod chlor, Tr sulf Mod Mb
	346.9	354.7	7.8		1.41	T	.04		93	3.16							1.41			1		1					10	10	65			Tr	10	5					Hf; sp clay-chlor alt. Sp sulf 1 ft patch int. cpy-py-sl
	354.7	364.0	9.3		.59	35.8' .69	.01	35.8' .03	86	2.96							.59			1		Tr					15	10	65		SP	1	5	5					Hf; mod clay - chlor alt. Sp sulf. Patches Tt
	364.0	373.3	9.3		.45		.03	.03	90	2.62							.45			1		1					15	10	70		Tr	1	SP	5		Mb	364.5	grad	Hf, as above to 364.5, then Mb; mod chlor - clay. Sp Hf
	373.3	382.7	9.4		.41		.03		97	2.74							.41			1		1					10	5	85					SP					Mb; as above to 378.8, then 1 ft Tt; mod chlor; then Mb wk. alt
	382.7	391.8	9.1		.17				96	2.72							.17			1		1					10	10	70			Tr	10			HF	382.7	grad	HF, sp chlor alt Tr sulf.
	391.8	397.0	5.2		.16				94	2.69							.16			1		1					10	10	70				10						HF, mod patches + vult chlor. Tr sulf
	397.0	406.8	9.8		.16				93	2.60							16			1		1					10	10	60		S		10	S					Hf, as above, Mod silica.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 2-116
Page 2 of 3 Pages

Collar Elev. 3010.19 Final Depth 639.2
Coords N 37,113.21 E 19,591.99
Inclination Vert
Logged by SAH - CWH - FTG
Date: Start 7/5/62 Finish 7/17/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
406.8	416.5	9.7		.22	30.8'	.04	30.8'	99	2.58							.22			SP	Tr	Tr					10	20	60		5	Tr	5	Sp					Hf, Mod chlor, ST patch of Tt from 410-412.2', Mod silic
416.5	427.2	10.7		.14	.58	.02	.02	73	3.17							.14			Tr					Tr		10	30	50		Tr		10	Tr					Hf, Patches of Tt + Mb; Mod chlor + calc vnlts, sp-md suls
427.2	437.0	9.8		.43		.01		70	3.09							.43										5	20	65				5	5		Qtzite	436.4	7°	Hf, as above To 436.4; then pyritic contact with qtzite.
437.0	444.1	7.1		.08	142.1' @			93	2.62							.08										Tr						98						Qtzite, dense, granular, qtz, ex sulphide vnlts; Material appears to have a vague Tz (PP) Rat in last 2 ft.
444.1	451.2	7.1		.18	.53			93	2.76							.18			Tr					Tr	Tr	15	30	45		SP		10	SP		Hf	446.1	brkn	Qtzite, Limy, To 446.1' then Hf, Silicous, sp suls
451.2	460.5	9.3		.69		.02		83	2.97							.69				Tr						15	50	20		5	Tr		1		Tt	455.6	grad	Hf, silicous, To 455.6 then Tt, St sp, Pb-zn
460.5	470.0	9.5		.50	57.8	Tr	57.8	87	3.38							.50							Tr	5	1	10	65	15		SP	1		1					Tt, Mod-St sp, Md Pb-zn
470.0	479.4	9.4		.41	.72	Tr	.01	87	3.34							.41					Tr			SP	1	10	65	10		SP	1	SP						Tt, " " Tr Pb-zn, patches sitst
479.4	489.0	9.6		.25		.02		78	3.93							.25				Tr					1	10	75	10		1			1					Tt, Sp-Mod Suls, Mod calc vnlts
489.0	496.9	7.9		.25		Tr		92	2.79							.25										SP	15	50		5		70	5		Sitst	489.0	brkn	Sitst, St silica, sp suls, vague banding; Patches Tt
496.9	504.2	7.3		.20				73	3.32							.20					Tr					5	25	10		5		45	10		Tt	501.8	grad	Sitst, as above to 501.8 then Tt, sp suls
504.2	510.8	6.6		.09				87	3.33							.09										5	85	5		SP			SP					Tt, Sp chlor, sp suls
510.8	513.9	7.1		.18				89	3.10							.18										5	60	5		1		20	5					Tt, sp clay, Tr chlor - silicif. Sp suls St sitst to 513.0
513.9	527.1	9.2		.13				91	3.45							.13								Tr		10	65	15		1	Tr		SP					Tt, st gar - silicif. Sp suls Carol-like text
527.1	534.4	7.3		.23				93	3.30							.23									1	10	50	15		1	1		15					Tt, Sp silicif - chlor along vnlts. Tr suls
534.4	544.1	9.7		.25				100	3.01							.25									1	10	70	5		1		1	5					Tt, as above Decr chlor
544.1	553.7	9.6		.14				95	2.99							.14									1	10	70	10		1		1	SP					Tt, as above Incr Hf
553.7	563.4	9.7		.13				78	3.28							.13					Tr				1	10	60	15		1	1		15					Tt, Sp clay - chlor - silicif. Tr suls Incr Hf
563.4	572.3	8.9		.32				100	2.53							.32									1	15	45	20		5	1	SP	15	Tr	Hf bx?	566.4	brkn	Tt, as above to 566.4, then Hf bx(?), st silicif. Mod clay, Tt
572.3	581.9	9.6		.24				90	2.62							.24									1	10	15	35	5	8	1	5	20					Hf, Brkn, St silic, wk Bx, sp qtz vnlng
581.9	590.0	8.1		.15				71	2.95							.15										15	10	45		10	1	SP	15		Sitst	581.9	brkn	Sitst, Dense, highly silicious, Tr moly
590.0	598.0	8.0		.42	170.8'	Tr	170.8'	92	2.80							.42								Tr		10	10	45		5	1	15	15		Hf	591.7		Sitst, as above To 591.7 then Hf, Tr Pb-zn
598.0	607.0	9.0		.42	.42	.01	.01	95	2.65							.42										10	5	30		SP	1	35	15					Hf, Patches, Tt, Sitst, Mod SiO2
607.0	616.7	9.7		.26				76	3.06							.26										5	15	30		1	1	40	5					Hf, as above
616.7	625.4	8.7		.15				88	2.93							.15										SP	5	10		1	1	Tr	SP		Dp	617.0	brkn	Hf, " " St silica, To 617.0 then Dp
625.4	634.4	9.0		.15				93	2.66							.15										Tr			Tr	SP	1		Tr					Dp, silicified, Mod qtz vnlng
634.4	639.2	4.8		.14				96	2.63							.14										1			1	1	1		1					Dp, as above

Av. Rec = 89%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) > 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-117
Page 1 of 2 Pages
Collar Elev 3165.08 Final Depth 624.8
Coords. N 36352.86 E 19799.88
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 7/13/62 Finish 7/26/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC →	0.0	11.8	11.8						ROCK	BIT																													R.B.
2400	11.8	22.4	10.6		.30				89	2.76	.07	.02	.01	.15		Tr	.05		Tr	Tr	Tr					10	10	80	Tr	Tr	Tr	SP	Tr		Hf	12.3	?	Hf, leached. Sp NS Cu, to 16.0' then Mb, leached
																																			Mb	16.0	grad	Mod lim along seams, wk Cu
	22.4	31.0	8.6		.13				89	2.99	.03	.01	.01	.05			.03									30	5	65	Tr			Tr	Tr		Hf	29.4	ggr	Mb as above to 29.4' then Hf, leached
	31.0	40.6	9.6		.44		.40		86	2.95	.20	.03	.02	.15			.04									10	10	80		SP		SP			Mb	34.5	brkn	Hf, leached; Mod clay alt to 34.5, then Mb leached
	40.6	48.7	8.1		.29	44.6 @	.22	44.6 @	96	2.86	.07	.03	.02	.10			.07									10	15	70		Tr		5			Hf	44.6	grad	Mb leached Sp clay to 44.6, then Hf leached Sp clay
	48.7	56.3	7.6		.72		.68		95	3.08	.30	.03	.05	.30			.04					Tr				10	25	65		SP		60						Hf, leached, Sp clay - chlor. Sp Mb Watercourse 55.5'-56.0'
	56.3	61.0	4.7		1.50	.76	.66	.37	100	2.60	.40	.03	.03	.20		—	.84								Tr	10	20	55			SP	5	10					Hf, leached Sp clay - chlor Tr CuOx
	61.0	62.2	1.2		1.35		.14		79	3.21	.04	.01	.01	.08		—	1.21				Tr					5	15	65		Tr	Tr	SP	15					Hf, as above
	62.2	75.6	8.4		.78		.20		100	2.81	.05	.01	.01	.13		—	.48	.10								5	30	55					10					Hf, " "
	75.6	85.6	10.0		.10				73	2.63	.05	.01	.01	Tr			.03		Tr								SP		Tr				Tr		Dp	76.0	~20°	Hf, " " to 76.0, then Dp; st bleaching, mafic blebs,
	85.6	93.0	7.4		.09				100	2.58	.03	Tr	.01	.02			.03									5	20	60			SP	15			Hf	88.5	25°	Dp; as above to 88.5, then Hf, sp clay, Sp siltst Tr CuOx
	93.0	102.9	9.9		.17				100	2.72	.06	.01	.01	.05			.04									5	15	70				10						Hf, sp clay alt. Tr CuOx
	102.9	113.6	10.7		.16				98	2.71	.06	.01	.01	.05			.03									10	10	70				10						Hf, as above Patch Dp 105.3 - 106.5
	113.6	120.4	6.8		.26				95	2.63	.13	Tr	.02	.04			.07									10	15	60	Tr	SP	Tr	5	SP					Hf, " " Dp from 117.0 - 119.5
	120.4	127.8	7.4		.37		.31		92	2.86	.05	Tr	.02	.24			.06									10	15	70		5		SP	1					Hf, leached Mod clay alt Tr CuOx Sp Tt
	127.8	137.6	9.8		1.01	2.68 @	1.76	2.68 @	78	3.07	.05	Tr	.02	.69			.25									15	15	60		5	1	1	5					Hf, leached St lim, Mod clay - chlor alt Tr CuOx Mod Tt
	137.6	145.0	7.4		.75		.63		80	3.45	.10	Tr	.01	.52			.12		SP							15	40	30		5	1		5		Tt	137.6	grad	Tt, leached, Sp silicif, Tr CuOx to 143.5, then int lim St CuOx
	145.0	154.6	9.6		1.19	1.00	.59	.66	89	2.71	Tr	Tr	.01	.58		—	.60		Tr							15	50	25		5	1		5					Tt; leached; Mod clay - sp silicif. Tr sulf, Mod chlor from 152.2
	154.6	162.9	8.3		.29		.21		96	2.54	.09	1	.01	.11			.08		1							Tr			Tr	SP	1		SP		Mz	154.8	50°	Tt as above to 154.8 then Mz leached, Sp clay - silicif
	162.9	169.1	6.2		.33				100	2.56	.06	1	.01	.20			.06		1							1				1	1	1		Tr				Mz; leached, Sp clay - jarc alt Tr CuOx, Dp Tr CuT
	169.1	179.3	10.2		.15				36	2.58	.05	1	.01	.07			.02		1											1	1	1	Tr	1				Mz, " " as above
	179.3	189.2	9.9		.10				81	2.60	.05	1	.01	.08			.02		1					Tr						10	1		1	1				Mz, " " " ST Fluorite vn with wk Pb
	189.2	198.4	9.2		.12				59	2.44	.07	1	.01	.02			.02		1							Tr				20	1		1	1				Mz, Brkn, ggy, leached, Frags of Hf in gg, Sp N.S. Cu
	198.4	207.2	8.8		.16				89	3.26		1	.01	.13			.02		1							15	20	40		10	1		15		HF-Bx	198.4	ggy	Hf, Bx, sharp Ang Frags, wk leached, Mod clay, Tr lim
NX →	207.2	211.0	3.8		.45		.17		96	2.71		1	.01	.16		—	.28		1			Tr				15	15	60		SP	1		10					Hf, Solid core, wk leached
1.875	211.0	214.2	0.2		—		—		0	—																													No Core
	211.2	219.2	8.0		—		—		—	—																													Cavity
	219.2	228.2	9.0		.28		.10		87	2.67			.01	.09		—	.18		Tr	Tr	Tr		Tr			75	SP	5		SP	Tr		5		Mb	219.2	—	Mb; leached, brkn; Sp clay alt
	228.2	237.0	8.8		.14		Cu		100	2.66			Tr	.04		—	.10									80	1	5		1	1		5					Mb; leached; Sp clay - chlor alt. Ggy patches
	237.0	245.7	8.7		.23				100	2.60							.23									60	10	15		1	1		5					Mb, patches of Hf, Tr Sulf
	245.7	254.9	9.2		.22				99	2.57						—	.22								Tr	Tr	50	15	20	1	1		5					Mb; " " " " Sp chlor
	254.9	264.4	9.5		.18				100	2.54						—	.18									1	65	5	15	1	1		5					Mb, Tr Sul, Tr chlor
	264.4	274.1	9.7		.05				98	2.70						—	.05		Tr								95		Tr		Tr		Tr					Mb; Tr leaching
	274.1	284.0	9.9		.08				92	2.63		Tr	Tr	.06			.02										95		1				1					Mb, Tr Sul
	284.0	293.6	9.6		.10				92	2.71			1	.07			.03										95		1				1					Mb, as above
	293.6	303.2	9.6		.38				95	2.68			1	.10		—	.28		1			Tr					90	Tr	5	SP			1					Mb, patches Hf, Tr Leach, wk Fluor - Pb - Zn veins
	303.2	311.5	8.3		.13				100	2.72			1	Tr		—	.13		1							Tr	90	Tr	SP	1			SP					Mb, Tr Sulf, Tr chlor
	311.5	321.1	7.6		.22				94	2.72				1		—	.22		1							Tr	95	1	Tr		Tr		1					Mb; Sp sulf, Sp chlor
	321.1	330.0	8.9		.17				94	2.66						—	.17							Tr	Tr		85	1	5		SP		5					Mb; Tr Hf, wk Fluorite vug with cpy, Pb - Zn
	330.0	341.0	11.0		.08				91	2.75							.08					Tr					80	1	SP	1		SP	5					Mb; Tr. Fluor + chlor
	341.0	350.4	9.4		.17				100	2.67							.17								Tr		85	1	5	1		1	5					Mb, Patches Hf, Tr Cpy, Fluor + Sphal
	350.4	359.7	9.3		.08				94	2.58							.08										65	1	15	5	Tr	5	Tr					Mb; as above, wk patches sphal
	359.7	368.4	8.7		.11				86	2.58							.11										30	5	45	5		8	Tr		Hf	359.7	grad	Hf, ST calc, ST chlor, Tr Sulf
	368.4	377.5	9.1		.79		.01		87	2.66							.79										15	5	50	5		20	5					Hf, as above

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-117
Page 2 of 2 Page:
Collar Elev 3165.08 Final Depth 624.8
Coords N 36352.86 E 19799.88
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 7/13/62 Finish 7/26/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pnch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JASPEROITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
377.5	384.3	6.8		.06				94	2.60	Tr						.06			Tr		Tr		Tr	Tr		20	5	50	5			20	SP					Hf, ST patches Mb; Tr Sulfs
384.3	393.7	9.4		.11				94	2.69							.11				Tr						20	5	50	5			15	Tr					Hf, Sp chlor, ~~w~~ Sulfs
393.7	402.8	9.1		.09				91	2.70							.09		Tr								90		SP	SP			SP			Mb	394.2	Brxn	Hf, To 394.2' Then Mb, Tr Sulfs
402.8	412.5	9.7		.10				95	2.71							.10										60	Tr	20				15	SP					Mb, Mod chlor, Tr Sul
412.5	420.5	8.0		.15				94	2.58							.15					Tr					20	SP	50			SP	15	5		Hf	412.5	grad	Hf, Mod calc, ST chlor, Tr Sul
420.5	430.4	9.9		.11				89	2.59							.11										10		40	15			20	5					Hf, " " " " gyx, ~~w~~ Bx, Tr sul
430.4	434.7	4.3		.24				76	2.55							.24										15		35	15			20	5					Hf, Bx, gyx, ST chlor, Tr sulfs
434.7	444.2	9.5		.28				100	2.65							.28				Tr						45	5	30	SP			5	Tr		Mb	439.5	brkn	Hf, mod clay - chlor, mod sulfs, mod Tt to 439.5, then Mb; mod chlor
444.2	454.0	9.8		.36				92	2.88							.36										50	5	30				5						Mb, mod clay - chlor. Sp Hf Sp sulfs.
454.0	463.4	9.4		.19		.01		100	2.64							.19										45	5	30			Tr	10						Mb, as above
463.4	473.0	9.6		.43		.02		93	2.90							.43										20	5	45				15			Hf	467.0	brkn	Mb; as above to 467.0, then Hf; st chlor. Sp sulfs Mod Mz
473.0	479.5	6.5		.19		.01		100	3.06							.19										15	5	65				5						Hf mod chlor - silicif Tr sulfs
479.5	489.2	9.7		.47	51.4 @	.01	51.4 @	95	2.70							.47					Tr			Tr	20	5	60				15						Hf; st chlor - mod clay Sp sulfs in veins Mod Mb
489.2	498.3	9.1		.64	57	.01	.01	83	3.17							.64										10	5	65				15						Hf, st chlor alt Sp sulfs. Sp Mb - Tt
498.3	507.8	9.5		.81		.02		99	2.77							.81										20	10	60				5						Hf, mod clay - chlor Sp sulfs Mod Mb
507.8	514.8	7.0		.84	82.8 @	.01		88	2.88							.84										15	5	70				5						Hf, as above
514.8	523.6	8.8		.25	57%	.01		93	3.07							.25										10	30	45	5			5			Tt	519.6	grad	Hf, Sp chlor - clay; sp sulfs to 519.6, then Tt sp clay alt
523.6	531.6	8.0		.35		.01		94	3.04							.35										10	35	40	5			10						Tt, st chlor alt to 526.2, then sp clay, sp sulfs
531.6	536.0	4.4		1.06	138 @	.01	13.8 @	99	2.93							1.06										10	10	60	5		Tr	15			Hf	531.6	grad	Hf, st chlor alt Mod - st sulfs Tr silicif
536.0	545.4	9.4		.78	87	.02	.02	100	2.70							.78										15	10	60	SP	Tr		10						Hf, mod chlor - sp silicif St sulfs Sp Tt
545.4	555.1	9.7		.10		.02		100	2.65							.10								5		10	5	20				Tr			Tt	545.4	grad	Tt, sp clay alt Sp sulfs Mod Hf
555.1	564.9	9.8		.44		.03		98	2.79							.44				Tr						10	5	10	Tr		5	1			Slt st	563.0	brkn	Tt, sp clay - chlor alt St Cu - Zn to 563.0, then Slt st Tr Mz
564.9	574.0	9.1		.13		.02		45	2.71							.13										SP	15	40			40	1			Hf	572.8	brkn	Slt st, sp chlor, Sp sulfs to 572.8 then Hf, mod clay alt Sp sulfs
574.0	578.5	4.5		.09		.02		100	3.10							.09									Tr	5	15	65		SP		5						Hf, sp clay Sp sulfs Mod Tt
578.5	586.8	8.3		.61	17.4 @	.02	17.4 @	89	3.15							.61										5	15	55		1	10	5						Hf, sp clay - silicif Sp sulfs Mod Tt Patches Slt st
586.8	595.9	9.1		.73	.67	.03	.03	80	3.14							.73										SP	5	5	SP		5	Tr			Dp	591.5	brkn	Hf, rt - Hf silicif bx (?), st sulf to 591.5, then Dp; mod silicif
595.9	605.5	9.6		.38		.04		78	2.69							.38												Tr			Tr							Dp, mod silicif Sp Mz text Mod incl Hf w st chlor (bx?)
605.5	611.3	5.8		.32		.02		86	2.74							.32																SP			Mz	607.5	brkn	Dp, st silicif, 1 vert fit zone (pebble dike?) to 607.5, then Mz, mod silicif Tr sulfs
611.3	620.1	8.8		.52		.02		82	2.69							.52													Tr	SP	Tr		Tr					Mz as above, Tr Dp text
620.1	624.8	4.7		.29		.04		100	2.66							.29														Tr								Mz, as above

Av. Rec. = 91%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-118
Page 2 of 2 Pages
Collar Elev 2942.58 Final Depth 572.4
Coords. N 37,092.76 E 19,791.64
Inclination Vert
Logged by SHA - CWH - FTG
Date: Start 7/18/62 Finish 7/30/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag	Hem	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz	QUARTZ	CHLORITE		FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
3996	4081	8.5		.09				96	2.64							.09			Tr		Tr			Tr		90	Tr	5		Tr		Tr	Sp		5	Mb	3996	grad	Mb, sp chlor, Mod Fluorite, Tr suls
4081	4157	7.6		.07				96	2.67							.07										85		10							5				Mb, cont. st. Fluorite, Tr suls
4157	4248	9.1		.03				92	2.71							.03										95		1	Sp										Mb, mod chlor, Tr hem, Tr suls
4248	4333	8.5		.07				99	2.69							.07							Tr	Tr	Tr	90	Sp	5											Mb, Tr suls
4333	4418	7.9		.05				100	2.71							.05										90		5											Mb, as above
4418	4510	9.8		.21				92	2.73							.21										90		1	Sp				5						Mb, sp chlor, Sp hem, Tr suls
4510	4616	10.6		.22			.02	85	2.72							.22										20	25	35		5	Tr		15			Hf	4540	brkn	Mb, as above to 4584 then Hf, brkn, gray, patches Tr, stend.
4616	4718	10.2		.54			.04	88	3.06							.54										10	65	10		Sp		Sp	Tr			Tt	4652	grad	Hf, Mod suls + chlor to 4652' then Tt, dense, siliceous
4718	4810	9.2		.07				100	2.90							.07										5	35	20		Tr		Tr	35	Sp					Tt, dense, siliceous, banded, Tr bands alternating with dense silica layers, siliceous rock resembles sst?, Tr suls
4810	4897	8.7		.06				100	2.87							.06			Tr							5	30	20		Tr		Tr	40	Sp					Tt, as above, cont. st. silica
4897	4984	8.7		.07				100	2.74							.07							Tr			10	45	15					25	Tr					Tt, dense, siliceous, Tr suls
4984	5077	9.3		.08				95	3.27							.08										5	65	15					10						Tt, as above
5077	5179	10.2		.69			.02	82	3.07							.69								Tr		5	60	20					15	Tr					Tt, st gar, Mod suls (cpy, sn)
5179	5223	9.4		.39			.03	78	2.93							.39									Tr	5	45	25					15						Tt, dense, banded w st sltst?, Sp suls
5223	5341	6.8		.27				100	2.64							.27										5	45	25					20						Tt, mod gar. Patches sltst? (chertx?) Sp suls
5341	5433	9.2		.27				100	2.58							.27										5	45	30		Sp			10						Tt, sp clay alt. Sp suls. Incr. Hf
5433	5531	9.8		.24				94	2.66							.24														Tr	Tr		Tr			Hf	5433	grad	Hf, mod silicif, tr suls to 5461, then Dp sp silicif Tr suls
																																				Dp	5461	brkn	
5531	5607	7.6		.20				100	2.62							.20			Tr											Tr	Tr	Tr	Tr						Dp, sp silicif Tr suls
5607	5700	9.3		.25				92	2.66							.25																							Dp, as above
5700	5724	2.4		.22				59	2.63							.22																	Sp						Dp, " "

Av. Rec. = 87%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

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Note (4)
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Hole No. D-118
Page 1 of 2 Pages
Collar Elev. 2942.58 Final Depth 572.4
Coords. N 32,072.76 E 19,791.64
Inclination Vert
Logged by SHA - CWH - FTG
Date: Start 7/18/62 Finish 7/30/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	14.0	14.0		Rock	Bit			—	—																														Rock Bit
NC 2.400	14.0	24.7	10.7		.29				39	2.55	.12		Tr	.13		.04			Tr	Tr									Tr	Sp	Tr		Sp	Tr		Mz	14.0	—	Mz; leached, Sp clay alt. Tr CuOx
	24.7	33.7	9.0		.19				72	2.57	.05		1	.12			.02									Tr	5	Sp	1							Tt	32.5	brkn	Mz; as above to 32.5, then Tt, leached, Sp clay Tr CuOx
	33.7	43.6	9.9		.12				61	3.31	.05		1	.07			Tr									10	75	10												Tt; leached, Tr silicif Sp CuOx
	43.6	53.9	10.3		.14				80	3.11	.07		1	.07												10	60	20		5	Tr			Tr		Hf	48.0	grad	Tt; as above to 48.0 then Hf, leached, mod clay, Tr CuOx
	53.9	62.9	9.0		.17				80	2.67	.04		1	.04			.09									10	15	60		5			5							Hf; mod clay alt to 57.0, then Sp chx - chlor Tr sulf
	62.9	67.0	4.1		.18				100	2.73	Tr		1	Tr			.18									10	40	45		Sp			Sp			Tt	65.0	~50°	Hf; sp chlor alt to 65.0, then Tt; sp silicif
	67.0	77.3	10.3		.19			.13	77	2.75			1	.13			.06							Tr		10	60	15		5										Tt; Sp clay - silicif Tr CuOx Mod Mb
	77.3	87.2	9.9		.68			.51	82	2.92			1	.51			.17							Tr		25	40	20		10										Tt, leached, mod clay Sp Mb, w. st CuOx
	87.2	96.9	9.7		.13				70	3.19	.03			.05			.05									10	30	55		Sp		5	Tr							Tt leached, Sp hem - chlor alt Tr CuOx Sp Mb
	96.9	105.3	8.4		.12				100	2.76				.02			.10									15	15	35				5			Tr	Mb	100.5	grad	Tt; as above to 100.5, then Mb; Sp chlor - hem alt Tr sulf
	105.3	115.4	10.1		.22				81	3.16							.22							Tr	Tr	85	Tr	15		Tr		Sp				Hf	105.3	grad	Hf; Sp clay alt. Mod Tt
	115.4	124.1	8.7		.38				100	2.64							.38									60	5	35		Sp		Tr	Sp							Hf; mod clay - chlor alt. Mod Mb
	124.1	133.3	9.2		.68		.03		99	2.72							.68									80	Tr	10		Tr		10				Mb	127.0	grad	Hf, as above to 127.0, then Mb, mod clay - chlor Sp Hf
	133.3	143.6	10.3		.07				93	2.69							.07									90		10				Sp								Mb; as above
	143.6	151.4	7.8		.13				92	2.70							.13		Tr							90		10				Tr	Tr							Mb; "
	151.4	159.5	8.1		.03				89	2.67							.03					Tr				85		15		Sp										Mb; "
	159.5	169.1	9.6		.06				96	2.67					Tr		.06								Tr	95		5		Tr	Tr									Mb; "
	169.1	179.3	10.2		.03				94	2.69							.03									95		5												Mb; "
VX 1.875	179.3	184.4	5.1		.02				96	2.70							.02									95		5												Mb; "
	184.4	192.0	7.6		.10				100	2.57					.02		.08							Tr		80	Tr	10			Tr	Tr								Mb; leached Tr CuOx
	192.0	202.1	10.1		.26				86	2.99					.10		.16									40	15	40		Sp		5								Mb; leached Sp clay alt Tr CuOx
	202.1	210.0	7.9		.07				85	2.70							.07									20	Sp	70		Tr		Tr				Mz	204.7	brkn	Mb; as above to 204.7, then Mz, sp alt Tr sulf ct silicif
	210.0	214.8	4.8		.19				95	2.74							.19							Tr		55	5	20				Sp				Mb	212.5	brkn	Mz; as above to 212.5, then Mb, wk alt Tt at ct
	214.8	221.8	7.0		.09				93	2.73							.09									85	5	5				5								Mb; Tr alt
	221.8	230.7	8.9		.03				99	2.72							.03					Tr				40	Tr	10				Sp								
																																				DP	226.2	brkn	Mb to 226.2' then DP wk Alt, Tr Sulf wk Mal to 230.0' then Hf (St. white lim silicate - Tremolite?)
																																				Hf?	230.0	45°	
	230.7	240.2	9.5		.02				100	2.67							.02									15	10	65			Tr	10	Tr							Hf, St. silica, wk sul
	240.2	248.9	8.7		.04				91	2.79							.04									15	5	70				10								Hf, as above, Tr DP
	248.9	258.4	9.5		.01				95	2.70							.01		Tr							30	10	55				5				Mb	253.5	grad	Hf, " " to 253.5' then Mb, Tr lim shears
	258.4	268.4	10.0		.02				92	2.69							.02									85	5	10				Tr								Mb, wk leached, Tr sulf
	268.4	278.1	9.7		.04				93	2.72							.04									90	Tr	10					Sp							Mb, Tr Sulf, Tr chlor
	278.1	287.4	9.3		.02				95	2.71							.02									90		10				Tr								Mb, as above
	287.4	296.6	9.2		.02				94	2.71							.02									95		5												Mb, " "
	296.6	305.4	8.8		.01				98	2.71							.01									95		5												Mb " "
	305.4	315.1	9.7		.01				97	2.58							.01									95	Tr	5												Mb " "
	315.1	324.0	8.9		.17				100	2.59							.17									90		5					5							Mb, mod chlor, Tr sulf
	324.0	332.1	8.1		.06				100	2.61							.06								Tr	75	5	10				10	Sp							Mb, Patches St silicification, wk sulf, Tr Mal
	332.1	341.8	9.7		.06				97	2.62							.06									75	5	10				10								Mb, as above
	341.8	351.9	10.1		.06				100	2.66							.06									80	5	5				10								Mb, Sp chlor, Tr sulf
	351.9	361.7	9.8		.13				93	2.90							.13					Tr				15	30	40			Tr	15				Tt	351.9	grad	Tt, dense, silicified, Tr Mb + Hf, Tr Sulf
	361.7	371.2	9.5		.16				89	3.04							.16									15	15	55				10	5			Hf	361.7	"	Hf, patches, Tr + Mb, Mod chlor, Tr Sulf
	371.2	381.0	9.8		.05				88	3.10							.05									85	5	5				Sp	5			Mb	371.2	"	Mb, Sp chlor, Tr Sulf
	381.0	390.0	9.0		.07				97	2.79							.07									85	5	5					5							Mb, as above
	390.0	399.6	9.6		.07				90	3.02							.07					Tr				20	5	70		Tr	Tr	5	Sp			Hf	391.2	"	Mb, " " to 391.2' then Hf

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) > 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-119
Page 2 of 2 Page

Collar Elev. 3169.24 Final Depth 622.8
Coords N 36221. E 19587.43
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 7-27-62 Finish 8-27-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys	Pitch	Black	Blue Green			Cc	Cpy	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	Quartz	Chlorite		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
378.0	381.0	3.0		.04				100	2.52	Tr							.04			Tr							Tr			Tr	Tr		Tr			Mz			Mz, Alt, sp calc, Tr chlor
381.0	387.4	8.4		1.35		.02		98	2.53								1.35			Tr	Tr	Tr					10	35	40		5	Tr	5			Hf	381.7		Mz, as above, to 381.7, then Hf, with mod Tt & mod cpy, mod calc veing, sp magnetite & chlor
387.4	398.0	8.6		.24		.05		81	2.68								.24			Tr	Tr	Tr					20	10	55		SP		15						Hf, sp clay alt Tr suls Mod Mb
398.0	407.5	11.5		.22				81	2.88								.22										10	20	60				5						Hf, sp clay - banded chlor alt Tr suls, Mod Mb
409.5	417.5	8.0		.34		.03		81	2.56								.34							Tr	Tr		10	15	60				SP						Hf, sp clay - patches silicif Pods gn-sl. Sp Tt.
417.5	426.4	8.9		.119		.06	.261	100	2.74								.119										10	10	65				10						Hf, mod chlor - sp clay Tr cpy - gn-sl. Mod Mb
426.4	436.5	10.1		.24	.26 @ .03	.02	@ .03	81	3.36								.24								SP		15	35	35		5		10			Tt Hf	428.0 436.0	brkn brkn	Hf, as above to 428, then Tt, sp clay alt to 436.0, then Hf; mod chlor. Sp Mb
436.5	443.6	7.1		.50		.02		86	2.93								.50			Tr	Tr	Tr			Tr		15	10	55		10	Tr	5						Hf, sp clay - chlor alt. Patches Tt. Vnlts of cpy - sl-gn
443.6	453.3	9.7		.31		.03		84	3.02								.31										15	10	50		SP		15						Hf, as above
453.3	464.0	10.7		.23				47	2.78								.23										35	20	25				15			Mb	453.3	grad	Mb; mod chlor - clay Sp Hf
464.0	474.0	10.0		.32				88	2.79								.32										45	20	30				5						Mb; mod chlor. Patches suls. w. chlor
474.0	484.1	10.1		.37	233 @			79	2.76								.37										15	10	60				10			Hf	474.0	grad	Hf, Mod chlor, Patches Mb, sp suls
484.1	494.4	10.3		.24	.3	.03		100	2.55								.34										10	10	65				10						Hf, as above, Tr Serpentine
494.4	503.4	9.0		.37	.01	.01		97	3.00								.37										10	30	30		5	Tr	5			Tt	494.4	grad	Tt, Tr -sp suls, sp chlor, Tr Pb-zn
503.4	513.4	10.0		.105		.04		82	3.55								.105				SP	SP			SP		10	20	35		SP		10			Hf	503.4	" "	Hf, Alt, ST suls, Mod chlor, Mod Pb-zn
513.4	523.4	10.0		.48		.02		100	2.32								.48				Tr						15	15	60				10						Hf, Mod chlor, sp cpy as vnlts
523.4	533.3	9.8		.31		.01		82	3.44								.31										20	25	45				5						Hf, sp suls, sp-Mod chlor
533.3	544.0	10.7		.45		.01		96	2.87								.45										10	60	25				SP			Tt	538.3	grad	Hf, as above, to 538.3' then Tt, Mod suls, Tr Pb-zn
544.0	554.0	10.0		.39		.04		92	2.69								.39										20	65	10			SP	Tr						Tr, sp suls as pods, sp chlor
554.0	562.0	8.0		.66	.126 @	.03	.110 @	100	2.63								.66				Tr						15	10	25				10						Tr, " " as Pods & vnlts, Patches Hf, Mod chlor
562.0	568.9	6.9		.21	.63	.02	.02	66	3.13								.21										15	50	30				SP						Tt, as above
568.9	576.6	7.7		.65		.02		90	2.86								.65			SP		Tr					10	50	35										Tt, sp clay alt Patches st gar + sltst. Mod suls, sl.
576.6	586.2	9.6		.48		.03		100	2.90								.48			Tr							10	50	20				10						Tt; sp clay alt Sp suls in vnlts
586.2	596.0	9.8		1.70		.03		84	2.96								1.70										10	40	20			5	Tr			Mz Dp	587.4 593.8	brkn brkn	Tt, as above to 587.4, then Mz; sp clay alt, mod Tt incl to 593.8, then Dp; st silicif Mod suls
596.0	606.3	10.3		.54		.01		89	2.62								.54			Tr							5	20	10		Tr	Tr				Tt	601.2	brkn	Dp; st silicif, tr suls to 601.2, then Tt; sp clay - silicif
606.3	614.0	7.7		.51		.01		86	2.72								.51										5	30	5			20	Tr			Dp	611.3	brkn	Tt, sp chlor, mod siliceous rk. to 611.3, then Dp; sp clay
614.0	622.8	8.8		.21		.03		88	2.63								.21										Tr					SP							Dp, Tr clay - silicif Tr suls Tr Mz text

Av. Rec = 86 %

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-119
Page 1 of 2 Pages
Collar Elev 3169.24 Final Depth 622.3
Coords N 36121.22 E 19587.43
Inclination Vert
Logged by SAA - CWH - FTQ
Date: Start 7-27-62 Finish 8-27-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys	Cu (1) Pitch	Cu (1) Black	Cu (1) Blue Green	Cu (1)	Cu (1) Cc.	Cu (1) Cpy.	Cu (1) Born	Fe (2) Lim.	Fe (2) Py.	Fe (2) Mag.	Fe (2) Hem	Fe (2) Spec.	Other (2) Galena	Other (2) Sphal.	Other (2) Molyb.	Other (2) Calcite	Other (2) Garnet	Other (2) Silicates	Other (2) Sericite	Other (2) Clay	Other (2) Sil. Qtz.	Other (2) QUARTZ	Other (2) CHLORITE	Other (2) UNKNOWN	Other (2) Rare Min.	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
	0.0	5.7	5.7						Rock	B.T																															R.B
NC→	5.7	13.8	8.1		.31				100	2.91	.22	.01	.01	.07			Tr		Tr	Tr							15 45 35			5	SP	Tr	Tr			Tt	5.7	?	Tt, Leached, Alt, Sp Ga Ox
2400	13.8	22.8	9.0		.26				100	2.57	.19	.01	.01	.05			Tr										15 50 30			SP		1		Tr						Tt, " " " patches Hf
	22.8	33.0	10.2		.19				93	2.77	.16	.01	.01	.01													15 50 30													Tt, as above
	33.0	41.7	8.7		.25				100	2.52	.10	Tr	.01	.14								SP					15 40 30				Tr	10								Tt, " "
	41.7	50.7	9.0		.25				100	2.60	.10	1	.01	.14													10 40 20			1	1	SP	15							Tt, Leached, Sp ox, Mod hem, mod calc units
	50.7	60.8	10.1		.30				78	2.92	.05	1	.01	.20			.04										15 45 25			1		Tr	10							Tt, as above, Becomes silty calc f rock
	60.8	69.3	8.5		.15				89	2.74	.03		Tr	.12			Tr										5 20 15			Tr		55	Tr	Tr			SltST	60.8	brkn	SltST, ST Sil, I-calc units, Tr Sul
	69.3	78.5	9.2		.33		.28		85	3.39	.04		.01	.23			.05					Tr					15 20 50			SP	Tr		15				Hf	69.3	" "	Hf, Leached, Mod calc, patches Tt, Sp ox
	78.5	87.5	9.0		1.19		1.09		100	2.61	.08	Tr	.01	.95			.15										15 25 40						15							Hf, ST Hem, Patches Mb, SP Sul
	87.5	95.0	7.5		2.47	3.61 @ 1.34	2.10	3.61 @ 1.15	93	2.60	.40	.01	.02	1.67			.39					S					10 15 60					Tr	S							Hf, Leached, Vr St Hem, Mod Calc, Tr Sulf
	95.0	104.7	9.7		1.35		1.20		96	2.53	.30	.02	.03	.85			.15					SP					15 10 75						SP							Hf, " " , Mod Hem, " " "
	104.7	114.6	9.9		.58		.42		93	2.67	.13	.01	.01	.28			.16					Tr					10 5 80			S										Hf, wk Leached, sp hem, Sp-Mod calc, Sp sil ox
	114.6	124.5	9.9		.18		.14		99	2.95	.06	.01	Tr	.08			.04		Tr								15 10 75			Tr										Hf, " " " Tr hem, Sp calc, sp silica
	124.5	134.1	9.6		.13		.08		92	2.59	.01	.01	Tr	.06			.06										10 10 60										Mz	132.0	brkn	Hf, as above To 132.0 then Mz, dike (?) wk Leached
	134.1	137.9	3.8		.12				92	2.59	.08	.01	Tr	.01			.02										Tr		Tr					Tr							Mz; wk Leached
	137.9	146.5	8.6		.12				94	2.57	.08	Tr	1	.01			.03										1														Mz; " "
	146.5	155.0	8.5		.13				98	2.90	.03	1	1	.02			.08										5 35 30			1	1	10	10				Tr	148.5	38°	Mz, " 1 To 148.5' then Tt with patches Hf, leached
	155.0	159.9	4.9		.31	2.50 @ .8	1.65	2.50 @ .8	93	2.75	.05	1	.01	1.59			.16					Tr					5 30 20			1	1	20	SP							Tt leached, St Hem, Mod calc
NX→	159.9	169.8	9.9		.22		1.10		86	2.87	.25	.01	.01	.85			.12										5 30 25			1	1	15	1							Tt Mod Hf, Leached, St hem, Mod calc
1.878	169.8	180.0	10.2		2.09	1.49	1.92	1.54	86	2.91	.15	.01	.01	1.75			.17										5 65 15			1	1	10	1							Tt as above
	180.0	195.0	15.0		—		—		—	—																															SLOPE
	195.0	204.4	9.4		.14				91	2.55	.04		Tr	.08		.01	.01		Tr	Tr							Tr		Tr	SP	Tr		Tr	Tr		Mz	195.0	—	Mz; leached Sp clay alt
	204.4	214.0	9.6		.12				86	2.55	.04	Tr	.01	.05		.02	Tr																							Mz; brkn, leached, Sp clay alt Tr wolfenite
	214.0	224.4	10.4		.09				72	2.57	.09		.01	.03		.01																Tr								Mz; leached Sp clay - Tr silicif
	224.4	234.6	10.2		.28				75	2.59	.14	.01	.02	.07		.03	.01																							Mz; leached, Sp clay - silicif
	234.6	239.5	4.9		.10				79	2.59	.05	Tr	.01	.03		.01	Tr																							Mz; as above
	239.5	247.6	8.1		.09				70	2.58	.05		.01	.02		.01																								Mz; "
	247.6	257.2	9.6		.10				87	2.61	.04		.01	.03		.02	Tr													Tr										Mz; leached, Sp clay alt.
	257.2	263.2	6.0		.08				76	2.59	.05		.01	Tr		.02																								Mz, " " "
	263.2	274.7	11.5		.08				56	2.54	.05		.01	1		.02																			Tr					Mz, " " ", wk Fluorite vns
	274.7	279.6	4.9		.12				36	2.47	.08		.01	.01		.02									Tr															Mz, " " " " "
	279.6	286.6	7.0		.12				53	2.56	.08		.01	.01		.02																								Mz as above
	286.6	296.9	10.3		.07				70	2.54	.04		.01	Tr		.02																								Mz; brkn; Mod clay alt Tr feldspath?
	296.9	304.4	7.5		.06				49	2.55	.04		Tr	Tr		.02																								Mz; as above
	304.4	311.6	7.2		.03				100	2.62	Tr			Tr		.01	.02					Tr					5 10 80	Tr				Tr	S				Hf	304.4	brkn	Hf; mod clay - chlor alt. Tr fluor. Tr sulf.
	311.6	318.9	2.3		.04				89	2.75	Tr			Tr		.01	.03										10 10 70				Tr		10							Hf, as above
Bx→	318.9	323.7	4.8		.07				74	2.60	.02		.01	.01			.03										5 5 10	Tr					S				Mz	314.4	brkn	Hf, as above to 314.4, then Mz; sp clay alt.
1.432	323.7	334.1	10.4		.08				88	2.57	.04		Tr	.01			.03										Tr			SP			Tr								Mz, sp clay alt
	334.1	338.3	4.2		.11				74	2.55	.06		.01	.01			.03																								Mz; as above.
	338.3	347.9	9.6		.07				70	2.52	.05		Tr	Tr			.02													Tr											Mz, " "
	347.9	356.3	8.4		.06				82	2.53	.04		Tr	.01			.01																								Mz, brkn, as above
	356.3	364.5	8.2		.06				91	2.61	.04		Tr	.01			.01															Tr								Mz, brkn, " "
	364.5	370.6	6.1		.12				87	2.56	.08		Tr	.01			.03																								Mz, as above.
	370.6	378.0	7.4		.03				100	2.55	.02						.01																								Mz, " "

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-120
Page 1 of 2 Pages
Collar Elev 2932.08 Final Depth 433.0
Coords N 37242.13 E 19591.53
Inclination Vert
Logged by SAA - FTG - CWH
Date: Start 8-4-62 Finish 8-20-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu N$	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Cu (1) Pkrn	Cu (1) Black	Cu (1) Blue Green	Cu (1) Cuprite	Cu (1) Cc.	Cu (1) Cpy.	Cu (1) Born	Fe (2) Lim.	Fe (2) Py	Fe (2) Mag.	Fe (2) Hem	Fe (2) Spec	Other (2) Galena	Other (2) Sphal.	Other (2) Molyb.	Other (2) Calcite	Other (2) Garnet	Other (2) Silicates	Other (2) Sericite	Other (2) Clay	Other (2) Un. Qtz	Other (2) Quartz	Other (2) Chlorite	Other (2) Jarosite	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
	0.0	4.2	4.2		—		—		R.B	—																													RB
NC → 2.400	4.2	12.9	8.7		.16				87	2.58	.13		Tr			.03			Tr										Tr	Sp	Tr		Tr	Tr	Dp	4.2	?	Dp; leached, ALT; Tr NS cu
	12.9	22.4	9.5		.14				85	2.58	.13		1			.01			1										1	1	1		1	1					Dp; as above
	22.4	32.7	10.3		.19				76	2.58	.18	Tr	1			.01			1										1	1	1		1	1					Dp; " "
	32.7	42.7	10.0		.27				90	2.58	.17	1	1	.08		.02			1										1	1	1	Tr	1	1					Dp; leached Sp silicif
	42.7	50.9	8.2		.14				89	2.61	.13	1	1			.01			1										1	1	1		1	1					Dp, as above
	50.9	59.9	9.0		.14				91	2.52	.13	1	1			.01			1	Tr									1	1	1		1	1					Dp; " "
	59.9	67.5	7.6		.07		.06		94	2.56	.06		1			.01			1										1	1	1		1	1					Dp; " "
	67.5	78.0	10.5		.40		.29		80	2.60	.12	Tr	.01	.16		.01	.10		1		Tr					S S 70			1	1	1	Tr	1	1	Hf	72.6	brkn	Dp; as above to 72.6, then Hf, silicif atet, then st clay-lim
	78.0	85.2	7.2		.70	37.7 @ .60	.55	37.7 @ .50	85	3.22	.15	Tr	.01	.39			.15		1							10 10 70			10	1	1		Sp	1					Hf leached; int. clay - lim - jaro alt Patches silicif Sp CuOx
	85.2	95.0	9.8		.79		.65		83	2.96	.15	.01	.02	.47			.14		1							10 15 60			15	1	1		1	1					Hf, as above to 88.0, then leached, sp clay alt Sp CuOx
	95.0	105.2	10.2		.56		.55		94	2.90	.10		.01	.44			.01		1							10 25 65			SP	1	Sp	Tr	1	1					Hf, leached, Sp clay alt Sp CuOx
	105.2	115.1	9.9		.35		.23		93	2.77	.03	Tr	.01	.19			.12		1							10 20 70			15	1	1		5	1					Hf, Sp clay - chlor alt to 111.0, then st clay - lim alt sp CuOx
	115.1	125.2	10.1		.35		.31		63	2.64	.05	1	.01	.25			.04		SP	1						SP 50 25			SP	1	15	SP	SP	1		Tt	115.1	brkn	Tt; leached; mod silicif - sp jaro to 124.0, then Sltst;
	—	—	—		—		—		—	—																										sltst	124.0	brkn	tr chlor; Tr suls
	125.2	135.2	10.5		.24		.105		61	2.68	.01	Tr	Tr	.04			.19		SP	1						SP SP 5			SP	1	85	1	1			Qtzte	133.0	good	Sltst; tr chlor, suls to 133.0 then Qtzte, leached, Tr CuOx
	135.2	143.6	7.9		1.97		1.76		88	2.91	1.25	.01	.01	.49			.21		1							SP 80 5			1	1	10					Tt	132.5	good	Qtzte; as above to 137.5, then Tt, leached; mod silicif Mod CuOx
	143.6	148.7	5.1		.95		.84		80	3.42	.70	Tr	Tr	.14			.11		1	1						1 70 15			1	1	10								Tt, leached pods; mod silicif Mod CuOx
	148.7	157.9	9.2		.96	52.1 @ .87	.51	52.1 @ .72	93	2.64	.10	1	.01	.40			.45		SP	1						Tr 10 30 50			1	1		SP			Hf	149.0	brkn	Tt, mod silicif to 149.0, then Hf, leached, sp clay - chlor
	—	—	—		—		—		—	—																										Tt	155.7	50°	alt to 155.7, then Tt; leached, mod CuOx
	157.9	168.5	10.6		.77		.70		82	2.77	.15	Tr	.01	.54			.07		SP	Tr		Tr				20 60 15			SP	Tr	SP								Tr, leached, Mod CuOx, patches Mb
	168.5	179.5	11.0		.58		.37		79	2.75	.10	.01	.02	.24	Tr	Tr	.21		Tr	Tr		1				Tr 70 20 5			1	1					Mb	168.5	good	Mb, wk leached, sp CuOx, Tr Tt
	179.5	188.4	8.9		.69		.40		85	2.74	.05	.01	.01	.33			.29		SP							30 45 15			1	1	Tr				Tt	181.5	" "	Mb as above to 181.5' then Tt, leached, patches Mb
	188.4	196.1	7.7		.18		.01		85	2.92	.01			Tr			.17		Tr	1		Tr				Tr 15 40 30			1	1		5							Tt, wk leached, Tr suls
N.X. → 1.875	196.1	206.1	10.0		.105	29.1 @ .06	.05	29.1 @ .06	90	3.06	.02		Tr	.03	Tr		1.00		L	1		L			Tr	L 10 35 25			1	1	15	5							Tt, dense, Mod Hem, Mod cpy, patches Mb, Tr chlor
	206.1	215.5	9.4		.32		.06		87	3.03	.01		1	.05			.76		SP	1		1				10 35 20			1	1	20	5							Tt, as above
	215.5	225.2	9.7		1.41	1.69	.03	.05	91	3.07							1.41			SP		1				15 30 30			1	1	20	15			Hf	223.0	good	Tt, dense, mod Hem, sp-mod. suls, Sp Silica To 223.0' then Hf
	225.2	234.9	9.7		.10		.03		100	2.64			Tr				.10		Tr	Tr						10 20 35			1	1	20	15							Hf, wk-Mod Ox, Sp cpy, Pb, Zn; Moly, Mod chlor, Tr Fluorite
	234.9	244.7	9.8		.42		.04		95	2.72							.47			1		Tr		Tr	Tr	Tr 25 20 30			1	1	5	15							Hf, sp suls., Tr chlor, Patches Mb
	244.7	253.3	8.6		.31	22.8 @ .40	.17	22.8 @ .09	81	3.25	.01			.01			.29			1						25 30 35			1	1	SP	5							Hf, Patches Mb + Tr, Tr cpy, Pb, Zn, Sp chlor
	253.3	262.7	9.4		.42		.06		95	2.66							.42			1						60 10 25			1	1		5			Mb	258.0	good	Hf, as above To 258.0' then Mb
	262.7	272.5	9.8		.08				100	2.69							.08			1						95	Tr		Tr			Tr							Mb, Tr Tt, Tr suls
	272.5	282.2	9.7		.15				92	2.71				Tr			.15			1		Tr				95			1										Mb; Tr L.M. on shears
	282.2	292.1	9.9		.19				86	2.89							.19			1						95 Tr Tr			1			SP							Mb; as above
	292.1	292.0	4.9		.18				92	2.65							.18			1						70 10 10			1			5							Mb; wex in chlor, Tr Hf.
	292.0	304.2	12.2		.19				100	2.57							.19			1	1	Tr	Tr			70 5 20			1			5	Tr						Mb; chlor - hem - suls in units. Tr Hf
	304.2	312.1	7.9		.18				96	2.45							.18				1	1	1			60 5 20			1			10	SP						Mb; mod chlor. Sp clay Tr suls. Mod Hf
	312.1	320.4	8.3		.36				78	2.67							.36				1	1	1			50 5 20			1			15	1						Mb; sp clay - chlor Sp Hf. Tr suls.
	320.4	330.4	10.0		.16				92	2.61							.16				1	1	1			65 SP 20			1			10	1						Mb; as above
	330.4	337.2	6.8		.18				88	2.57							.18				1	1	1			70 1 15			1			10	5						Mb; mod chlor - jaro' Tr suls. Sp Hf
	337.2	344.5	7.3		.19				96	2.56							.19				1	1	1			60 5 15			1			10	SP						Mb; as above
	344.5	354.1	9.6		.21				97	2.60							.21				1	1	1			65 5 15			1			10	1						Mb " " Sp Hf, Tr suls
	354.1	364.4	10.3		.17				100	2.64							.17				1	1	1			90 5 35			1		SP	10			Hf	355.1	good	Mb, as above To 355.1' then Hf, Mod chlor, Tr sulfs, patches Mb
	364.4	374.0	9.6		.24				90	3.06							.24				1	1	1			20 15 55			1		5	5	SP						Hf, Mod chlor, sp - Mod suls, Tr Tt
	374.0	383.3	9.3		.29				90	3.03							.29				1	1	1			20 15 55			1		SP	5	Tr						Hf, " " " wk suls, Mod Mb, Tr Tt

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr), Sparce (Sp) + 5 %, Moderate (Md) 5 - 60 %, Strong (St) + 60 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-120
Page 2 of 2 Pages
Collar Elev. 2988.03 Final Depth 633.0
Coords. N. 32,242.13 E. 19571.53
Inclination Vert
Logged by SAA - FTG - CWH
Date: Start 8-6-62 Finish 8-20-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1): Chrys	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2): Lim.	Py	Mag	Hem	Spec	Other (2): Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	Quartz	Chlorite	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
385.3	392.2	8.9		.27				94	3.18							.27			Tr	Tr				Tr	5	20	60		SP		Tr	5			Hf			Hf, sp chlor, incr in SiO_2; wk Mb
392.2	401.7	9.5		.21			.04	97	2.66							.21									15	10	55		1		1	5	Tr					Hf, " ", st patches of Mb, Tr suls
401.7	410.0	9.3		.58			.05	86	3.23							.58									20	15	25		5		1	5			Tt	405.0	grad	Hf, as above to 405.0' then Tt, Mod Suls, Cu-Pb-Zn, to
																																			Mb	408.0	" "	408.0' then Mb Tr suls
410.0	420.5	9.5		.87			.06	99	2.69							.87			Tr						20	40	30		SP		5	SP			Hf	410.0	" "	Hf, Mod silica, st patches of Tt, with Mod suls
420.5	430.6	10.1		.25			.03	93	2.57							.25					Tr	Tr		5	20	15	55		1		Tr	5						Hf, as above
430.6	440.0	9.4		.46			.03	92	2.57							.46								SP	15	10	60		5	Tr	SP	5						Hf, Mod chlor, sp-Mod suls
440.0	449.1	9.1		.25			.01	96	2.82							.25									10	5	65		SP	1	1	10	Tr					Hf, as above
449.1	458.5	9.8		.17			.02	94	2.77							.17					Tr				10	5	70		1	1	1	10						Hf, " "
458.9	467.7	8.8		.50			.08	95	2.96							.50								Tr	10	35	45		5	1		SP						Hf, patches Tt, sp-Mod Suls
467.7	475.0	7.3		.56			.02	82	2.72							.56									10	30	40		SP	1		15						Hf, as above, incr in chlor
475.0	481.1	6.1		.47			.01	100	2.86							.47					Tr				5	15	40		Tr		10	20			Tt	479.0	grad	Hf, " " to 479.0' then Tt, Mod suls
481.1	488.8	7.7		.40			.03	82	3.30							.40									5	35	20		1	SP	25	5						Tt, sp chlor, sp cpy, Mod py
488.8	498.5	9.7		.19			.02	100	3.19							.19									5	55	15		1	Tr	5	15						Tt, sp clay-chlor alt Incr silicif. Sp suls
498.5	508.3	9.8		.22			.01	100	3.17							.22									5	60	20		1	1	SP	15						Tt, sp clay-chlor St gar. Sp suls
508.3	517.1	8.8		.44			.02	88	3.24							.44								SP	5	5	0	25	SP	1	1	10			Hf	511.2	grad	Tt, as above to 511.2, then Hf; mod chlor. Mod cpy, sl, gn
517.1	526.7	9.6		.18			.05	90	3.32							.18							Tr	Tr	Tr	5	0	30	1	1	1	10			Tt	517.1	grad	Tt, sp clay alt. Tr suls
526.7	536.6	9.9		.18				86	3.29							.18					Tr					5	0	30	1	1	5	15					Tt, deer gar, incr silica w. banded text. St banded chlor at 533.3
536.6	543.2	6.6		.27				80	3.36							.27										5	4	5	20	1	1	5	25					Tt; st chlor alt. Slabs siliceous rk. Tr suls
543.2	552.7	9.5		.34				100	3.34							.34										10	40	10	Tr		5	25						Tt; st chlor to 545, then sp clay alt. Sp cpy, sl
552.7	562.5	9.8		.10			.08	92	3.13							.10										10	50	20				5	15					Tt, sp chlor - clay alt Tr suls.
562.5	572.0	9.5		.40			.04	82	3.21							.40					Tr					10	40	30				10	10					Tt, 1" bands gar w. siliceous rk to 567.3, then sp chlor - feldspath
572.0	581.7	9.7		.21			.02	96	2.76							.21										15	30	10				5	10					Tt; mod chlor w. siliceous rk. Patches lgn text. Incr Hf
581.7	591.4	9.7		.20				90	2.73							.20										15	15	60		SP		SP	10			Hf	581.7	grad	Hf; mod chlor - silicif. Mod banded Tt.
591.4	599.5	8.1		.12				79	2.69							.12					Tr					15	10	50		Tr	SP	10	15					Hf; dense, mod chlor - silicif. Mod qtz veining. Tr suls
599.5	608.4	8.9		.61			.04	89	2.60							.61									Tr	5	10	30	Tr		Tr	Tr			Dp	602.0	brkn	Hf, int silicif to 602.0, then Dp; int silicif. Tr suls
608.4	618.3	9.9		.14			.05	40	2.63							.14										SP						15						Dp, mod silicif. Tr suls.
618.3	625.2	6.9		.15				72	2.60							.15																5				Mz	618.3	brkn	Mz; sp silicif Tr suls.
625.2	633.0	7.8		.19				92	2.54							.19																SP						Mz; mod silicif to 628.0, then qtz. vnlt.

AVG REC = 89%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Dp - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. 0-121

Page 1 of 2 Page

Collar Elev. 2940.26 Final Depth 611.1

Coords. N 31387.57 E 19585.69

Inclination Vert

Logged by SAH - CWH - FTG

Date: Start 8-20-62 Finish 9-5-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vs. Qtz.	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	5.8	5.8						R.B.																													Rock Bit
NC-4	5.8	15.1	9.3		.52	19.5 @ 41	.42	19.5 @ .39	91	2.56	.38	.01	.03			.10			Tr											Tr	Tr	Tr				Mz	5.8		Mz, leached, Alt, Mod Ser + Lim
2400	15.1	25.1	10.0		.47		.36		100	2.55	.33	.01	.02			.11																	Tr						Mz, as above
	25.1	34.2	9.1		.24		.14		90	2.56	.12	Tr	.02			.10																		Tr					Mz, " "
	34.2	40.9	6.7		.21				99	2.51	.10	Tr	.02			.09															Tr							Mz, " "
	40.9	49.2	8.3		.25				95	2.51	.11	.01	.03			.10				Tr																		Mz, " "
	49.2	59.5	10.3		.27				100	2.55	.18	Tr	.02			.09																						Mz, " "
	59.5	66.8	7.3		.11				95	2.57	.07	Tr	.01			.03																			Dp	59.5	?	Dp, leached Alt, (May be F G No 3) Tr dk inclusions
	66.8	76.7	9.9		.07				100	2.46	.04	Tr	.01			.02														Sp				Tr					Dp, leached. Sp clay - silicif
	76.7	86.7	10.0	—	.11				90	2.48	.05	.01	.02			.03			Sp	Tr											5	Tr	Sp						Dp, as above Gry patches
	86.7	95.8	9.1		.27		.06		65	2.46	.05	Tr	.01			.11	.10		Tr												15					Mz	86.7	brkn	Mz, st. leaching, brkn, Mod clay - lim alt
	95.8	105.3	9.5		.57	34.2 @ 41	.10	34.1 @ .09	47	2.40	.07	.01	.02			.40	.07		Sp			Tr									30								Mz, leached; St chlor - clay alt.
	105.3	113.3	8.0		.36		.02		97	2.59	.02	Tr	Tr			.20	.16		Tr										Tr	Sp									Mz, leached, Sp clay alt
	113.3	123.4	10.1		.29		.08		90	2.59	.07	Tr	.01			.16	.05														Tr			Tr					Mz, as above
	123.4	130.5	7.1		.42		.19		87	2.53	.16	.01	.02			.20	.03																						Mz, leached, mod clay alt Tr CuOx
	130.5	140.0	9.5		.26				68	2.54	.08	.01	.01			.10	.06													Sp	Sp								Mz, " " " " " Fine Sen in part
	140.0	148.4	8.4		.20		.13		91	2.56	.10	.01	.02			.06	.01													Tr	Tr		Tr						Mz, as above
	148.4	156.0	7.6		.49		.33		86	2.53	.29	.01	.03			.12	.04														20								Mz, brkn, ggy, Leached, Sl clay, Sp Chlor, last 2', clay 33
	156.0	164.4	8.4		1.59	36.0 @	.18	36.0 @	72	2.65	.11	.01	.02	.04		.20	.21		5	Tr	Tr						5	10	55		Sp		Tr	25			Hf	156.0	33°	Hf, intense chlor, Sp - Mod Sulf (cpy), patches Tt
	164.4	174.3	9.9		.69	.37	.44	.35	94	2.54	.32	.01	.03	.08		.20	.05		Tr								Sp				Tr			Sp	Tr		Mz	164.4	brkn	Mz, leached, Alt, Mod Chlor
	174.3	184.4	10.1	—	.73		.41		96	2.59	.34	.01	.04	.02		.02	.25	.05										Sp	5	10				Tr	Tr		Tt	182.0	52°	Mz, as above To 182.0' Then Tt, Tr CuOx
	184.4	194.4	10.0		.34		.27		100	2.55	.10	.01	.02	.14		.01	.06		Sp									5	50	35				10						Tt, wk leached, Sp - Mod Chlor, patches Mz, + Hf
	194.4	204.9	10.5		.15		Tr		100	2.83	.02	Tr	Tr	.02		Tr	.11		Tr									5	80	15				Sp						Tt, dense, Patches St. silica, wk sulf, Tr chlor
	204.9	214.0	9.1		.11				97	2.92							.11					Tr						10	60	20				5	5					Tt, as above
	214.0	223.3	9.3		.13				83	3.46							.13											10	40	35				10	5					Tt, " " "
	223.3	232.9	9.7		.47		.13		94	2.59	Tr	Tr	Tr	.13			.34		Tr									5	40	20		Sp		5	Sp		Mz	223.5	32°	Tt " " To 223.5' Then Mz, wk leached
	232.9	240.0	7.1		.34		.03		93	2.71							.34					Tr					Tr	10	5	50		5			5		Hf	232.8	brkn	Mz, Leached To 237.8' then Hf, St. chlor, Sp sulf, Mod calc
	240.0	250.0	10.0		.60		.05		74	2.71							.60										Tr	10	35	30		5	Sp		5	Sp	Tt	245.0	brkn	Hf, st. chlor, sp sulf To 245.0' Then Tt, St gyp, + gyp
	250.0	256.6	6.6		.46		.01		100	2.78							.46											15	30	45		Sp	Tr	Tr	Sp					Tt, St gar, Mod "Bull" gyp; Mod Hem, Sp sulf. Trace Hf
	256.6	264.0	7.4		1.97		.04		100	2.37							1.97				Tr							15	10	60		10					Hf	256.6	brkn	Hf, st clay - chlor St sulf in pods + vnlts
	264.0	274.9	10.9		1.48		.03		81	2.64							1.48					Tr						15	10	60		5					Hf			Hf, intense chloritization, Mod sulf, Mod calc
	274.9	280.0	5.1		.46		.01		85	2.69							.46											20	10	60		5			5					Hf, as above
NX →	280.0	289.1	9.1		.53		.03		79	3.00							.53											15	15	55		5			5					Hf, Brkn, banded, St chlor, Sp sulf, Tr Tt
1.875	289.1	298.4	9.3		.56	143.5 @ .75	.04	143.5 @ .06	73	2.65							.56											15	15	60		5			5					Hf, as above, patches Tt
	298.4	305.8	7.4		.62		.01		74	2.66							.62										Tr	Tr	15	10	60		5			5					Hf, deck. in chlor, Alt, Patches Tt, Sp - Mod cpy, Tr Pb - Zn
	305.8	314.9	9.1		.20		.01		78	2.66							.20												Tr	10	15	50		Sp		10	10		Mz	313.0	50°	Hf, " " ", cont. patches Tt, To 313.0 Then Mz, Sp - Mod Sulf
	314.9	323.4	8.5		.78		.02		58	3.02							.78					Tr					Tr		20	35	30		5		5	5		Tt	315.0	brkn	Mz, Alt, Mod sulf To 315.0 Then Tt, Alt, Mod sulf To 321.0
																																						Mb	321.0	" "	Then Mb, Sp - Mod cpy, Tr Pb - Zn, Mb - Bx last ft.
	323.4	332.0	8.6		.62		.01		67	2.58							.62			Tr		Tr		Tr	Tr			10	30	20		10	Tr	5	5		Tt	323.4	" "	Tt, St. sandy gar, Mod sulf; Mod chlor, Tr Pb - Zn
																																						Mz	329.5	" "	To 329.5' Then Mz, Brkn, silicified
	332.0	341.6	9.6		.97		.01		94	2.41							.97			Tr	Tr						Tr	10	10	30		5	Tr		5		Hf	334.0	Brkn	Mz, Brkn, silicified To 334.0' Then Hf, Int. ft. St Tt, St cpy
	341.6	348.6	7.0		1.39		.05		97	2.38							1.39											10	25	45		5			5					Hf, Mod chlor + calc, Patches gyp, sandy Tr, Mod chlor
	348.6	356.2	7.6		.64		.07		95	2.83							.64					Tr						10	35	35		5			10					Hf, " " " , patches Tt, Mod cpy, Tr Pb - Zn
	356.2	366.6	10.4		.48		.07		99	2.69							.48											15	35	35		5			5					Hf, as above, Mod cpy
	366.6	379.6	13.0		—		—		—	—																													No core, old Stope

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-121
Page 2 of 2 Pages
Collar Elev 2940.26 Final Depth 611.1
Coords N 37387.57 E 19585.69
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 8-20-62 Finish 9-5-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Peach	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Malyt.	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz.	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
375.6	382.4	6.8		.80	.49	.01	.49	70	3.58							.80			Tr					Tr		15	70	10		5	Tr		Tr	Tt	375.6	grad	Tt. ST. Suls, cpy + zn, Mod chlor,
382.4	390.5	8.1		.52	.65	.01	.01	88	3.40							.52										15	60	20		5	Tr						Tt, Mod Suls, cpx-zn, Mod, chlor + calc.
390.5	397.6	7.1		.04				100	3.14							.04					Tr					10	65	20		SP		SP					Tt dense Siliceous, Tr Suls,
397.6	408.1	10.5		.12				96	2.52							.12								Tr		Tr	15	5						Mz	397.6	brkn	Mz, Brkn, Alt, Mod chlor, wk suls, Tr Tt
408.1	412.6	4.5		.25				100	2.66							.25							Tr	Tr		Tr	15	SP			15	SP					Mz, as above
8x → 412.6	418.8	6.2		.07				82	3.11							.07										5	30	40		Tr	Tr	Tr	15		409.1	brkn	Mz, " " To 409.1 then Hf, dense, Mod chlor, sp suls
1.432 418.8	425.3	6.5		.08				78	3.55							.08										5	40	25				5	20	SltST	418.8	brkn	SltST; dense; Siliceous; blk; (Qtzite?) To 421.7', then Tt, dense
				—		—		—	—																									Tt	421.7	brkn	siliceous, st gar, wk suls.
425.3	436.4	11.1		.15				93	3.28							.15			Tr							5	50	10		Tr	Tr	25	10	SltST	433.2	grad	Tt, dense siliceous, wk-sp suls, To 433.2' then SltST. To end
436.4	446.2	9.8		.11				87	2.67							.11										SP	SP	SP				6	5				SltST, dense, Blk, siliceous, Tr suls, Tr chlor, patch Tt
446.2	455.8	9.6		.09				72	3.25							.09					Tr					1	25	1				50	15				SltST, as above, Patches Tr, Tr + SltST. conts. 40°
455.8	465.1	9.3		.09				92	3.37							.09										1	65	10				Tr	Tr	Tt	455.8	40°	Tr, dense, Siliceous, Tr chlor, Tr suls
466.1	471.1	6.0		.13				61	3.25							.13										1	65	10									Tt, as above
471.1	477.0	5.9		.06				66	3.15							.06										5	60	20									Tt, " "
477.0	488.5	11.5		—		—		—	—																												Stope
488.5	494.7	6.2		.08				87	3.00							.08			Tr							5	70	20		Tr	Tr	Tr	Tr				Tt; as above
494.7	501.7	7.0		.09				89	3.45							.09										Tr	80	10		Tr	Tr	5	5				Tt; mod silicif. Tr suls.
501.7	511.8	10.1		.17				92	3.26							.17										1	70	5		1	1	15	SP				Tt, as above. Banding of Tt + siliceous rk about 40° dip
511.8	521.6	9.8		.15				97	3.10							.15										SP	70	20		1	1	5					Tt; as above
521.6	530.4	8.8		.22				82	2.73							.22					Tr				Tr	1	60	15		1	1	15	1				Tt, sp silicif. Mod siliceous rk (Sltst?). Sp suls
530.4	537.9	7.5		.25				62	3.23							.25										1	50	15		1	1	15	5				Tt, sp silicif. Tr suls.
537.9	547.2	9.3		.24				83	2.90							.24										5	60	20		1	1	10	5				Tt, sp silicif. Mod siliceous rk. Tr suls
547.2	552.5	5.3		.20				82	3.88							.20										5	65	20		1	1	10	SP				Tt, st gar. Tr clay - silicif. Tr suls.
552.5	561.7	9.2		.20				98	2.97							.20										5	60	20		1	1	10	1				Tt, wk clay. Mod siliceous rk (cherty). Tr suls
561.7	571.8	10.1		.04				97	3.24							.04										5	75	10		1	1	10	1				Tt, as above.
571.8	579.9	8.1		.16				88	3.29							.16										5	60	10		1	1	20	1	SltST(?)	578.0	grad	Tt, st gar to 578.0, then SltST(?), lt gy siliceous rk
579.9	589.1	9.2		.12				76	3.23							.12										5	55	10		1	1	30	1	Tt	584.7	15°	SltST(?), lt to dk gy siliceous rk w suls to 581', then Tt, Tr clay
589.1	599.8	10.7		.22				86	3.13							.22										5	70	5		1	1	20	1				Tt, tr clay, patches mod SltST(?)
599.8	606.6	6.8		.33				55	3.31							.33										5	70	5		1	1	20	1				Tt, as above
606.6	611.1	4.5		.62		.02		55	2.62							.62										SP	20	5		1	Tr	Tr		Dp	607.3	brkn	Tt, as above 607.3, then Dp. st silicif, tr suls.

AVG REC = 87%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3): Tt - Toctite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-123

Page 1 of 2 Pages

Collar Elev 3211.01 Final Depth 416.1

Coords N 31,338.13 E 19,208.03

Inclination Vert

Logged by SAA - RTG

Date: Start 9/5/62 Finish 9/19/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Cu (1) Pitch	Cu (1) Black	Cu (1) Blue Green	Cu (1) Cuprite	Cu (1) Cc.	Cu (1) Cpy	Cu (1) Born	Fe (2) Lim.	Fe (2) Py	Fe (2) Mag	Fe (2) Hem	Fe (2) Spec	Other (2) Galena	Other (2) Sphal.	Other (2) Molyb	Other (2) Calcite	Other (2) Garnet	Other (2) Silicates	Other (2) Sericite	Other (2) Clay	Other (2) Vs. Qtz.	Other (2) QUARTZ	Other (2) CHLORITE	Other (2) Barite	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
	0.0	2.0	2.0		—		—		ROCK	BIT																													Rock Bit
MC → 2400	2.0	10.9	8.9		.89	28.5 @ .10	.72	2+5 @ .53	72	2.94	.60	.01	.01	.10			.17		SP	Tr						5	45	25		5	5	SP	SP			Mz	2.0	?	Mz, leached, ALT, Tr chry to 6.6' then Tt, leached, Mod N.S. Cu
									—	—																										Tt	6.6'	70°	sp banding, Mod qtz stringers
	10.9	20.4	9.5		.45		.29		82	2.65	.25	Tr	.01	.03			.16		SP	Tr						5	40	30		10	SP	Tr	Tr						Tt, leached, ALT, Mod, Mal weathg, St qtz Pods, Mod Lim
	20.4	26.5	6.1		.82		.61		58	2.97	.40	1	Tr	.21			.21		1	1		Tr				5	60	20		5	1	1	1						Tt, Brxn, Leached, Mod Lim, Mod N.S. Cu
	26.5	39.3	12.8		—		—		—	—																													Old STOPE
	39.3	50.4	11.1		1.01		.72		61	3.00	.05	.02	.02	.63			.29		SP	Tr		Tr				10	60	15		SP	Tr	Tr	5						Tt, dense, siliceous, St Hem, Mod cu ox, Tr sulf
	50.4	60.7	10.3		1.10		.89		89	2.85	.05	.01	.02	.81			.21		1	1		1				10	60	20		1	1	1	5	Tr					Tt, as above
	60.7	70.8	9.1		.89		.46		96	2.74	.10	.01	.01	.34			.43		1	1		1				10	50	25		1	1	1	5	1					Tt, " "
	70.8	80.8	10.0		.49		.08		95	2.87	.04		Tr	.04			.41		Tr	1		1				15	50	20		Tr		SP	SP						Tt, " "
	80.8	89.5	8.7		.42		.38		88	3.03	.05		1	.33			.04		SP	1						10	40	30		SP		Tr	15						Tt, Sp slag, silicif & chlor Mod Hf
	89.5	99.7	10.2		.81		.51		98	3.00	.04		1	.47			.30		1	1		Tr				10	40	30		1		5	5						Tt mod silicif, Tr CuOx Patches st. chlor
	99.7	108.0	8.3		1.24	1.14 @ .86	1.07	1.14 @ .67	92	3.09	.05		1	.102			.17		1	1		1				10	40	20		1	Tr	5	20						Tt, as above
	108.0	118.1	10.1		.83		.57		98	2.79	Tr		1	.57			.26		1	1		1				40	25	20		1	1	SP	5			Mb	108.0	Brx	Mb, St. Patches Tt, Mod silicification, St. Hem, Sp cu ox
									—	—																										Tt	116.0	"	To 116.0' then Tt, Sp cu ox, Mod Hem
	118.1	126.4	8.3		1.00		.97		100	2.65	Tr		Tr	.97			.03		SP	Tr		Tr				35	25	15		SP	Tr	Tr	5						Tt, sp hem - silicif Sp CuOx Sp Mb, Hf
	126.4	136.4	10.0		.60		.50		98	2.69	.15		1	.35			.10		1	1		1				55	15	10		1	1	1	SP			Mb	126.4	grad	Mb, leached, Patches, Tt, hem, Sp cu ox
	136.4	146.5	10.1		1.06		.98		100	2.67	.20		1	.78			.08		1	1		SP				40	30	15		1	1	1	1						Mb; " " St. Patches Hem, Tt, Mod Hf, Sp cu ox
	146.5	154.6	8.1		.76		.73		100	2.70	.10	Tr	1	.63			.03		1	1						15	15	5		1		1	Tr						Mb; as above, Patches Bx.
	154.6	165.1	10.5		.92		.88		96	2.69	.10	1	1	.78			.04		5	1		Tr				60	25	5		1		1	1			Tt	160.0	grad	Mb; " " " To 160.0' then Tt, St. hem, Mod cu ox
	165.1	171.8	6.7		1.28		1.20		97	2.74	.20		1	1.00			.08		SP	1		1				10	60	10		Tr		5	5						Tt, St. Hem, Mod cu ox, Mod sulf
	171.8	180.0	8.2		.60		.35		93	2.86	.15		.01	.19			.25		1	1		SP				10	65	15		1		5	5						Tt " " " Mod Hf & Mb Patches
	180.0	187.9	7.9		.52	.18 @ .05	.04	.18 @ .06	89	2.64	Tr		Tr	.04			.48		1	1		Tr				20	5	65		SP	Tr		SP			Hf	180.0	grad	Hf, Tr leaching, Mod chlor, sp-Mod sulf, Calc veining
	187.9	198.1	10.2		1.46		.08		90	2.63							1.46			1	Tr					10	SP	80		1			1						Hf, No leaching, " " " " " "
	198.1	206.3	8.2		.14		.03		83	2.69							.14			1							Tr	5	1	60	1	SP	10	5						Hf, as above, becomes siliceous at end
	206.3	213.0	6.7		.18				63	2.87							.18			1							1	SP	1	25	1	1	25	10		SITST	206.3	Brxn	SITST, brxn, ggx, ST silica, Mod chlor, wk sulf,
	213.0	222.8	9.8		.28				97	2.83							.28			1							1	5	5	45	1	1	15	10		Hf	216.5	" "	SITST, as above To 216.5' then Hf, Mod chlor, wk sulf
	222.8	228.7	5.9		.35				87	2.87							.35			1								5	10	40	1	1	5	15					Hf, Brxn, ggx, Mod chlor, wk sulf
	228.7	238.2	9.5		.29		.04		88	2.82	.04						.25		Tr	1								5	10	60	1	Tr	5	15					Hf, as above. Mod qtz vein w moly. Siltst from 232.0 - 233.5
	238.2	240.0	1.8		.33		.02		72	2.99							.33		1	1								5	5	65	1	1	SP	10					Hf, sp chlor Mod qtz veining Sp sulf
	240.0	249.0	9.0		—		—		—	—																													Stope.
	249.0	253.8	4.8		1.95	2.26 @ 3.11	.32	2.26 @ .29	91	2.59	.22					.10	1.63		Tr	SP	Tr							5	10	65		SP	Tr	Tr	15					Hf, mod clay - chlor. Mod sulf in veins
MC → 1875	253.8	262.0	8.2		2.26		.44		61	3.18	.30	Tr			.10	.04	1.80	.02					Tr		Tr		10	10	10		Tr			10						Hf, as above, Mod sulf, tr. + in veins
	262.0	272.0	10.0		4.37		.15		51	3.46	.10				.05		4.20	.02		5					1.30		10	10	60		SP	SP		10		Tt	265.1	grad	Hf, " " To 265.1 then Tt, St cpy, Pb, zn, Mod chlor
	272.0	275.2	3.2						No	core																													No core
	275.2	283.8	8.6		.31		.05		82	2.42	-						.31			SP	1	1		Tr	Tr	Tr	10	5	50		Tr	Tr	30	5		SITST	275.2	?	SITST (?), dense, siliceous, wk calc, sp chlor, sp sulf, To
																																				Mz	282.0	Brxn	282.0' then Pink Mz, Mod sulf, sp Pb-zn
	283.8	292.6	8.9		.15		.05		88	3.18							.15			1	1	1					10	35	10				10	5		Tt	283.8	" "	Tt, dense, ST gar, sp - Mod sulf, Sp chlor
	292.6	301.5	8.9		.28		.05		60	3.51							.28				Tr	1					5	45	35				10	5					Tt, as above
	301.5	311.0	9.5		.61	16.3 @ .66	.04	16.3 @ .04	70	2.80							.61					1					5	50	40				5	SP					Tt, dense, ST gar, incr in qtz veining, decr in sulf
	311.0	317.8	6.8		.74		.04		73	3.15							.79					1					5	5	35				50	5		SITST	314.0	Brxn	Tt, as above to 314.0 then SITST, wk sulf
	317.8	326.5	8.7		.27		.05		64	3.02							.27					1					10	30	35		SP		20	5		Tt	317.8	brxn	Tt, mod silicif Qtz - moly veining Sp sulf
	326.5	333.0	6.5		.27				91	2.58							.27					1				Tr	15	40	25		Tr		15	5					Tt, as above to 330.0, then Tt; sp chlor Sp sulf
	333.0	342.1	9.1		.15				87	3.04							.15					1					10	45	25				15	5					Tt, sp chlor Tr sulf
	342.1	350.8	8.7		.16				69	3.18							.16					1					5	40	35				20	SP					Tt, st. gar, sp sulf to 349, then st. silicif Sp sulf

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO-SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-123
Page 2 of 4 Pages
Collar Elev 3011.01 Final Depth 472.7
Coords N 37,338.13 E 19,208.23
Inclination Vert
Logged by SAA-FTG
Date: Start 9/5/62 Finish 9/19/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garner	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
350.8	360.9	10.1		.18				86	3.01							.8			Tr		Tr				5	30	40		Tr	Tr	20	5				Tt; st silicif, poss.b Tr Mz, to 354.5, then st gar, sp chlor
360.9	366.2	5.3		.11				79	3.06							.1									5	40	25				25	5				Tt, st gar, sp suls. Incr chlor
366.2	373.0	6.8		.44		.03		100	2.90							.44			Sp						5	30	35				20	10				Tt, mod chlor. Bx along vnlts. Sp suls
373.0	383.2	10.2		.35		.02		74	3.22							.35			Tr						5	20	15	Tr			10	5		Mz;	378.0	bx	Tt, as above to 378.0, then Mz; sp clay-ser. Sp suls
383.2	390.1	6.9		.19				61	2.56							.19								Tr								5	Sp				Mz; sp silicif. Sp suls
390.1	400.9	10.8		.25				74	2.69							.25																5					Mz; as above to 391.0, then int silicif. Patches poss. Qtzte
400.9	407.4	6.5		.13				76	2.63							.13																5					Mz; st silicif. Patches w. sp. suls
407.4	413.0	5.6		.15				92	2.51							.15																5					Mz; as above
413.0	423.8	10.8		.13				79	2.62							.13																5					Mz; ST silica, patches ST Felds, sp suls, Sand pebble size ST frags
423.8	433.2	9.4		.14				80	2.59							.14																5					Mz, Bkn, st silica, wk suls
433.2	442.3	9.1		.08				88	2.65							.08																5					Mz, sp silicif, Tr feldspath on vnlts. Sp suls
442.3	450.5	8.2		.10				97	2.62							.10																5					Mz; mod silicif. Tr suls.
450.5	460.4	9.9		.22				75	2.98							.22																10					Mz; sp clay-silicif. Patches w. feldspars(?) leached + removed
460.4	467.3	6.9		.19				96	2.65							.19																5					Mz; wk alt. Tr suls
467.3	472.7	5.4		.18				66	2.63							.18																5					Mz; as above
						Av. Rec =		83%																													
							END OF HOLE																														

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-122

Page 1 of 1 Pages

Collar Elev. 3060.12 Final Depth 301.4

Coords. N. 36694.19 E. 19204.63

Inclination Vert

Logged by SAA - CWH - FTG

Date: Start 8-27-62 Finish 9-6-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green			Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JARGOSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	4.0	4.0		—		—		Rock	Bit																														Rock Bit
NX →	4.0	11.3	7.3		.14				93	2.50	.10	Tr	.01	.03						sp							5	sp	Tr		sp	sp	5	5		Mz Bx	4.0	—	Mz Bx; Mod rounded Tt, qtzite, + varied sign. incl in Mz
1875																																					Mz	6.0	15°	+ matrix to 6.0; then Mz; leached; wk alt. 0.6' Tt incl
	11.3	20.0	8.7		.03				97	2.52	.03		Tr							Tr									Tr		Tr			Tr						Mz; leached; wk clay alt Mod mafics.
	20.0	29.7	9.7		.03				92	2.51	.03		1							Tr									1		1			1						Mz; as above; f.g. areas w. high mafics
	29.7	37.8	8.1		.05				78	2.52	.05		1							1										Tr	1	Tr		1						Mz; leached, wk clay alt Mod mafics
	37.8	47.6	9.8		.06		.04		91	2.55	.06		1							1									1		1	1		1	Tr					Mz; as above
	47.6	56.0	8.4		.46		.23		93	2.49	.22		.01				.23			1	Tr						Tr	sp	1		sp	1		1	1					Mz; patches st lim. Decr mafics. Ggy areas. Tt incl.
	56.0	65.2	9.2		.16		.10		55	2.58	.10		Tr				.06			1	1										1	1		1	1					Mz; leached; Sp clay alt Tr CuOx.
	65.2	72.9	7.7		.23				79	2.60	.17		.01				.05			1	1										1	1		1	1					Mz; leached; Sp silicif. Tr CuOx Sp mafics
	72.9	82.6	9.7		.38		.26		95	2.46	.20		.01	.05			.08	.04		1	1		Tr				5	5	25		1	1		1	1					Mz; leached; Sp silicif. St incl of Hf-Tt.
	82.6	92.4	9.8		.62		.53		91	2.89	.20	.01	.01	.31				.09		1	1		1				5	25	20	1	1	1		1	1		Tt	86.8	brkn	Mz; leached; mod clay alt. to 86.8, then Tt; sp clay, Mod Hf
	92.4	102.2	9.8		.46	38.6	.37	33.6	78	2.87	.05	.01	.01	.30				.09		1	1						10	35	35	5	1	5	sp	sp						Tt; leached; sp clay alt Tr CuOx Mod Hf.
	102.2	107.1	4.9		.55	0	.50	0	86	2.74	Tr	.01	.01	.48				.05		1	1						10	35	35	10	1			1	1					Tt; as above
	107.1	115.8	8.7		.66	62	.58	.54	89	3.08	.55	Tr	.01	.02				.08		1	1						5	60	20	sp	1	Tr								Tt; leached; sp silicif. Tr CuOx Patches Hf
	115.8	121.2	5.4		.93		.82		66	2.83	.60	1	.01	.21				.11		1	1						5	75	10	1	1	sp								Tt, as above.
	121.2	131.5	10.3		.34		.31		65	2.52	.29	1	.01	.01				.03		1	1						Tr			1	1	Tr	Tr			Mz	122.4	brkn	Tt; mod clay, sp CuOx, mod Hf to 122.4, then Mz; sp clay
	131.5	138.2	6.7		.14		.14		87	2.55	.14		Tr							1	1										1	1	1	1						Mz; wk alt, mod mafics. Dp ? incl.
	138.2	145.5	7.3		.32				63	2.57	.30	Tr	1	Tr				.02		1	1									5	1	1	1						Mz; leached; sp clay - silicif. Sp CuOx.
	145.5	150.0	4.5		—		—		0	—																														No Core
	150.0	159.1	9.1		.05				46	2.63	.05		Tr							Tr											Tr	Tr		Tr						Mz; leached, brkn; Sp clay alt
	159.1	168.5	9.4		.05				54	2.67	.05		1							1											1			1						Mz; leached; wk alt. Tr CuOx
	168.5	175.2	6.7		.03				84	2.64	.03		1							1											1			1						Mz; as above
	175.2	185.1	9.9		.06				58	2.39	.06		1							1											5	1		1						Mz; leached Mod clay - lim alt
	185.1	195.0	9.9		.05				79	2.60	.05		1							1											sp	1		1						Mz; leached; wk alt Sp mafics
	195.0	204.4	9.4		.06				67	2.62	.06		1							1										Tr	5	1		1						Mz; leached; mod clay.
	204.4	212.1	7.7		.12				69	2.59	.12		1							1											sp	1		1						Mz; as above.
	212.1	215.8	3.7		.14				93	2.59	.10		1				.02	.02		1	Tr										1	1		1						Mz; leached; wk alt
	215.8	222.0	6.2		.11				64	2.62	.11		1				Tr	Tr		1	1										1	1		1	Tr					Mz, as above
	222.0	232.7	10.7		.12				37	2.54	.12		1				1	1		1	1										1	1		1	1					Mz, " "
	232.7	243.2	10.5		.11				71	2.57	.11						1	1		1	1										1	1		1	1					Mz, Leached, Alt, Tr. Mas Sa
	243.2	251.0	7.8		.13		.08		27	2.57	.08						.03	.02		1	1										1	1		1	1					Mz, " " Brkn, " "
	251.0	260.2	9.2		.18		.08		53	2.60	.08						.06	.04		1	1										1	1		1	1					Mz, " " " "
Bx →	260.2	269.2	9.0		.19				67	2.60	.10						.05	.04		1	1										1	1		1	1					Mz, Leached, Brkn, Alt, Tr. CuOx
1432	269.2	276.8	7.6		.07				72	2.55	.04						.02	.01		1	1										1	1		1	1					Mz, " " "
	276.8	285.4	8.6		.11				88	2.58	.05						.03	.03		1	1										1	Tr		1	1					Mz, " " "
	285.4	295.8	10.4		.10				78	2.55	.05						.02	.03		1	1										1	1		1	1					Mz, " " "
	295.8	301.4	5.6		.10				87	2.62	.06						.02	.02		1	1										1	1		1	1					Mz, " " "

Av Rec = 73%

End of Hole

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5% Moderate (Md) 5-50% Strong (St) +50%

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-125
Page 1 of 2 Pages
Collar Elev. 3110.50 Final Depth 400.0
Coords N 36953.06 E 19204.41
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 9/17/62 Finish 9/25/62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz.	QUARTZ	CHLORITE	Shears	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	4.3	4.3						RB																													Rock Bit
NC → 2.400	4.3	13.6	9.3		.10				74	2.53	.07	.01	.01			.01			Tr										Tr	Tr					Mz	4.3	?	Mz, leached, Alt, brkn, Tr cuox
	13.6	20.6	7.0		.08				93	2.62	.06	Tr	.01			.01						Tr									Tr		Tr	Tr					Mz, as above
	20.6	29.4	8.8		.105	.12	.45	.23	36	2.57	.12	.01	.02	.10		.20	.40		Sp	Tr							20	30		S		Sp	Sp		Tt	24.7	Brkn	Mz, " " To 24.2' Then Tt, st leached, Mod cuox, st Un
	29.4	37.9	8.5		.128	.13	.73	.38	28	2.68	.40	.01	.02	.30		.05	.50		10								50	50		15		S	S					Tt, leached, St. brkn, sp-mod cuox, Tr chlor
	37.9	48.2	10.3		.53		.50	.56	91	2.47	.30	.02	.03	.15		.01	.02		S								5	10	20	Tr	10		Sp	S		Mz	43.9	Brkn	Tt, as above To 43.2', Then Brkn, ggy, st clay and Mz
	48.2	57.0	8.8		.35		.27		44	2.63	.25	.01	.01	Tr		.07	.01		Sp								Tr				20			S				Mz, intense alt, ggy, st clay, (Bx?), sp cuox, st sand, Tr Tt
	57.0	66.2	9.2		.10				49	2.50	.07	.01	.01			.01						Tr									20		Tr	S					Mz, Brkn, ggy, Alt, sp cuox
	66.2	75.2	9.0		.35				94	2.58	.05	Tr	.01	.15		.02	.12		Tr	Tr	Tr						5	40	55		Sp		Sp	Tr		Tt	66.8	Brkn	Mz, as above To 66.8' Then dense, silicified Tt, sp cuox
	75.2	86.5	11.3		.19				62	2.57	.03	Tr	.01	.05		.01	.09										SP	10	10	Tr			Tr		Tr	Mz	77.2	ggy	Tt, as above To 77.2' Then Mz, Brkn, Leached, Alt
	86.5	90.4	3.9		.10				77	2.89	.07	.01	.01	Tr		.01																						Mz, Brkn, Leached, Alt, Tr cuox
NA → 1.876	90.4	101.2	10.8		.10				30	2.56	.07	.01	.01			.01																						Mz, as above
	101.2	111.1	9.9		.10				74	2.54	.05	.01	.02			.02						Tr																Mz, " "
	111.1	118.0	6.9		.12				85	2.52	.06	.01	.02			.03																						Mz, " "
	118.0	128.5	10.5		.09				49	2.59	.06	Tr	.01			.02				Tr																		Mz, " " Tr feldspath
	128.5	139.2	10.7		.08				92	2.57	.06		.01			.01																						Mz, as above
	139.2	145.5	6.3		.11				48	2.50	.07		.01			.03				Tr																		Mz, " "
	145.5	155.4	9.9		.12				54	2.56	.09		.01			.02															5							Mz, " " Gray patches
	155.4	166.3	10.9		.08				68	2.56	.06		.01			.01															SP							Mz, leached, brkn, Tr cuox, Tr feldspath
	166.3	176.9	10.6		.11				77	2.55	.07		.01			.03																	Tr		Tr			Mz, as above, sp silicification, Tr cuox
	176.9	185.6	8.7		.08				62	2.50	.06		.01			.01														SP	15							Mz, St. Alt, ggy in part
	185.6	195.5	9.9		.15				41	2.42	.11		.01			.03															25			Sp				Mz, Intense Alt, leached, st clay, mod Jaro
	195.5	203.5	8.0		.15				87	2.54	.12		.01			.02															40							Mz, " " " " st Jaro, sp cuox
	203.5	211.6	8.1		.31				95	2.56	.25		.01			.05															20							Mz, as above
	211.6	221.2	9.6		.22				92	2.53	.19		.01			.02															15			Tr				Mz, " "
	221.2	230.9	9.7		.13				80	2.57	.10		.01			.02				Tr											15		Sp	Sp				Mz, mod alt Patches st alt
	230.9	237.5	6.6		.17				100	2.48	.15		.01			.01														S	30							Mz, int clay - jaro to 233.0, then mod clay - jaro
	237.5	247.3	9.8		.17				87	2.42	.14		.01			.02														SP	20			S				Mz, mod alt. Patches st mafics
	247.3	254.7	7.4		.13				74	2.55	.10		.01			.02														S	15			Sp				Mz, mod alt. Patches st clay
	254.7	263.2	8.5		.15				82	2.48	.10		.01			.04														S	30							Mz, st alt. Sandy areas
	263.2	272.0	8.8		.18				89	2.45	.13		.01	Tr		.04														SP	20			10				Mz, mod clay alt Patches int alt
	272.0	281.5	9.5		.13				84	2.55	.07		.01			.05															15			Sp				Mz, as above.
	281.5	288.1	6.6		.23				85	2.62	.04		.01			.15	.03														10		Sp					Mz, brkn, st clay alt
	288.1	297.0	8.9		.13				89	2.60	.03		Tr			.08	.02													10	15							Mz, sp clay alt
	297.0	308.7	11.7		.16				45	2.64	.02					.10	.04													SP	5							Mz, as above, ggy areas
	308.7	311.4	2.7		-		-		-	-																												No Core
	311.4	320.5	9.1		.20		.01		54	2.61						.15	.05		Tr	Tr										Tr	Sp	Tr		Sp				Mz, wk Alt, Mod Silica, sp py, Tr cpy
	320.5	329.7	9.2		.61		.02		96	2.61						.50	.11									Tr				Sp	5			10				Mz, intense chlor. Alt, sp Feldspath, Tr Moly + Hem, Tr cpy
	329.7	339.1	9.4		.11		.01		94	2.56						.08	.03													Tr	Sp			Sp				Mz, Mod Alt, sp chlor, Tr silic, Tr Moly + cpy
	339.1	348.7	9.1		.36				99	2.61						.30	.06																					Mz, as above
	348.8	357.7	9.5		.12				98	2.59						.10	.02													10	10							Mz, " "
	357.7	365.4	7.7		.10				96	2.67						.07	.03													Tr	Tr			Tr				Mz, " "
	365.4	371.2	5.8		.17				95	2.60						.11	.06		Tr												Sp							Mz, " "
	371.2	382.0	10.8		.14				96	2.61																												Mz, " "

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-133
Page 2 of 2 Pages
Collar Elev. 3110.50 Final Depth 400.0
Coords. N 36953.06 E 19204.41
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 9/17/62 Finish 9/25/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Jn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
382.0	390.0	8.0		.19				100	2.61							.19			Tr						Tr				Tr	Sp	Tr	Tr	Sp					Mz, Alt, wk Lim in Shears, Tr. Sulf
390.0	400.0	10.0		.17				97	2.45							.17		Tr	1						1				1	1	1	1	1					Mz, as above
						AVG Rec =		75 %																														
				End of Hole																																		

Remarks

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 0-124
Page 1 of 1 Pages
Collar Elev 3080.13 Final Depth 320.6'
Coords N 36,804.90 E 12,183.36
Inclination VERT
Logged by SRA FTG CWH
Date Start 9-7-62 Finish 9-16-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sn Qtz	CLARTY	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	3.4	3.4						R.B.																														Rock Bit
NC → 2.400	3.4	12.8	9.4		.13				50	2.34	.10	.01	.01			Tr			Tr										Tr	Sp	Tr		Tr		Mz	3.4	?	Mz, Bxx w, Alt, Leached, Frags of Tt (Cont. zone)
	12.8	18.4	5.6		.10				38	2.32	.09	Tr	.01			Tr																							Mz, " " " Cont. Frags Tr. Tr Cuox, + Hem
	18.4	25.8	7.4		.62		.50		56	3.04	.15	.02	.03	.30		.06	.06			Tr						3 60 35				Tr		Tr			Tt	18.4	bx	Tt, leached; Sp clay - tr silicif. Tr CuOx
	25.8	34.2	8.4		.75		.50		91	2.78	.20	.02	.03	.25		.05	.20									10 60 30				Sp			Sp		Hf	33.2	10°	Tt, leached; st lim. w. py(?) bxwork to 33.2, then Hf, sp clay
	34.2	40.8	6.6		.13	St.9 @	.04	St.9 @	90	2.68	.04	Tr	.01	.04		Tr	.04									15 15 55						15						Hf, patches clay - jaro - silicif. Tr CuOx; 3" Mz at 35.9
	40.8	50.0	9.2		.72	.59	.52	.43	71	3.18	.12	.02	.03	.35			.20									15 40 35						10			Tt	45.7	brkn	Hf, sp clay - jaro to 45.7, then Tt, sp silicif
	50.0	60.2	10.2		.57		.43		82	2.47	.10	.01	.02	.30		Tr	.14					Tr				15 40 35						10						Tt, leached areas; tr chlor - clay. Patches Hf
	60.2	70.3	10.1		.62		.48		76	2.51	.16	Tr	.02	.30			.14									20 20 55						5			Hf	60.2	brkn	Hf, leached; sp clay - chlor. Calcite filled cavity at 63.5 for 2.5'
	70.3	78.2	7.9		.24		.19		67	2.33	.08	.01	.02	.08		Tr	.05									10 10 60						Sp			Mz	77.5	brkn	Hf, leached; mod chlor. to 77.5, then Mz; sp clay
	78.2	87.8	9.6		.13		.08		52	2.56	.06	.01	.01	Tr		.04	.01									Tr		Tr					Tr						Mz; leached; mod clay alt. Tr "live lim"
	87.8	93.3	5.5		.09		.09		62	2.55	.09	Tr	Tr			Tr															Tr		Tr		Tr					Mz; leached, mod - st clay
	93.3	100.0	6.7		.45		.44		59	2.59	.40	.01	.03	Tr		.01														Sp	Sp								Mz; leached, sp clay, ggy areas. Sp CuOx
NX → 1.875	100.0	109.9	9.9		.07		.07		74	2.55	.06	Tr	.01			.02														Tr	Tr								Mz; leached, sp clay
	109.9	118.2	8.3		.08				78	2.54	.05		.01			.02														Sp									Mz; leached; sp clay; Tr suls
	118.2	127.8	9.6		.29				90	2.55	.26		.01	.02		Tr																							Mz; as above Sp CuOx, Tr suls
	127.8	138.3	10.5		.20				93	2.57	.18	.01	.01																										Mz, as above
	138.3	145.0	6.7		.13				75	2.53	.12	Tr	.01																			Tr	Sp						Mz, " "
	145.0	153.9	8.9		.04				94	2.54	.04		Tr																	Tr									Mz " "
	153.9	159.6	5.7		.07				71	2.57	.06		.01																										Mz, wk alt Tr CuOx Tr suls
	159.6	168.6	9.0		.13				58	2.56	.12		.01																										Mz, as above
	168.6	173.2	4.6		.12				43	2.61	.12		Tr																	Sp			Tr						Mz, as above
	173.2	183.5	10.3		.05				76	2.55	.03					.02																Tr						Mz, leached; sp clay, Tr CuOx
	183.5	192.8	9.3		.08				85	2.55	.03					.05				Tr																		Mz, leached, sp clay - silicif. Tr CuOx
	192.8	200.5	7.7		.04				98	2.61	.03					.01																						Mz, wk alt. Tr CuOx
	200.5	208.1	7.6		.04				72	2.62	.03					.01														Tr									Mz, as above
	208.1	213.1	5.0		.09				93	2.60	.06					.03																							Mz, " "
	213.1	222.3	9.2		.17				84	2.51	.14					.03														Sp									Mz; " "
	222.3	232.9	10.6		.10				69	2.60	.04					.06																							Mz, " " Patches high biotite or silica
	232.9	243.4	10.5		.07				90	2.61	.05					.05														Tr									Mz; wk alt Tr CuOx, suls
	243.4	253.2	9.8		.09				86	2.60	.04					.05																							Mz; as above.
	253.2	261.2	8.0		.06				88	2.61	.03					.03																							Mz; " "
	261.2	267.0	5.8		.09				54	2.61	.04					.05														Sp									Mz, sp clay Tr CuOx, suls
	267.0	274.6	7.6		.13				74	2.57	.07					.06																							Mz; as above Jaro alt of fspar. along shears
	274.6	281.6	7.0		.13				53	2.57	.07					.06														5									Mz, brkn, ggy, Mod Clay, Tr ser, sp. CuOx, Tr Jaro
	281.6	292.2	10.6		.13				46	2.50	.07					.06														10									Mz as above
	292.2	300.8	8.6		.06				92	2.55	.03					.03														5	Sp								Mz, brkn, Alt, Leached, sp qtz vns, Tr CuOx
	300.8	309.2	8.4		.06				69	2.53	.03					.03														5	Tr								Mz; as above, no qtz vns
	309.2	315.7	6.5		.07				98	2.56	.03					.04														Sp									Mz; Brkn, Alt, Leached, Tr Jaro, wk CuOx
	315.7	320.6	4.9		.08				54	2.52	.04					.04														5									Mz; as above
							NG Rec =		79%																														
					End of Hole																																		

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-128
Page 1 of 1 Pages
Collar Elev. 2940.67 Final Depth 500.0
Coords N 37,544.18 E 19,199.19
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 9-19-62 Finish 10-1-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	Jarosite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	7.8	7.8						RB																														
7.8	17.0	9.2		.77		.69		90	2.60	.22	.01	.01	.47			.08		Sp	Tr							5	40	30		10	Sp	Tr	5		Tt	7.8	?	Tt, leached, St gar. patches Hf, ar calc, Mod silic
17.0	27.3	10.3		1.19		1.05		87	2.57	.25	.02	.02	.78		.03	.11		Sp								5	60	20		5			10					Tt, " " " " , Tr sulf
27.3	37.4	10.1		1.08		1.05		87	3.04	.25	.01	.01	.78			.03					Tr					5	60	20		5		5	5					Tt, dense, sp sulf as pitch covered veins, sp Cu ox
37.4	47.8	10.4		.85		.76		81	3.26	.58	.01	.01	.16		.01	.08										Sp	60	25		5	Tr	5	5					Tt, dense, leached, Mod Cu ox, Tr sulf
47.8	58.0	10.2		1.54	1.42 / 1.70	1.40	1.37 / 1.95	43	3.21	.97	.02	.01	.40		.04	.15										5	42	48		Sp		5	5					Tt, as above, patches Hf, Sp - Mod Cu ox
56.0	66.7	8.7		.66		.30		57	2.70	.17	.01	.02	.10		.04	.32										5	45	40				5	5					Tt, as above, Mod silic
66.7	74.0	7.3		.60	1.23 / 2	.42	1.22 / 2	65	2.61	.28	.01	.01	.12		Tr	.18		Tr								5	60	20		Tr		10	5					Tt, dense, siliceous, leached
74.0	80.3	6.3		2.87		2.57		87	2.42	1.60	.03	.04	1.50		Tr	.30		Sp								10	40	35		Sp		10	5					Tt, leached, vuggy, brkn, Mod Cu ox, Tr sul
80.3	88.8	8.5		.87	.98	.75	.84	36	2.71	.30	.02	.03	.40		.01	.11										5	45	35		Tr		10	5					Tt, dense, siliceous, leached
88.8	98.0	9.2		.94		.86		76	2.52	.45	Tr	.01	.40		.05	.08										5	30	20	Sp	5		5	5		Mz	95.0	brkn	Tt, leached, St lim. to 95.0, then Mz, Alt, leached
98.0	107.0	9.0		.55		.46		83	2.50	.42		.01	.03		.09															15		Tr	Sp	Tr					Mz, leached, Alt, brkn, Mod silica
107.0	116.9	9.9		.96	1.20 / 1.6	.84	1.20 / .56	82	2.50	.80		.01	.03		.12															20								Mz, St Alt, Mod leached, (Contact zone?), Mod Cu ox
116.9	123.6	6.7		.53		.45		76	2.94	.40		.01	.04		.08															15								Mz, as above
123.6	131.0	7.4		.49		.33		81	2.50	.25		.01	.06		.16															15								Mz, " "
131.0	140.5	9.5		.13				49	2.40	.13		Tr			Tr															15		Tr						Mz; Sp clay-silicif Tr Cu Ox
140.5	150.8	10.3		.24				81	2.56	.22					.02															10								Mz, as above
150.8	159.7	8.9		.17				95	2.57	.15					.02															10		Sp						Mz, " "
159.7	168.2	8.5		.19				76	2.58	.19					Tr															5		5						Mz, " "
168.2	178.2	10.0		.35				85	2.41	.28					.02															10		Sp						Mz, " "
178.2	188.1	9.9		.20				84	2.51	.20					Tr															10								Mz, mod clay - sp silicif Tr Cu Ox
188.1	191.7	3.6		.17				90	2.56	.15					.02															10		Tr						Mz, sp silicif Tr Cu Ox
191.7	201.7	10.0		.15				81	2.57	.12	Tr				.03															5		Sp						Mz, sp clay - jarosite alt Tr Cu Ox
201.7	211.0	9.3		.16				84	2.57	.13					.03			Tr												5		Tr						Mz, sp clay - silicif Tr Cu Ox
211.0	221.3	10.3		.25				52	2.54	.21					.04															5								Mz, brkn, leached, sp clay - silicif Tr Cu Ox
221.3	232.2	10.9		.22				96	2.58	.10					.12															5								Mz, leached, sp clay - silicif
232.2	239.5	7.3		.16				85	2.53	.10	.01				.05															5								Mz, as above
239.5	248.6	9.1		.19				90	2.56	.10	Tr		.03		.06															Sp								Mz, " "
248.6	253.5	4.9		.19				98	2.59	.15					.04																	Tr						Mz, " "
253.5	264.2	10.7		.23				79	2.60	.17					.06																							Mz, " "
264.2	273.5	9.3		.22				90	2.53	.18					.04																		5					Mz, " "
273.5	282.4	8.9		.11				95	2.45	.08				Tr	.03																		Sp					Mz, " "
282.4	291.4	9.0		.25				91	2.57	.23					.02																							Mz, " "
291.4	298.6	7.2		.34				86	2.57	.26	.02	.03			.03																	Tr						Mz, " "
298.6	308.2	9.6		.20				84	2.56	.14	.01	.02			.03																							Mz, " "
308.2	319.4	11.2		.37				77	2.53	.34	Tr	.01			.04															20								Mz, as above to 317.0, then int clay alt Mz sand
319.4	330.0	10.6		.12				68	2.47	.10	.01	.01			.02															15								Mz, as above to 327, then mod clay alt
330.0	338.4	8.4		.38				80	2.83	.08	.01	.01	.03		Tr	.25					Tr				Tr	Sp	10	75		5	Tr	10			Hf	330.0	brkn	Mz, mod clay - lim to 333.0, then Hf, st chlor Tr suls, bur
338.4	345.6	7.2		.38				74	2.98	Tr					.23	.15										5	10	70		5		10	Sp		Mz	344.0	brkn	Hf, st chlor Tr suls, Tr cal veing to 344, then Mz mod clay chlo
345.6	354.3	8.7		.10				95	2.58						.02	.08										Tr			Tr	Sp		Tr	Tr					Mz, mod clay w tr Cu Ox Sp chlor, Tr suls
354.3	363.4	9.1		.06				86	2.67							.06														5								Mz, mod clay Tr silicif Patches mod chlor Tr suls
363.4	374.1	10.7		.12				91	2.61							.12														Sp								Mz, mod clay Tr silicif - ser Tr epidote Tr suls
374.1	384.7	10.6		.15				70	2.55							.15														Tr								Mz, as above
384.7	393.8	9.1		.12				100	2.58					Tr		.12																						Mz, mod clay - ser alt Tr suls
393.8	401.6	7.8		.27		.01		100	2.47							.27										5	20	50				25			Hf	393.8	brkn	Hf, mod chlor, Complexly intruded + bx by Mz Patches silicif Sp suls

UC → 2400

MX → 2485

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-126
Page 2 of 2 Pages

Collar Elev 2940.67 Final Depth 500.0
Coords. N 37,544.18 E 19,199.19
Inclination Vert
Logged by SHA - CWH - FTG
Date: Start 9-19-62 Finish 10-1-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	Trce Dip	Remarks
401.6	410.6	9.0		.59	13.4	.05	18.4	95	2.77							.59			Tr		Tr				S	10	13		Tr	Tr	10	Tr		Tt	4040	grad	Hf, st chlor-silicif to 4040, then Tt, st silicif Patches st chlor, suls
410.6	420.0	9.4		.46	.52	.05	.05	97	2.62							.46									Sp	S	20				5			Mz	4130	70°	Tt, mod chlor-silicif to 4130, then Mz, st silicif Tr suls
420.0	424.7	4.7		.20		.01		94	2.64							.20								Tr				Tr	Sp		5			Mz			Mz, int silicif Remnant incl Mafic patches
424.2	431.5	6.8		.14				78	2.56							.14									Sp				S		10			Mz			Mz, st clay-silicif Rk whitish Sp calcite veining (alt?)
431.5	441.1	9.6		.23				89	2.65							.23													S		10			Mz			Mz, as above, Vague Dp Text
441.1	449.9	8.8		.19				97	2.64							.19													Tr		30			Mz			Mz, intense silicification, cont st Dp Text
449.9	459.3	9.4		.15				97	2.64							.15															25			Dp	449.9	?	Dp, " " " " gtz veins, Vague Tr, Mafics
459.3	468.1	8.8		.12				87	2.63							.12								Tr							30						Dp, cont, intense silicification, sp suls, Tr Moly
468.1	477.4	9.3		.14				95	2.64							.14															30						Dp, Alt, intense SiO_2, sp py
477.4	486.6	9.2		.21				84	2.62							.21				Tr											35						Dp. " "
486.6	497.0	10.4		.29				75	2.65							.29															15						Dp, decr in SiO_2, cont Alt, Tr py
497.0	500.0	3.0		.15				85	2.64							.15															10						Dp as above
						AVG REC =		82%																													
				End of Hole																																	

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows:
Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Stong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-127
Page 1 of 2 Page
Collar Elev. 3691.15 Final Depth 400.7
Coords N 32,101.18 E 19,200.30
Inclination Vert
Logged by SBA, ETG, CWH
Date: Start 9-25-62 Finish 10-5-62

	Depth From	Depth To	Int'vl	Elev	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pyrch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	11.8	11.8						88																														
NC → 2.400	11.8	21.0	9.2		.72	.20.8	.58	.20.8	22	2.76	.38	.01	.01	.18		.02	.12		Tr	Tr						5	15	60	Tr	10	Tr	5	5		Tt	11.8	?	Tt, Brkn, leached, ggy, sp-Mod chox
	21.0	32.6	11.6		.43	.56	.37	.46	18	2.52	.20	.01	.01	.15		.04	.02									Tr	Tr			10	Sp	5	5		Mz	21.0	?	Mz, " " " " " Tr chox, Tr Sel
	32.6	39.4	6.8		.16		.15		36	2.66	.10	.01	.01	.03			.01									5	30	55		5		5	Sp		Tt	32.6	?	Tt, dense, st silica, Tr chox
	39.4	49.2	9.8		.38		.28		45	2.61	.20	.01	.01	.06		Tr	.04									Sp	20	50		25	Tr	5						Tt, Brkn, ggy, (fine ggy), st lim, Sp-chox
	49.2	60.0	10.8		.36		.32		82	2.41	.25	.01	.01	.05		.01	.03			Tr						Sp	18	30	Tr	20			5		Mz	55.7	brkn	Tt, as above To 55.7, Then Mz, ggy brkn, st lim, Tr Sel
	60.0	70.0	10.0		.28		.27		69	2.59	.22	.01	.01	.03			.01									Tr				5			Tr		Mz			Mz, brkn, ggy, leached, Tr Sel, chox
	70.0	76.6	6.6		.38				84	2.58	.15	Tr	Tr	.15			.02									5	20	65		5		Sp	5		Tt	74.4	brkn	Mz, as above To 74.4 Then Tt, leached, sp-mod chox
	76.6	81.6	5.0		.32				100	2.51	.19	.01	.01	.06			.05		Sp			Tr				5	25	60		5			5					Tt, dense, st lim, mod Pyrite, sp chox, Tr chlor, Tr Hem
	81.6	91.6	10.0		.35		.25		89	2.73	.13	.01	.01	.10		.02	.08		Tr							10	25	50		10			5					Tt, as above
	91.6	101.2	9.6		.94	31.2	.90	31.2	86	2.54	.48	.01	.01	.40		.03	.01					Tr				5	20	55		10		5	5					Tt, " "
	101.2	111.3	10.1		.42		.36		94	2.44	.24	.01	.01	.10		.03	.03									5	20	55		10		5	5					Tt, " " Tr Sulf, Patch Hf
	111.3	113.7	2.4		1.23	.64	1.04	.56	100	2.41	.48	.01	.03	.60			.19					Tr				5	30	55		5		5	Sp					Tt, as above
	113.7	123.3	9.6		.41		.32		91	2.60	.12	.01	Tr	.19			.09									40	20	15		20		Tr	5		Mb	119.5	20°	Tt (bx) sp hem-clay w. incr chlor, Mb to 119.5, then Mb; tr CuOx
	123.3	133.5	10.2		.31		.20		92	2.64	.05	Tr	Tr	.15			.11		Sp							40	20	15		20			5					Mb, leached, sp clay Sp Hf w. st. clay Incr clay - chlor
	133.5	142.0	8.5		.36		.01		100	2.55							.36				Tr					5	15	75		Tr			5		Hf	133.5	grad	Hf, sp chy - chlor Mod cal veining. Veins + blebs suls
	142.0	150.7	8.7		1.37		.01		72	2.70							1.37									10	15	70					5					Hf, mod chlor Patches hem - clay Mod suls.
	150.7	153.3	2.6		.10		.01		91	2.83							.10									10	10	70		Sp			10					Hf, mod clay - chlor alt Sp suls
	153.3	157.1	3.8		2.19		.01		90	2.83							2.19					Tr				10	5	65		10			10					Hf, " " " " Mod suls
Bx → 1.432	157.1	167.9	10.8		.94		.05		75	2.96							.94									10	5	70		10			5					Hf, " " " " " "
	167.9	176.0	8.1		1.64		.07		78	2.51							1.64			S		Tr				5	10	75		Tr			5					Hf, as above
	176.0	181.1	5.1		1.79		.06		52	3.23							1.79									5	10	75					5					Hf, Mod chlor, Mod suls, patches Tt
	181.1	190.0	8.9		1.41		.05		32	3.31							1.41		Sp							5	50	45					Sp		Tt	181.1	brkn	Tt, Brkn, ST gar, Mod suls sp chlor,
	190.0	199.3	9.3		1.69		.06		73	3.03							1.69			Tr	Tr					5	50	40					5					Tt, ST gar, Mod cpy + py, " " sp sal units
	199.3	208.6	9.3		.61		.24		80	2.95							.61									5	40	45					10					Tt, as above, incr in silica
	208.6	218.1	9.5		.44	20.13	.04	202.3	98	2.63							.44					Tr				5	30	45					20					Tt, dense, Silicious, decr in suls, sp chlor
	218.1	228.3	10.2		2.43	.129	.03	.03	90	3.25							2.43									5	25	50					20					Tt, ST gar, Mod cpy, sp chlor
	228.3	237.7	9.4		1.69		.03		98	2.58							1.69									10	10	70					10		Hf	228.3	grad	Hf, ST cpy, Mod chlor, sp sal units, patches Tt
	237.7	247.8	10.1		1.65		.03		88	2.91							1.66									10	40	26		20			5		Tt	237.7		Tt, ST gar sand, Mod cpy, sp color
	247.8	257.4	9.6		.66		.04		100	2.40							.66									10	20	65		Tr			5					Tt, patches Hf, Mod cpy, Mod chlor
	257.4	266.8	9.4		2.62		.03		98	3.01							2.62		Sp							10	70	70					10		Hf	258.4	grad	Tt, as above To 258.4 Then Hf, Mod cpy, chlor
	266.8	276.3	9.5		1.11		.03		100	2.82							1.11		Tr							10	30	55					5		Tt	266.8	" "	Tt, Sp cpy, Mod gar, Mod chlor
	276.3	286.4	10.1		1.34		.03		85	3.02							1.34							Tr	Tr	10	35	40		Sp	Tr		5					Tt, ST gar, Mod - St cpy + py
	286.4	296.6	10.2		.98		.01		100	2.50							.98							Sp		10	40	40					Sp					Tt, ST gar, Mod cpy + py
	296.6	305.3	8.7		.40		.02		95	3.36							.40					Tr		Tr		10	50	30					10					Tt, as above, patches Hf
	305.3	315.0	9.7		.62		.05		92	3.00							.62									10	50	30					5					Tt, ST gar, Sp cc, py
	315.0	324.5	9.5		1.63		.02		88	3.30							1.63									5	40	30				Tr	5					Tt, Mod gar, Sp cc, py, Mod Silica
	324.5	334.3	9.8		1.21		.03		99	2.60							1.21									Sp	30	20	Tr			Sp	5					Tt, as above, Tr Hem. Patches Mz
	334.3	344.3	10.0		1.20		.02		93	2.83							1.20									5	35	20					5		Dp	337.0	brkn	Tt, Mod gar, St SiO_2 To 337.0 Then Dp, Mod cpy + py, Alt
	344.3	351.4	7.1		.25		.02		76	2.59							.25															5	Tr					Dp, Alt, Mod gr veining, sp cpy · Py
	351.4	358.3	6.9		.10				91	2.60							.10													Tr		Sp						Dp, as above
	358.3	367.0	8.7		.15				98	2.65							.15																					Dp " "
	367.0	377.8	10.8		.10				88	2.63							.10																		Mz	376.4	brkn	Dp " " To 376.4 Then Mz, Alt, Tr Suls
	377.8	387.2	9.4		.13				93	2.62							.13																					Mz, Alt, Silicified, Tr cpy
	387.2	393.5	6.3		.16				94	2.62							.16																					Mz, " " " Tr Dp, Suls

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows:
Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-127
Page 2 of 2 Pages
Collar Elev. 3091.15 Final Depth 400.7
Coords. N 21,101.18 E 19,200.30
Inclination Vert
Logged by SRA, FTB, CWH
Date: Start 9-25-62 Finish 10-5-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
393.5	400.7	7.2		16				78	2.65										Tr						Tr				Tr	Tr	Tr	Tr					Mz; sp clay - silicif, Tr suls
						Av Rec =		82%																													
					END	OF	HOLE																														

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral % or, as follows: Trace (Tr) Sparce (Sp) < 2% Moderate (Mod) 2-50% Strong (St) +50%

Note (3): Tf - Toelite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Do - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-118
Page 1 of 2 Pages
Collar Elev. 3903.76 Final Depth 232.3
Coords N. 33,903.24 E. 19,998.49
Inclination Vert
Logged by SAA, RTG, GWH
Date Start 10-27-82 Finish 10-27-82

	Int. Depth From	To	Int'vl	Elev.	% Cu Total	Avg	NS	Avg	% Core Recov	Sp. Gr.	Cu (1) Chryc	Pitch	Black	Blue Green		Cu	Cpy	Bore	Fe (2) Lim	Hy	Mag	Hem. Spec.	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Mn Ox	Quartz	Chlorite	Jarosite	(3) Rock Type	Structures (4) Depth	Type Dip	Remarks
	0.0	12.0	12.0						88																													Rock Cut
HF	12.0	18.3	6.3		.44		.67		59	2.23	.26	Tr	.01			.17			Sp	Tr	Tr							Sp	15	Tr		Tr		Dp	12.0	?	Dp, leached, Alt, Brkn, sp. silica, Mod lim
	18.3	26.8	8.5		.27		.21		54	2.37	.20	1	.01			.06													10								Dp, as above
	26.8	36.9	10.1		.17				82	2.33	.11	1	.01			.05												Tr	20								Dp, brkn, ggy, leached, Alt, Tr cuox
	36.9	42.6	5.7		.14				18	2.40	.11	1	Tr			.03													15								Dp, as above, Mod lim lim
	42.6	49.3	6.7		.17		.04		62	2.41	.04					.13													10								Dp, " " "
	49.3	57.6	8.3		.22		.02		88	2.53						.82								Tr				Sp	15								Dp, st Alt, brkn ggy, gtz veing, sp-Mod cc
	57.6	68.2	10.6		.23		.05		74	2.53						.23													20								Dp, as above, cont. cc, patches with Mz Text
	68.2	78.3	10.1		.65		.01		83	2.57						.65													30					Mz	68.2	gsy	Mz, brkn, ggy, st. Alt, sp cc
	78.3	87.4	9.1		.77	1.33 @	.01	1.33 @	90	2.55						.77			Tr										25			5		Dp	91.4	brkn	Mz; as above, Bx zone, 87.4 - 91.4', sp. suls, Dp at 91.4
	87.4	95.8	8.4		.76	0.70	.01	.04	83	2.59						.76													30			5					Dp, st. Alt, ggy, sp. cc, py
	95.8	104.4	8.6		.54		.01		84	2.57						.54													20			SP					Dp, as above, patches st Feldspath, sp cc
	104.4	114.0	9.6		.49		.09		86	2.59						.49													25								Dp, st alt. Possib patches of Mz Tr cc
	114.0	122.6	8.6		.47		.08		90	2.58						.47			Tr										25				Tr				Dp, brkn; st clay alt Tr cc
	122.6	132.5	9.9		.21		.09		89	2.63						.21													10					Mz	130.0	brkn	Dp, as above, to 130.0, then Mz; st alt Tr suls
	132.5	140.0	7.5		.04				97	2.61						.04												Tr	Sp								Mz; mod clay - sp silicif. Sp suls
	140.0	150.5	10.5		.02				92	2.63						.02													5								Mz; as above
	150.5	160.0	9.5		.12				91	2.58						.12													15								Mz; brkn, st clay alt - patches silicif Sp suls
	160.0	168.4	8.4		.18				91	2.58						.18													10								Mz; st clay alt. Patches sp. jaro. Tr suls.
	168.4	179.1	10.7		.20				76	2.57	.02		Tr			.02			Tr					Tr	10				15					Hf	178.0	brkn	Mz, mod clay, patches st feldspath to 178.0, then Hf, st clay
	179.1	185.9	6.8		.70	1.86 @	.25	1.86 @	54	2.67	.15		1			.10			.35	.10					Sp	Tr	60		10			10					Hf, st clay - chlor. Decr. chlor. Tr CuOx
	185.9	191.0	5.1		.40		.14		100	2.46	.10			.01		.03			.15	.11					5	15	55		10		5	SP	SP				Hf, mod clay alt Tr suls - CuOx. Tr Tf
	191.0	197.7	6.7		.85	.67	.35	.26	92	2.46	.15			.01		.19			.15	.35					10	15	60		10		5						Hf, Alt, leached, Tr suls (c.c.), cuox, ggy, sp chlor
	197.7	207.9	10.2		.26				97	2.98										.26					Tr	10	25	60		SP	SP		SP					Hf, Alt, sp silica, Tr chlor, sp cpy, Tr Tf.
	207.9	212.3	4.4		.10		.04		97	2.75	Tr			.01		.03				.06						10	20	60		Tr	Tr		5					Hf, to 199.0' then Bx - fresh Mz, dp, gtz (?) frags (rounded) in sp. pale gray silicious matrix, sp cpy
	212.3	217.5	5.2																																			No Core Old Stope
	217.5	226.6	9.1		.28		.10		51	2.71	.10				Tr			.05		.13		Tr	Tr					Tr	5	15	60		Sp	Tr		5			Hf, silicious, Tr chlor, Tr suls
	226.6	236.0	9.4		.66		.07		100	2.90					1		Cu	.06		.60									10	25	50					5			Hf, patches Tf, sp calc veing, sp cpy + cc
	236.0	245.7	9.7		.60		.32		100	2.55	.15			Tr	1		.22	.05		.18									10	40	25			10	Sp	Tf	236.0	grad	Tr, Alt, wk leached, Tr Hf, sp cpy, sp native Cu at 244.0.
	245.7	254.5	8.8		.69		.11		55	2.73	.08			1		.03				.58									5	45	30			5					Tr, Alt, lk " " , sp cc, Tr cpy
	254.5	264.6	10.1		.57		.06		69	2.96										.57									5	45	20			20					Tf, dense, silicious, Tr suls
	264.6	271.9	7.3		.31	.91.5 @	.07	.91.5 @	96	3.15										.31									10	50	15			15					Tf, as above
	271.9	278.8	6.9		.74		.04		98	2.86										.74									10	40	35			10					Tf, sp cpy, Tr chlor, st silica
	278.8	283.0	4.2		.58	.55	.04	.09	84	2.93										.58									10	15	65			SP		Hf	280.4	grad	Tf, as above to 280.4', then Hf, sp suls, Mod chlor.
	283.0	292.5	9.5		.25		.05		97	2.56										.25				Tr	Tr				10	20	60					5			Hf, mod clay - chlor. Sp suls. Mod Mb
	292.5	302.2	9.7		.59		.07		97	2.61										.59									15	15	60					8			Hf, mod chlor - clay. Patches st suls - chlor. Patches Mb
	302.2	308.5	6.3		.38		.06		69	3.11										.38									10	25	50					8			Hf, mod chlor - suls. Patches gar - clay.
	308.5	318.1	9.6		.62		.06		98	2.75										.62									10	30	50					8	Tf	313.6	20°	Hf, mod chlor - clay - suls to 313.6, then Tf; sp clay w. chlor blebs
	318.1	327.8	9.7		.07		.05		100	2.75										.07									15	35	40					10	Hf	323.0	brkn	Tf, sp clay - wk gar to 323.0, then Hf, st chlor. Tr suls.
	327.8	337.5	9.7		.18		.05		98	2.73										.18									10	20	50					15			Hf, st chlor. Mod Mb Tr suls
	337.5	345.2	7.2		.59	1.62 @	.10	1.62 @	91	2.86										.59									10	10	50					30			Hf, mod chlor - clay - suls, incr to int chlor w. Hf bx.
	345.2	353.2	8.0		.79	.69	.08	.09	75	3.30										.79					Tr	Tr	15	20	45					20	Tf	350.5	brkn	Hf, bx ? zone w. st chlor - clay - suls to 350.5, then Tf, st gar
	353.2	362.0	8.3		.05				97	2.63										.05									5	5	15	Tr			5	Sp	Hf,	353.7	brkn	Hf, int chlor to 355.0, then Mz; mod clay alt. Tr suls
																																			Mz	355.0	brkn	

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif Igneous

Hole No. 0-128
Page 2 of 2 Pages
Collar Elev. 2903.76 Final Depth 733.3
Coords. N 37,493.24 E 19,798.49
Inclination VERT
Logged by SAA, FTG, CWH
Date: Start 10-2-62 Finish 10-17-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
362.0	373.0	11.0		.03				96	2.66							.03			Tr							Tr			Tr	SP	Tr	SP	5					Mz, sp clay alt. Tr suls. 1.5' bx w gn-sl Chlor matrix.
373.0	378.0	5.0		.03				82	2.60							.03											Tr	SP					5					Mz, sp clay alt. Tr suls. Mod feldspath
378.0	384.2	6.2		.08				100	2.61							.13										5	5	60				5	10		HF	378.5	30RH	Mz, To 378.5', then Hf, Tr suls Mod chlor
384.2	393.8	9.6		.06				95	3.05							.06							Tr	30		10	30	45				Tr	10		Tt	384.2	30rd	Tt, dense, Mod cpy + sphal, sp chlor, Tr Pb
393.8	403.5	9.7		.31				95	3.26							.31								20		10	30	40					10					Tt, as above
403.5	413.2	9.7		.31				95	3.07							.31								30		10	25	50	Tr				10		Mz	412.0	75°	Tt, " " To 412.0 then Mz, Mod Feldspath
413.2	423.2	10.0		.02				90	2.65							.02										Tr							Tr					Mz, fresh, Euhedral Feldspars, Pink, Tr suls
423.2	433.2	10.0		.02				90	2.64							.02													Tr									Mz, as above, "Thumb Nail" sized + shaped pink Felds
433.2	441.8	8.6		.09				100	2.65							.09													Tr			SP						Mz, as above " "
441.8	448.0	6.2		.20				100	2.61							.20										SP	50	15		Tr		20			Tt	441.8	brkn	Tt, sp clay, mod gar layered w siliceous rk Tr suls
448.0	455.0	7.0		.06				87	3.31							.06											50	10				25						Tt, sp banding w siliceous rk, grading to st gar Tr suls.
455.0	462.6	7.6		.19				100	2.67							.19					Tr			Tr			20	15				5	5					Tt, sp chlor - silicif Tr suls
462.6	468.5	5.9		.12				85	3.03							.12											20	15				5	5					Tt, mod silicif Tr suls
468.5	476.6	8.1		.45	16.3' @	.24	16.3' @	89	2.83							.45							Tr	Tr			50	10			SP	15	5					Tt, st silicif Sp. 2nd Fspar Poss.b Tr Mz w. st. silicif.
476.6	484.8	8.2		.44	.44	.21	.02	87	3.19							.44					Tr						60	20		SP	Tr	Tr	5					Tt, as above grad to st gar. Sp Cu-Zn.
484.8	494.2	9.4		.19				85	3.04							.19											50	20				15	SP					Tt, patches sp clay Sp silicif Tr suls
494.2	497.5	3.3		.06				100	2.91							.06											50	20				15						Tt sp silicif Tr suls
497.5	507.6	10.1		.23				83	3.11							.25											60	20				10						Tt, sp clay - silicif Tr suls
507.6	516.3	8.7		.27				70	2.56							.27											40	25				25	5					Tt, st silicif Patches possib Mz - Mz bx Mod suls.
516.3	525.5	9.2		.92		.04		89	2.90							.92			SP	Tr					Tr		5	15	30			SP	10					Tt, sp clay, mod Hf, grad to mod gar w mod suls.
525.5	533.7	8.2		.19				100	2.82							.19			Tr								5	30	20		SP	25	5					Tt, sp silicif grad to st silicif w mod siliceous rk Tr feldspath
533.7	543.4	9.7		.19				89	2.77							.19											10	30	15			25	5					Tt, st silicif. Patches st siliceous rk (Siltst ?) Sp Siltst
543.4	547.5	4.1		.26				98	2.91							.26											10	45	20			20	5					Tt, st gar Patches Siltst Siliceous rk probably bleached Siltst.
547.5	555.7	8.2		.23				100	2.64							.23											10	20	20			35	5					Tt, wk gar Mod Siltst Patches possib feldspath Tr suls
555.7	564.0	8.3		.36		Tr		43	2.59	Tr						.36											SP	20	20			40	5		Bx	555.7	Grad.	Bx w/ [illegible] (Tt & Siltst & [illegible]) & [illegible] st. [illegible] [illegible] [illegible] Shows [illegible] Sp [illegible], Cpy, [illegible] [illegible] & end.
564.0	572.7	8.7		.55		Tr		51	2.55							.55			Tr				Tr				SP	20	35			30	10					As above but w/ a more [illegible] (Mz ?) [illegible] Flt [illegible] & start
572.7	580.2	7.5		.27				97	2.65							.27											5	20	35			25	10					Bx, frags of Siltst, qtz w vague Mz set in silicified matrix
580.2	588.4	8.2		.22				82	3.15							.22										Tr	5	45	30			5	10		Tt	580.2		Tt, st gar Sp clay - chlor Tr suls Sp Siltst
588.4	597.7	9.3		.19				100	2.64							.19					Tr						5	55	20			5	5					Tt, st gar Tr suls ? ft patch Siltst w bleaching on walls
597.7	606.6	8.9		.19				99	2.82							.19											5	55	20			SP	10					Tt, st gar Tr suls Tr Tt bx along qtz veins
606.6	615.0	8.4		.26				94	3.32							.26							Tr	Tr			5	60	25				10					Tt, sp silicif Tr suls Tr Siltst. Incr Hf
615.0	624.8	9.8		.28		.03		100	2.63							.28											5	50	15			20	5					Tt, sp silicif Tr suls Mod Hf. Patches mixed Tt - Siltst
624.8	634.4	9.6		1.76		.02		82	3.07							1.76									Tr		5	30	40			20	5		Hf	624.8	grad	Hf, sp clay - chlor, Tr suls, grad to mod silicif - st suls Tr Tt.
634.4	641.7	7.3		.30		.01		98	2.76							.30											SP	10	40			35	5		Qtzte?	636.5	grad	Hf, st silicif Tr suls to 636.5, then Qtzte, wk silicif Siltst?
641.7	650.9	9.2		.10				85	2.78							.10									Tr	Tr	Tr					95	Tr					Qtzte, vague ghosts of Siltst? Tr suls
650.9	660.4	9.5		.13				86	2.64							.13								Tr								95						Qtzte, as above Patches vague dark banding
660.4	670.0	9.6		.18				88	2.67							.18																95						Qtzte, as above Typical granular texture absent in all Qtzte
670.0	680.5	10.5		.15				85	2.61							.15							Tr	Tr								95						Qtzte, as above Sp suls
680.5	689.9	9.4		.13				89	2.64							.13																95						QTzTe (?) " " This may be intensely silicified Dp. Sp Pb-Sph
689.9	700.2	10.3		.19				88	2.63							.19																95			Dp? Qtzte?	689.9	grad	Dp?, Intense Silica, vague Dp Text, May be Qtzte, Tr Sph, Pb Moly
700.2	710.0	9.8		.22				87	2.71							.22																95						Dp? as above. St Qtz veing
710.0	719.6	9.6		.19				94	2.65							.19																95						Dp?, " " " Intense silicification
719.6	728.8	9.2		.22				98	2.66							.22																95	Tr					Dp? " " " " " Tr Sph
728.8	733.3	4.5		.28				99	2.73							.28																95						Dp? " " " "
			Avg.	of	Hole		Avg.	87%																														

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) +50 %

Note (3):
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-139
Page 1 of 2 Pages
Collar Elev 2933.44 Final Depth 633.0
Coords N 36,980.39 E 19,976.41
Inclination Vert
Logged by SAA, FTG, LWH
Date: Start 10-5-82 Finish 10-29-82

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born.	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	14.0	14.0						Rock	Bit																														Rock Bit
NC 2.400	14.0	24.7	10.7		.24				48	2.53	.04	Tr	Tr			.20			Tr	Tr									Tr	Sp	Tr		Tr	Tr		Dp	14.0	—	Dp; mod clay alt. Tr suls. 6" patch Dp br.
	24.7	35.6	10.9		.08				70	2.60	.02					.06																								Dp, sp clay alt.
	35.6	45.4	9.8		.16				11	2.58	.10					.06																								Dp; st clay alt. leached
	45.4	53.7	8.3		.08				82	2.62	Tr					.08														S		Tr								Dp; dense, siliceous, wk ALT, Mod dk Mg. inclusions, Tr suls
	53.7	60.7	7.0		.05				53	2.62						.05														Sp										Dp. as above
	60.7	68.8	8.1		.02				71	2.65						.02														Tr										Dp, " "
	68.8	77.3	8.5		.05				82	2.64						.05																								Dp; alt mostly bleaching. Sp ang incl. Tr suls.
NX → 1.875	77.3	84.5	7.2		.04				100	2.57						.04									Tr															Dp; as above
	84.5	94.7	10.2		.04				97	2.64						.04									Tr															Dp, partially bleached. Sp ang incl. Tr suls.
	94.7	104.5	9.8		.04				83	2.63						.04																								Dp; incr bleaching. Sp dk incl. Tr. suls
	104.5	114.4	9.9		.03				90	2.64						.03																								Dp, as above, Mod silica
	114.4	120.0	5.6		.02				97	2.60						.02																								Dp, " " "
	120.0	130.1	10.1		.03				54	2.56	.01		Tr			.02			Tr			Tr							Tr	S		SP								Dp, ST ALT, Tr suls
	130.1	139.2	9.1		.02				85	2.53	Tr					.02														Sp				Tr		Mz	130.1	8-KN	Mz, wk. ALT, wk leach, Tr sul
	139.2	147.7	8.5		.04				63	2.55	.01					.03																								Mz, ALT, leached, 8-KN, Tr suls. w crack
	147.7	157.3	9.6		.07				40	2.55	.01					.06											20	10	SP	35						Tt	147.0	33V	Mz, as above To 147.0, 7KN, Tr (Meth sul), leached
	157.3	165.7	8.4		.33				52	3.02	.02			.11		.20			10								50	5		10		SP								Tt, 8-KN, gg, leached, LAST 2 ft BIX gg, st lib & Fe oxides
	165.7	176.0	10.3		.26			.18	37	3.17	.15			.02	.01			.08	5								5	35	30	15			5							1st 2' as above then Tr, beta or lightpeth. Co2O3 & gen Cu To
	176.0	185.3	9.3		.42	36.1'	.19	36.1'	93	2.76	.18			.01	Tr			.15	.08	Tr			Tr		Tr		10	55	25	SP			SP							Tr as above in hem stain @ start, gen CuO & C.C.
	185.3	194.1	8.8		1.34	0	.02	0	90	3.24								.34	1.00							Tr	10	40	40	SP			Tr							Tr, becoming more lime, w/ "reserves" of Sp & spec.
	194.1	203.2	9.1		2.17	1.12	.01	0.06	81	3.14								1.50	.67							41	10	45	40											Tr w Sp-wk spha, sp spy.
	203.2	212.7	9.5		.58		.03		93	3.25								.40	.18							41	10	20	50				5			Hf	205.9	Grad.	Tr to Hf w grad over gen. greenish CuSiO, wk & less Sp
	212.7	222.0	9.3		.11				100	2.69								.11			Tr					Tr	95	Tr	Tr					Tr		Mb	213.0	Grad.	Hf, & Mb barren. Hf w sep. patches. Mb, white, coarsely Klinc
	222.0	230.1	8.1		.11				98	2.70								.11	Tr								95													Mb, white, coarsely Klinc. A few sulfide (Py) veins
	230.1	240.0	9.9		.07				91	2.70			Tr					.07									95							Tr						Mb, as above. Last ½ leached, vuggy in part
	240.0	249.3	9.3		.09				89	2.70								.09									85						10							Mb, leached, vuggy in part. Several patches of "blue" sulfs
	249.3	255.8	9.5		.01				96	2.69								.01									85		SP				5							Mb, white, coarsely clear, leached, vuggy in part.
	255.8	264.6	5.8		.06				95	2.74								.06									80	5					SP		Tr					Mb as above. Some patches of blue sulfs
	264.6	272.8	8.2		.05				98	2.67			.01					.04									80	10					Tr							Mb, " "
	272.8	282.5	9.7		.03				90	2.69			Tr					.03									95	SP												Mb, " "
	282.5	292.2	9.7		.06				99	2.71								.06									95	Tr												Mb, " "
	292.2	301.4	9.2		.04				98	2.68								.04							Tr		85	5					5							Mb, patches Hf, Tr suls, sp chlor
	301.4	311.6	10.2		.02				89	2.65								.02									80	10					5							Mb; incr in chlor, dk, Tr suls
	311.6	320.9	9.3		.02				96	2.75								.02									45	Tr	35				5							Mb; as above
	320.9	331.4	10.5		.02				86	2.76								.02									50	15	35				10							Mb, Mod patches Hf, Mod chlor, Tr sus
	331.4	337.7	6.3		.03				100	2.75								.03									40	15	30				10							Mb; as above
	337.7	348.6	8.9		.02				100	2.80								.02									50	5	30				10							Mb; st Hf, Mod chlor, Tr suls.
	348.6	358.6	10.0		.01				94	3.01								.01									5	30	50				5			Hf	348.6	grad.	Hf, sp-Mod chlor, Tr suls.
	358.6	368.2	9.6		.27				94	2.78								.27									70	SP	10				10			Mb	358.6	s.i.	Mb; sp chlor, Tr sul as veins
	368.2	377.1	8.9		.35		.06		100	2.66								.35				Tr					60	5	25			Tr	5							Mb, Mod chlor, "Pods" st spy & px
	377.1	386.9	9.8		.67		.06		90	2.89								.67					Tr			Tr	5	5	60				10			Hf	377.1	grad.	Hf, st chlor, Mod sulfs as veins + diss, Tr zn.
	386.9	395.2	8.3		.09		.01		94	3.31								.09									5	35	45				5	SP						Hf, st silicification (SiO2 ST), Tr. Tr, Mb, sp sulfs, Mod chlor
	395.2	404.7	9.5		.69		.02		92	2.70								.69				Tr					70	10	15			Tr				Mb	395.2	"	Mb, "Pods" cpy, Tr zn & Pb, sp chlor
	404.7	414.2	9.5		.49		.03		87	2.95								.49									80	5	5				5							Mb, as above

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Note:
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Note (3)
Ts - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-139
Page 2 of 2 Pages
Collar Elev. 2933.46 Final Depth 693.0
Coords N. 36,189.32 E 19,976.37
Inclination Vert
Logged by SAA, FTG, GWH
Date: Start 10-5-62 Finish 10-25-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Mn Ox	QUARTZ	CHLORITE	GRAPHITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	414.2	423.3	9.1		1.09		.03		100	2.71							1.09			Tr		Tr					35	Tr	SP		SP			SP		Mb			Mb; Sp chlor, Tr sulf, Tr Hem, Tr Tt
	423.3	433.1	9.8		.58		.04		96	2.60							.58										30	10	40		5	Tr	SP			Hf	435.0	grad	Mb; as above, To 435.0' then Hf, Mod chlor, Tr sulf.
	433.1	442.8	9.7		.70		.02		83	2.92							.70		Tr								10	15	60		5			5					Hf, St chlor, Tr Mb & Tt, Sp sulf, Tr Hem, Mod py, Tr [illegible]
	442.8	453.9	11.1		.87		.05		77	2.71							.87										10	15	60		5			10					Hf, St chlor, Mod sulf, Patches Mb
	453.9	460.0	6.1		.50	.69	.02	.03	100	2.68							.50										10	15	60		SP			5					Hf; as above, deer chlor
	460.0	467.6	7.6		.58		.01		94	3.02							.58			SP							10	50	30					SP		Tt	461.8	grad	Hf; as above to 461.8; then Tt, sp clay, sp. sulf.
	467.6	477.9	9.3		2.07		.02		99	2.82							2.07			S					Tr		35	30	20		S			1		Mb	480.5	grad	Tt, as above to 480.5, then Mb; sp clay. St sulf at contact
	477.9	487.6	9.7		.64		.01		90	3.16							.64			SP							70	15	5		SP			1					Mb; sp clay. Sp Tt, sp sulf in pods, rimmed w. grn. gan.
	487.6	497.5	9.9		.63		.03		83	2.73							.63										20	30	35					5		Hf	487.6	grad	Hf, sp clay-chlor. Sp sulf. Patches Tt, Mb
	497.5	506.8	9.3		.41		.02		100	2.69							.41				Tr						15	15	60					5					Hf; sp-clay chlor. Sp sulf. Mod Mb. @ 2" patch clay-sulf.
	506.8	516.3	9.5		.53		.01		92	2.69							.53					Tr					10	10	70					8					Hf; sp clay - mod chlor. Sp sulf. Patches st clay. Sp Tt, Mb
	516.3	521.2	4.9		.50		.03		92	2.69							.50							Tr			15	10	65					10	Tr				Hf; sp clay - mod chlor. Patches st. chlor. Sp sulf.
	521.2	527.9	6.7		.59		.03		91	2.90							.59					Tr					20	5	30		S			20					Hf; as above. Sp chlor - sul banding
	527.9	535.8	7.9		.12				94	2.63							.12							Tr			5	5	60		SP		15	5	Tr				Hf; sp chlor - clay. Mod Sltst w patches possib bx. Sp sulf
	535.8	545.1	9.3		.35				73	3.07							.35										5	10	60				10	10					Hf, mod chlor - sp feldspath. Patches Sltst, Tt. 1.5' st. silicif. Mz.
	545.1	554.6	9.5		.31				89	3.05							.31										5	5	40				10	30					Hf; mod chlor - silicif. Sp cal veining. Sp sulf.
	554.6	564.9	10.3		.23				87	2.94							.23										SP	SP	25				50	15		Sltst	554.6	brkn	Sltst: sp chlor in lt gy Sltst. Sp sul veining. Blebs? possib Dp.
	564.9	572.8	7.9		.03				100	2.64							.03			Tr								Tr	Tr		Tr		90	Tr		Qtzite	564.9	brkn	Qtzite?, tr sulf. Visible remnant sed. text. absent.
BX →	572.8	582.4	9.6		.05				94	2.68							.05										Tr						90						Qtzite; tr sulf. Possib. silicif + bleached Sltst
1.432	582.4	591.7	9.3		.10				100	2.68							.10																95						Qtzite; tr sulf " " " "
	591.7	602.0	10.3		.06				86	2.73							.06							Tr									95						Qtzite; as above. " " " "
	602.0	611.4	9.4		.09				98	2.77							.09																95						QTzite, " "
	611.4	621.0	9.6		.11				92	2.70							.11																95						QTzite, " "
	621.0	631.5	10.5		.05				50	2.66							.05																95						QTzite, vague Dp Text, Tr cpy
	631.5	636.0	4.5		.04				79	2.66							.04																95						QTzite; (Dp?) as above
	636.0	643.9	7.9		.13				91	2.70							.13																95						Qtzite (?) as above
	643.9	653.8	9.9		.23				97	2.69							.23																95						Qtzite; possib silicif. Sltst.
	653.8	662.6	8.8		.11				91	2.62							.11																95						Qtzite, int silica
	662.6	672.1	9.5		.11				81	2.84							.11																95			Dp	662.6	grad?	Dp; int silicif. Possib tr Mz. text. w. remnant fspars.
	672.1	680.0	7.9		.08				90	2.63							.08																90						Dp, as above
	680.0	684.5	4.5		.09				97	2.69							.09																90						Dp; " "
	684.5	693.0	8.5		.07				86	2.73							.07																90						Dp; " "

Av. Rec = 86%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-130
Page 1 of 4 Pages
Collar Elev 2888.97 Final Depth 232.5
Coords. N 37552.14 E 19801.38
Inclination Vert.
Logged by SAA - CWH - FTG
Date: Start 10-17-62 Finish 10-31-62

	Depth From	Depth To	Intvl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	22.0	22.0						Rock	Bit																													Rock Bit
NC 2.400	22.0	29.0	7.0		.16				60	2.55	Tr		Tr			.16			Tr	Tr										SP	Tr		Tr	Tr	Dp	22.0	—	Dp; leached; sp clay alt Tr suls
	29.0	34.2	5.2		.27				71	2.55	.14		Tr			.13														5								Dp; as above
	34.2	43.3	9.1		.26				96	2.57	Tr					.26													Tr	SP								Dp, Leached, Tr Ser, Tr-sp cc., Tr py
	43.3	52.3	9.0		.22				100	2.58						.22																						Dp, as above
	52.3	61.2	8.9		.25				86	2.57						.25																						Dp, " "
	61.2	69.7	8.5		.35		.10		93	2.58	.10		Tr	Tr		.25																						Dp, Mod Ser, Leached on shears, Tr-sp cc, Tr py
	69.7	78.3	8.6		.57		.21		94	2.56	.21					.36	Tr																					Dp, as above, Tr Jara
	78.3	86.1	7.8		.36		.15		91	2.55	.15					.21			SP											10				SP				Dp, Alt, Tr cc, Tr Jara, wk leached, Tr chry
	86.1	95.0	8.9		.37				94	2.57	.12					.25														5				Tr				Dp; Alt, dk Ang inclusions, leached, Tr cc, Jara, chry
	95.0	104.6	9.6		.25				84	2.55	.09					.16														5								Dp; as above
	104.6	114.3	9.7		.21				79	2.62	.07					.14														10								Dp, " "
	114.6	124.0	9.7		.19				83	2.58	.09					.10														5								Dp; " "
	124.0	134.0	10.0		.17				76	2.59	.07					.10														SP								Dp; " "
	134.0	144.2	10.2		.11				63	2.56	.05					.06														5								Dp; " "
	144.2	153.6	9.4		.11				17	2.57	.05					.06														SP								Dp; " "
	153.6	162.1	8.5		.15				73	2.56	.04					.11			Tr											60			SP					Dp; st clay alt w ang. frags Dp. Prob. gouge in flt zone.
	162.1	172.3	10.2		.78		.48		91	1.81	.28			.20		.30														60								Dp, as above, Sp Cuox
	172.3	182.1	9.8		.96	35.9	.48	35.9	74	2.41	.30	Tr		.18		.48			10			Tr					20	10		50					Tt	172.3	ggy	Tt, Leached. ST Alt, ggy, Mod Lim, Sp-Mod Cuox
	182.1	191.5	9.4		1.25	1.05	.52	.52	78	2.45	.14		.01	.37		.63	.10		10							SP	50	10		25		SP	Tr					Tt, Leached, " " Mod Lim, Mod Cuox
	191.5	198.0	6.5		1.31		.62		76	2.57	.12		.01	.49		.59	.10		10								40	20		30								Tt, as above, Sp BLK Cuox, Mod Cuox, Tr Suls
	198.0	206.3	8.3																																				No core, Old stope
	206.3	212.0	5.7		.83		.55	2.43	33	2.52	.10	Tr	.02	.43		.23	.05		5	Tr							Tr	30	20		30		Tr	Tr					Tt, Brkn, ggy, Alt, Mod Lim; sp cuox, Tr suls
	212.0	222.7	10.7		1.13	2.43	.59		43	2.74	.15		.02	.42		.44	.10		10									40	25		20								Tt, as above
	222.7	230.5	7.8		.40	.82	.04	.49	84	2.83						.30	.10										20	5	50		SP			5		Hf	222.7	ggy	Hf, Mod chlor, sp suls, Mod. calc veins
NX → 1.875	230.5	239.6	9.1		.25				74	2.79						.05	.20								Tr		10	20	60		5			Tr					Hf, mod clay Tr suls
	239.6	247.0	7.4		.08				80	2.62							.08			Tr							15	5	60		5	Tr		10					Hf, as above to 242.0, then mod chlor w. cal. veins Sp suls.
	247.0	257.0	10.0		.14				97	2.64							.14				Tr						10	5	50		SP			20					Hf, mod chlor Tr suls Sp mb. Sp veins w. black chlor
	257.0	265.2	8.2		.09				91	2.68							.09				Tr						10	5	40					15					Hf, as above.
	265.2	275.0	9.8		.45		Tr		89	2.77							.45										25	15	50					5					Hf, sp clay, mod Mb. Mod veins w. black chlor Tr suls.
	275.0	282.6	7.6		.11		.04		94	2.70							.11										10	5	75					5					Hf, as above Incr chlor
	282.6	292.4	9.8		.15				100	2.56							.15								Tr	Tr	10	10	70					5					Hf, mod clay- chlor alt Tr suls.
	292.4	302.1	9.7		.24		.05		80	2.96							.24										10	15	60					5					Hf, mod chlor- clay Tr suls.
	302.1	311.4	9.3		.18		.04		94	2.74							.18										10	10	60					10					Hf, as above Sp mb
	311.4	320.9	9.5		.38		.07		97	2.89							.38								Tr		10	15	60					5					Hf, as above Incr Tt
	320.9	328.2	7.3		.19				97	3.19							.19			SP		Tr					10	40	20					20		Tt	320.9	gmd	Tt, sp clay - chlor Sp suls
	328.2	337.1	8.9		1.16		.03		64	3.08							1.16										10	35	30		5			10					Tt, Mod chlor, Mod Py, Tr (Py-Zn)
	337.1	347.0	9.9		.23	.446	.02	.446	49	3.14							.23					Tr					10	35	30		5			10					Tt, as above,
	347.0	356.9	9.9		.53	.54	.03	.02	90	3.16							.53										10	45	25		SP			5					Tt, " " decr in chlor & suls
	356.9	366.2	9.3		.36		.02		98	2.91							.36										10	45	30					SP					Tt, " " "
	366.2	372.8	6.6		.43		.02		99	2.99							.43										10	40	30				Tr						Tt, Patches Hf, Mod Py- Tr sp Cu-Zn-Pb, Mod chlor
	372.8	382.5	9.7		.29		.01		82	3.01							.29										10	45	30			Tr		5					Tt, as above, Last ft. siliceous, Tr Suls
	382.5	391.0	8.5		.09				89	2.64							.09										Tr			Tr			SP	Tr		Mz	382.5	Brkn	Mz, Alt, silicified, Tr Suls, sp Ser
	391.0	397.6	6.6		.14		.02		96	2.59							.14																						Mz, as above
	397.6	404.0	6.4		.66		.01		95	2.65							.66										SP	15	10										Mz, Patches Tt, Alt, silicified, Tr Suls

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) > 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-130
Page 2 of 2 Pages
Collar Elev. 3888.97 Final Depth 637.5
Coords N 32552.74 E 19601.58
Inclination Vert.
Logged by SAA - CWH - FTG.
Date: Start 10-17-62 Finish 10-31-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Un. Qtz.	QUARTZ	CHLORITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
404.0	413.4	9.4		.30		.01		99	3.12							.30			Tr	Tr						5	50	40		SP	Tr		SP		Tt	404.0	30 N	Tt, silicified, Tr suls, sp chlor, tr Mag
413.4	418.5	5.1		.31		.01		96	2.96							.31					Tr					5	40	35		1	1	SP	5					Tt, as above
418.5	428.3	9.8		.24				54	2.72							.24							Tr			5	35	30		5	1	15	5	Tr				Tt, silicified, sp suls, Patches Sltst, 931
428.3	436.2	7.9		.26				91	2.76							.26										SP	Tr	Tr		SP	1	65	5		Sltst	428.3	30 W	Sltst, st. silic., sp sulf., patches Tt
436.2	445.2	9.3		.18				96	3.10							.18				Tr						5	45	30		1	1	5	SP		Tt	436.2	"	Tt, st. gar., sp suls, calc veins, Tr chlor
445.2	454.9	9.2		.26				99	3.10							.26									Tr	5	50	30		1	1							Tt, as above
454.9	464.4	9.5		.26				97	2.74							.26				Tr						5	55	30		1	1	Tr	1					Tt, " " patches sltst
464.4	470.9	6.5		.17				91	3.12							.17				1						5	70	20		1	1		5					Tt, as above, sp suls
470.9	480.2	9.3		.09		.02		91	3.46							.09										SP	75	20		1	1	Tr	SP					Tt, as above
480.2	489.0	8.8		.44		.02		94	3.05							.44									Tr	5	55	30		1	SP	1	5					Tt, as above
489.0	495.8	8.8		.53	498	.02	498	90	2.80							.53					Tr			Tr		5	40	20		1	Tr	25	5					Tt, as above 2' patch Sltst.
495.8	504.6	8.8		.54	2.96	.01	.03	102	2.82							.54				1						5	90	30		1	1	15	5					Tt, as above Incr Sltst
504.6	513.4	8.8		.13		.03		81	2.79							.13										SP	5	SP		1	1	65	5		Sltst	504.6	brkn	Sltst; mod silicif - sp chlor. Sp suls
513.4	520.5	7.1		.24		.03		75	2.97							.24										5	40	20		1	1	20	5		Tt	513.4	grad	Tt, sp chlor Patches Sltst
520.5	530.0	9.5		1.30		.03		92	2.79							1.30										5	45	35		5	1	5	SP					Tt; sp chlor - silicif. Patches st. suls
530.0	539.0	9.0		.14		.02		89	2.97							.14										SP	20	10		SP	1	60	1	Tr	Sltst	530.0	grad	Tt; as above to 537.0, then Sltst, st silicif. Sp suls
539.0	548.8	9.8		.22				68	2.70							.22										SP	Tr	10		1	1	60	15					Sltst; mod silicif. Sp suls.
548.8	556.6	7.8		.24				63	2.89							.24										1	1	10		1	1	60	10					Sltst, as above to 552.0, then int silicif
556.6	565.6	9.0		.24				70	2.63							.24									Tr	1	1	10		1	1	80	5					Sltst (?) int silicif. Orig. ck. prob Sltst
565.6	574.2	8.6		.10				89	2.67							.10										1	1	10		1	1	85	SP		Qtzte	565.6	grad	Qtzte; tr suls Remnants sed text
574.2	584.5	10.3		.07				83	2.61							.07										1	1	10		1	1	90	1		Qtzte bx	583.8	brkn	Qtzte, as above to 583.8, then Qtzte bx; silicif matrix
584.5	594.5	10.0		.05				82	2.61							.05						Tr							Tr		95	1		Qtzte	588.5	brkn	Qtzte bx; as above to 588.5, then Qtzte; tr suls; tr bx
594.5	603.4	8.9		.06				93	2.69							.06								Tr	Tr						95	1						Qtzte; patches st silicif Tt - Hf.
603.4	613.5	10.1		.11				87	2.62							.11										1				1	95	1		Mz	608.0	brkn	Qtzte; as above to 608.0, then Mz; int silicif. Remnant Epos
613.5	623.1	9.6		.19				92	2.63							.19										1				1	Tr	80	1		Qtzte	613.5	brkn	Qtzte; tr suls to 620.0, then Mz; sp silicif. Sp suls
																																			Mz	620.0	brkn	
623.1	632.7	9.6		.18				94	2.66							.18									Tr	1			Tr	SP	Tr	5	Tr					Mz; patches mod silicif. Sp. suls
632.7	637.5	4.8		.18				92	2.65							.18										1	1		1	1	1	5	1					Mz; as above

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tr - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-131
Page 1 of 2 Pages
Collar Elev 2,988.02 Final Depth 299.0
Coords N 36,801.99 E 20,088.34
Inclination Vert
Logged by SAA - CWH - PTO
Date: Start 10/22/82 Finish 11/1/82

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Specc	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz.	QUARTZ	CHLORITE	Fluorite	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	14.3	14.3						Rock	Bit																													Rock Bit
NC 2.400	14.3	24.5	10.2		.25		.10		78	2.55	.09		.01			.15			Tr	Tr								Tr	Tr	5	Tr		5		Dp?	14.3	—	Dp ?, vague ign. text in dense greenish rk (Ap?) to 19.1, then Ak, wk. alt, ind?, to 22.6, then Dp; sp alt
																																				Ak	19.1	brkn	
																																				Dp	22.6	75°	
	24.5	34.2	9.7		.11				83	2.58	.05		.01			.05			Tr	Tr									Tr	SP	Tr		Tr					Dp; sp clay alt. Patches st. feldspath. Sp. ang. incl.
	34.2	43.5	9.3		.12				89	2.49	.05		.01			.06														5					Ak Bx	39.5	brkn	Dp; as above to 39.5, then Ak Bx, patches st. clay.
	43.5	51.6	8.1		.40		.17		47	2.83	.16		.01			.23			5									Tr		5			5		Dp ?	45.3	brkn	Ak Bx, as above to 45.3, then Dp ? vague ign text in dense greenish (chlor) rk (Hp?) Patches st. Cg. pinkish Sphen
	51.6	58.3	6.7		.23	.22 @ .52	.12	.32 @ .31	87	2.56	.11		.01			.11			SP	Tr										SP			Tr		Ak	52.6	grad	Dp.?, as above to 52.6, then Ak; sp silicif. & sp. Dp text. grad to 1' patch of Dp at 57.3
	58.3	65.7	7.4		.49		.30		92	2.55	.29		.01			.19			Tr	Tr								10	Tr	SP	1	10	1		Hf	64.7	brkn	Ak; sp clay w. mod. Dp text. throughout to 64.7, then Hf, leached, st silicif.; tr bx text
	65.7	75.6	9.9		.85		.56		67	3.02	.20		.01	.35	COVELLITE	.29			10	Tr								10	20	30	1	10	Tr		Tt	72.2	grad	Hf, st lim.- silicif., tr CuOx to 72.2, then Tt; leached
	75.6	84.9	9.3		.09				70	3.70			Tr	.09					SP									SP	65	20	SP	1	Tr	Tr		Hf	80.2	brkn	Tt, st gar. to 80.2, then Hf; mod clay; Tr. sltst
	84.9	94.9	10.0		.15				87	3.63	.02		1	.13					1									5	40	40	1	1		1					Hf, sp clay Tr CuOx Tr Sltst. Patches st. Tt
	94.9	105.6	10.7		.63		.53		69	3.46	.25		.01	.27	.05		.05		Tr	1								5	40	20	5	1	20	1		Tt	94.9	brkn	Tt, mod silicif, patches st. leaching; tr CuOx, to 99.6, then Sltst, leached; tr blk CuOx
																																				Sltst	99.6	brkn	
	105.6	114.8	9.2		.05		.01		100	2.80			Tr	.01			.04		Tr	Tr										Tr		60	5						Sltst, incr. dark matrix. Patches bx w. ang. qtzite frags
	114.8	122.8	8.0		.70	25.5 @ .72	.05	25.5 @ .03	99	2.97							.70		1					SP			SP	40	10	SP		30	5		Tt	117.5	brkn	Sltst; as above w. st qtzite bx to 117.5, then Tt; sp chlor, grad to st. qtz
	122.8	131.8	9.0		.77		.02		78	3.25							.77		1					Tr				5	55	30		Tr		Sp					Tt, sp silicif. Tr suls. Patches bleached Sltst
	131.8	140.3	8.5		.69		.08		97	3.35							.69		1					Tr	Tr			40	30	20						Mb	139.0	brkn	Tt; sp silicif w. pods st qtz. (Sltst?) to 139.0, then Mb; tr chlor
	140.3	147.8	7.5		.29		.01		98	3.46							.29									Tr		80	Tr	20									Mb, leached; pods silica
	147.8	152.1	4.3		.24				92	2.71							.24		Tr									80	5	15	Tr		Tr						Mb, tr chlor in veins
NX 1.875	152.1	162.0	9.9		.39				76	3.40							.39											75	5	20									Mb, as above to 155.0, then Tt; tr chlor. Tr suls, st. st. qtz.
	162.0	169.1	7.1		.17				100	2.98							.17											60	10	10	Tr			SP	Tr	Mz	162.0	35°	Mz; vague ign text w. Tt; serpentine veins to 164.0, then Mb; sp silicif, sp chlor. Patches bx.
																																				Mb	164.0	brkn	
	169.1	179.3	10.2		.08				90	2.69							.08		Tr	Tr	Tr		Tr	Tr				85	5	10				Tr					Mb, patches chlor, lim. Tr suls
	179.3	188.9	9.6		.03				98	2.68							.03											90	Tr	10									Mb, sp clay
	188.9	198.1	9.2		.01				97	2.66							.01											95	1	5									Mb; " "
	198.1	207.5	9.4		.03				97	2.70							.03							Tr				95	1	5									Mb; " "
	207.5	216.6	9.1		.03				98	2.69							.03											95	1	5									Mb; " "
	216.6	226.1	9.5		.01				96	2.69							.01		Tr									70	5	20				5	Tr				Mb; " " Patches sp. chlor.- silicif
	226.1	233.8	7.7		.02				84	2.66					.01		.01											75	5	10		Tr	10	Tr					Mb; leached; mod clay
	233.8	243.1	9.3		.02				91	2.72					.01		.01											65	5	10			20						Mb, wk leached, Tr chlor, Tr zn
	243.1	252.3	9.2		.02				94	2.69					.01		.01											60	5	15			20						Mb; " " " " " , sp-Mod silicif
	252.3	261.6	9.3		.05				100	2.68							.05				Tr							60	5	15			20						Mb, as above
	261.6	271.1	9.5		.07				94	2.68							.07											50	10	15			20	5					Mb; " " Mod chlor
	271.1	280.3	9.2		.08				93	2.76							.08											50	5	20			20	5					Mb; sp chlor, Tr suls
	280.3	289.5	9.2		.03				93	2.75							.03											20	10	40			20	10		Hf	280.3	grad	Hf, Mod chlor " incr in silica
	289.5	299.0	7.5		.01				95	2.67							.01											20	10	40			20	10					Hf, Mod chlor, Tr suls
	299.0	307.9	8.9		.03				95	2.67							.03							Tr	Tr			40	5	40			10	5		Mb	303.0	" "	Hf as above To 303.0' Then Mb
	307.9	317.2	9.3		nil				96	2.68							nil											80	Tr	10			5	5					Mb, wk leached, patch Hf, sp chlor
	317.2	326.5	9.3		.01				96	2.68							.01											85	1	10			Tr	5	Tr				Mb; Fluorite vns, Tr Pb - Zn, Tr chlor
	326.5	336.3	9.8		nil				88	2.68							nil											90	1	5				5					Mb; as above
	336.3	345.3	9.0		.01				93	2.69							.01		Tr									90	1	5				5					Mb, small pods Zn, Tr sphal, Tr fluorite & Pb

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-131
Page 2 of 3 Pages
Collar Elev 2,988.02 Final Depth 799.0
Coords. N 36,891.99 E 20,002.34
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 10/22/62 Finish 11/7/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	BARITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
3453	3548	9.5		nil				91	2.67							nil		Tr								85			SP	Tr								Mb; Tr chlor, Tr sulf
3548	3642	9.4		nil				95	2.57							nil			Tr							40	Tr	25				SP						Mb; as above, Mod silica, patch Hf
3642	3733	9.1		.08				98	2.66							.08										5	5	30				1			Hf	364.2	grad	Hf, Tr chlor, Tr Tt, Tr sulf
3733	3833	10.0		.09				85	2.63							.09										10	5	70		5		5						Hf, Mod. Mb patches, Tr sulf
3833	3928	9.5		.07				100	2.75							.07										30	5	50		Tr		10	5		L.S.	383.3	grad	Ls. (Mb?), Mod chlor, Tr sulfs
3928	4011	9.3		.04				93	2.79							.04										30	5	50					5					Ls; " " " " Patch Hf, sp silica
4011	4104	9.3		.05				86	2.93							.05										10	10	65		5			5		Hf	401.1	grad	Hf, Alt, Mod - St chlor, calc units, Tr sul
4104	4197	9.3		.08				91	2.71							.08										10	5	65		SP			5					Hf, as above, patch Mb
4197	4291	9.4		.08				94	2.72							.08										10	5	70					5					Hf, St calc, Mod L.S. patches, Mod chlor, Tr sul
4291	4383	9.2		.04				97	2.61							.04										30	5	55					5		Mb	432.4	grad	Hf, as above To 432.4' then Mb
4383	4480	9.7		nil				89	2.64							nil										85	Tr	5					SP					Mb; sp chlor, Tr sulfs
4480	4570	9.0		.04				100	2.80							.04										45	Tr	25					5					Mb, as above
4570	4663	9.3		.22				94	2.72							.22				Tr						45	1	30					5					Mb (L.S.?), sp-Mod chlor, Tr sulfs
4663	4760	9.7		.02				94	2.72							.02										70	1	15					SP					Mb; as above
4760	4854	9.4		.04				96	2.71							.04										80	1	10					1					Mb; " "
4854	4943	8.9		.22				96	2.86							.22							Tr	Tr		35	1	35			Tr	10			Hf	490.0	grad	Mb; as above To 490.0', then Hf, Sp cpx, Tr Pb-Zn
4943	5039	9.6		.09				95	2.74							.09										15	5	70										Hf, Sp chlor, Mod calc, Tr sulf, patch Mb
5039	5129	9.0		.35		.02		96	2.86							.35				Tr	Tr		Tr			10	5	70				SP	5					Hf as above, Tr sph - Pb - Zn, Tr Tt
5129	5219	9.0		.53		Nil		81	3.37							.53			SP							10	20	50					SP					Hf, Mod chlor, sp cpx, Sp Tt,
5219	5314	9.5		.10		.01		95	2.98							.10										5	40	20				25	5		Tt	521.9	grad	Tt, dense, silicified, sp sulf
5314	5370	5.6		.12				97	2.72							.12										5	40	20				25	5		Sltst	533.0	" "	Tt, as above To 533.0' then Blk Sltst, Tr sulf
5370	5479	10.9		.07				89	2.71							.07			Tr		Tr					5	40	25				10	10		Tt	540.0	grad	Sltst, sp chlor, patches Hf to 540.0, then Tt, sp chlor Patches Hf
5479	5568	8.9		.08				93	3.35							.08										5	70	20				5	Tr					Tt, sp clay Sp bands bleached Sltst Tr sulf
5568	5663	9.5		.14				94	3.09							.14										5	80	15				10						Tt, st gar. Blebs qtz. Tr sulf
5663	5755	9.2		.11				93	3.40							.11										5	50	20				15						Tt, st gar. Tr sulf in vnlts. Patch Sltst
5755	5830	7.5		.20				100	2.76							.20										5	35	30				25						Tt, mod chlor w Sltst grad to st. gar. Tr sulf
5830	5926	9.6		.13				100	2.86							.13										5	50	25				15						Tt, as above, Banded Sltst
5926	6010	8.4		.12				99	2.72							.12										5	45	20				25			Sltst	592.6	grad	Sltst, dense, siliceous, banded, Patches Tt, Tr sulf
6010	6109	10.9		.21				100	2.72							.21										5	45	35				15			Tt	601.0	" "	Tt, dense, siliceous, Tr Sltst, Tr sulf
6109	6198	8.9		.12				93	3.08							.12					Tr					5	50	25		10		10	SP					Tt, as above, wk Bx with calc. matrix trend
6198	6291	9.3		.96	.86	.05	.06	90	3.08							.96										10	40	30		SP		5	10					Tt, St chlor, Mod sulf, Tr sph - Zn, patches Hf
6291	6389	9.3		.99	.98	.02	.04	95	2.80							.99										10	40	35				5	5	5				Tt, as above, Mod sulf
6389	6472.3	8.9		.30		.02		100	2.69							.30										10	40	30				15	SP					Tt, " " becomes siliceous
6472.3	6559	8.6		.10		.01		90	2.93							.10										10	35	20				30						Tt, " " St siliceous
6559	6653	9.4		.23		.02		88	2.88							2.3										10	20	25				45			Sltst	655.9	grad	Sltst, dense, sp sulf. Patches Tt
6653	6736	8.3		.15				93	3.05							.15										10	40	25				20			Tt,	665.3	" "	Tt, dense, silicified, Tr sulf
6736	6827	9.1		.39		.01		92	2.76							.39										10	45	25				10						Tt, as above
6827	6919	9.2		.15				95	2.77							.15										5	55	20				15						Tt, " " patches Sltst, Tr sulf
6919	6945	2.6		.10				83	2.71							.10										5	40	35				10						Tt, st silica, patches Sltst, Tr sulf
6945	7036	9.1		.23				99	2.70							.23										5	10	25				60			Sltst	694.5	brkn	Sltst, dark gy, mod qtz. uning w sp sulf to 703.0, then
																																			Tt	703.0	~50°	Tt, mod gar, sp sulf.
703.6	713.1	9.5		.33				89	3.15							.33										5	60	25				10						Tt, st gar, sp sulf w inst. Sltst
713.1	722.2	9.1		.18				92	2.70							.18										5	30	65				30			Sltst	713.1	grad	Sltst, sp clay patches. Sp Tt - Hf w sp sulf
722.2	731.0	8.8		.17				93	2.74							.17										10	40	30				20			Tt	722.2	grad	Tt, mod gar blebs in Sltst Areas Tt w sp chlor Sp sulf
731.0	740.1	9.1		.33				93	2.73							.33									Tr	10	40	30				8						Tt, as above

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. [illegible]
Page 2 of [illegible]
Collar Elev. 2988.02 Final Depth [illegible]
Coords N 36,801.93 E 10,002.[illegible]
Inclination Vert
Logged by SAM - SWB - [illegible]
Date: Start 10/22/62 Finish 11/7/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
740.1	749.5	9.4		.36				90	2.79							36			Tr							10	35	35		S	Tr		S					Tt. Patches Hf, Mod clay, Sp Sulf, Tr Ab
749.5	758.4	8.9		.16				96	2.83							.16										10	15	20		SP	1	SP	SP		SILST	749.5		SILST, dense, siliceous, sp chlor, Tr Py, Tr Hf
																																			Tt	754.5		To 754.5 then Tr Hf
758.4	767.5	9.1		.14		Nil		88	3.01							14			Tr							10	30	20		SP	1	25	SP					Tt. Patches SILST, Sp Bx, calc veins
767.5	777.0	9.5		.42	.47	.02	.26	89	2.84							.42			SP					Tr		10	40	25		1	1	15	1					Tt. as above, Tr Sulf
777.0	785.9	8.9		.36	.8	.02	.2	97	3.06							.36			Tr							10	60	20		1	1	5	1					Tt. " " "
785.9	794.2	8.3		.45	.41	.01	.02	96	2.95							.45								Tr		10	65	20		1	1	SP	1					Tt. Patches SILST, Sp Sulf, Mod Hf, Sp Cc
794.2	799.0	4.8		.24		nil		100	2.66							24										10	50	30		1	1	1	1					Tt. as above
					Av	Rec	=	92%																														
					End	of	Hole																															

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-132
Page 1 of 1 Pages
Collar Elev. 3079.43 Final Depth 166.0
Coords. N 37,400.93 E 19,001.25
Inclination Vert.
Logged by SAA - CWH - FTG
Date: Start 11-1-62 Finish 11-16-62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov.	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	9.2	9.2						A	B																													Rock Bit
9.2	18.3	9.1		.16				59	3.05	.15		.01						SP			Tr					10	50	30		5	Tr	Tr	SP		Tt	9.2	?	Tt, leached, sp. Mod chlor, Tr sul & US cu, Tr sil
18.3	23.5	5.2		.30		.23		46	3.04	.22		.01				.07		1			.5					10	60	20		SP	1	1	Tr					Tt, as above
23.5	32.3	8.8		1.41		1.26		100	2.60	.90	.01	.02	.33			.15		1			.5					10	60	25		1	1	1	1		Hf	30.1	brkn	Tt, leached, sp hem alt. w tr suls, mod CuOx to 30.1, then Hf, sp chlor alt. St CuOx.
32.3	40.7	8.4		2.33		2.04		50	2.74	.10	.01	.02	1.91			.29		SP								10	10	60		10	Tr	Tr	SP					Hf, leached, sp chlor - sere alt. St. CuOx
40.7	46.7	6.0		1.38		1.13		70	2.73	.05	.01	.01	1.06			.15		Tr								10	10	60		10	1	1	Tr					Hf, leached, mod clay alt. St. CuOx
46.7	55.3	8.6		.88		.70		92	2.52			.01	.69			.18		1								10	10	70		5	1		SP					Hf, mod clay - sp chlor alt. Mod CuOx
55.3	64.8	9.5		.80	.87	.59	.79	80	3.06			.01	.54			.05		1			.5					10	40	30		SP	1		1		Tt	55.3	brkn	Tt, sp hem alt. Mod CuOx, Tr suls
64.8	74.8	10.0		1.14	.98	1.03	1.23	91	3.09			.01	1.07			.06		1			.10					10	40	30		1	1		1					Tt, mod hem alt; wk bx w cal cement 70.1-73.8. Sp CuOx
74.8	84.4	9.6		1.53	.38	1.38		90	2.63		.01	.01	1.36			.15		1	Tr		.5					15	40	30		1	1		1					Tt, mod hem alt Tr bx St CuOx Sp suls in vnlts.
84.4	93.8	9.4		2.58		2.29		89	2.99		.01	.02	2.26			.29		1	1		.5					15	40	30		1	1		1					Tt, as above
93.8	103.0	9.2		1.23		.10		88	3.01	Tr?	.01	.02	1.07			.13		1	1		SP					15	40	35		1	1		1					Tt, as above w incr clay
103.0	111.4	8.4		.77		.73		47	3.12			.01	.72			.04		1	1		Tr					10	30	40		1	1		10		Mz	111.3	~20°	Tt, sp hem - mod qtz vn 111.3, then Mz. Int chlor at st.
111.4	120.2	8.8		.15		.13		100	2.55	.02	Tr	.01	.10			.02		1	1							SP				1	1		SP					Mz; sp clay - chlor alt.
120.2	127.7	7.5		.12				50	2.55			.01	.13			.03		1	1							1		SP		1	1	5	5					Mz; sp clay - silicif, sp HF? incl. w bx texture st chlor
127.7	136.1	8.4		.15				61	2.55			.01	.12			.02		1	1							1		1		1	5	15	5					Mz; st qtz vning. Sp CuOx. Chlor. incl may be st alt. Ap.
136.1	145.7	9.6		.16				71	2.59			.01	.13			.02		1	1							1			Tr	5	SP	SP	SP					Mz, wk leached, Tr live bins, Tr US cu, Tr cc, sp silica
145.7	154.0	8.3		.14				75	2.58			.01	.12			.01		1	1							Tr				SP	Tr							Mz, " " Tr cc, Mod qtz vning
154.0	160.6	6.5		.22				100	2.44			.01	.19			.02		1	1							1				5	SP		1					Mz, as above, " " Tr Mo?
160.6	166.0	5.4		.43		.18		89	2.58	.03	Tr	.05	.19			.27		1	1							1	5	20		SP		Tr	1					Mz, patches Hf, wk leached.

Av. Rec. = 77%

End of Hole

Hole abandoned; penetrated, large, unsurveyed, caved, some sat stopes since. Impossible to advance further.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

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Note (3)
Tt - Tactite
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Mb - Marble
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Da - Dacite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-135
Page 1 of 2 Pages
Collar Elev. 3136.14 Final Depth 4552
Coords. N 36,207.34 E 19,393.26
Inclination Vert
Logged by SAA - CWH - F.T.G.
Date: Start 11-7-62 Finish 11-21-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	JAROSITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	6.3	6.3						R.B.																															Rock Bit
NC →	6.3	16.0	9.7		.83	28.9 @ .77	.81	28.9 @ .70	33	2.88	.75	Tr	.01	.05			.02		Tr								85	10	SP		SP				Tr		Mb	6.3	?	Mb; Leached, sp Mal, clay; Tr suls, sp. chlor, Tr Tt
2.400	16.0	25.7	9.7		.88		.81		92	2.61	.19	.01	.01	.50			.07			Tr							10	5	75		SP	Tr	Tr	Tr			Hf	16.0	grad	Hf; " " " " " Tr Tt, sp. chlor
	25.7	35.2	9.5		.58		.47		98	2.67	.35	Tr	.01	.11			.11					Tr					45	5	35		5						Mb	27.2	brkn	Hf, mod clay, tr gar Tr CuOx to 27.2, then Mb, sp CuOx
	35.2	45.1	9.9		.27		.19		98	2.63	.15	1	.01	.03			.08										85	Tr	5		SP									Mb, leached Sp CuOx
	45.1	54.0	8.9		.12				98	2.68	.05		Tr	.03			.04										85	1	5		SP									Mb, as above
	54.0	64.1	10.1		.26				98	2.68	.07		1	.15			.04					Tr					90	1	5					Tr						Mb, leached Mod CuOx in vnlts
	64.1	73.5	9.4		.28				92	2.84	.05		1	.20			.03										90	SP	5											Mb, as above
	73.5	83.8	10.3		.13				98	2.70			1	.08			.05										95	Tr	SP		Tr									Mb, Tr lim - suls
	83.8	94.2	10.4		.06				95	2.71				.04			.02					Tr					95	1												Mb, as above
	94.2	103.8	9.6		.10				99	2.67			Tr	.07			.03										95	1												Mb, " "
	103.8	113.7	9.9		.28				98	2.70		Tr	.01	.23			.04										90	1	1		SP									Mb, " "
	113.7	123.0	9.3		.22				88	2.56			.01	.17			.04					Tr					90	1	1		1			Tr						Mb, " "
	123.0	128.8	5.8		.10				98	2.69				.07			.03										95	1	Tr		Tr									Mb, " "
	128.8	137.5	8.7		.14				84	2.69				.10			.04										90	1	SP		SP			Tr						Mb, wk leached, Tr lim + suls
NX →	137.5	146.6	9.1		.22				100	2.65			.01	.16			.05										85	1	5		1	Tr		1						Mb; as above, Tr chlor
1.875	146.6	155.8	9.2		.12				98	2.61				.05			.07										45	5	40		1	1		SP						Mb, " " "
	155.8	165.8	10.0		.22				89	2.67				.05			.17										70	SP	25		1	1								Mb, " " "
	165.8	175.0	9.2		.12				100	2.68				.07			.05										95		Tr		1	1								Mb, " " "
	175.0	185.7	10.7		.05				90	2.71							.05					Tr					95		1		Tr									Mb, " " "
	185.7	193.8	8.1		.19				100	2.67				.16			.03		Tr								85	Tr	SP		SP									Mb, " " Tr Alunite
	193.8	203.4	9.6		.08		.05		95	2.71				.05			.03										95	1	Tr		Tr									Mb, " "
	203.4	212.8	9.4		.50		.28		100	2.61			.01	.27			.22										50	35	15											Mb; Tr Hf, Tr Suls, Tr bxn
	212.8	222.3	9.5		.09		.07		94	2.72			Tr	.07			.02					Tr					90	SP	5											Mb; " " "
	222.3	231.5	9.2		.16				98	2.68			1	.13			.03										85	1	5		SP			Tr						Mb; " " "
	231.5	240.1	8.6		.24				96	2.76			1	.06			.18							Tr	Tr		60	5	25		1			SP						Mb, " " "
	240.1	249.9	9.8		.20		.12		88	2.70			.01	.11			.08										80	SP	10		1			Tr						Mb, " " "
	249.9	260.5	10.6		.70	122' @ .58	.53	122' @ .44	79	2.70			.01	.52			.17							Tr			35	30	20		5	Tr		5		Tr	Tt	254.0	brkn	Mb; To 254.0, then Tr, leached, vugs, Mod Mb, Tr Tt, bxn, NS cu
	260.5	267.1	6.6		.39		.29		76	2.58	.01		.01	.27			.10										SP	5	5		5			5			Mz	261.0	" "	Tt, as above to 261.0, then Mz, leached, wk Alt, Tr chlor
	267.1	277.9	10.8		.26				80	2.65			.01	.20			.06										SP	SP	10		5			25						Mz, leached, Alt, Bxn, Patches Hf, mod chlor, Tr NS cu
	277.9	283.7	5.8		.20				60	2.42	.03		.01	.10			.06														5			SP	Tr					Mz, as above
	283.7	291.6	7.9		.29				80	2.79	.02			.22			.05										5	5	35		5			1	1		Hf	286.0	brkn	Mz; as above to 286.0, then Hf; mod chlor, cal vnlts, St Sh
	291.6	301.0	9.4		.44		.24		80	2.57			.02	.22			.20										SP				5			1	1		Mz	291.6	" "	Mz; Bxn, leached, Alt.
	301.0	310.7	9.7		3.58		.05		98	2.76				.05			3.53					Tr					10	20	60		5			1			Hf	301.0	" "	Hf, leached, wk - Mod Bx, Tr NS cu, Patches Tt, St suls
	310.7	320.0	9.3		1.29		.04		92	2.85							1.29										10	40	30		SP	1	5	1			Tt	310.7	" "	Tt, leached, Patches Hf, Mod suls, Mod chlor, Tr Hem
	320.0	329.1	9.1		1.23		.03		82	2.82							1.23										15	35	45				SP	1			Hf	325.3	" "	Tt, as above, To 325.3, then Hf, St chlor, Sp suls
	329.1	338.8	9.7		.46		.04		95	2.69							.46										10	20	60					5						Hf, St chlor, Sp suls
	338.8	342.7	3.9		.41	128.4 @	.04	128.4 @	99	2.60							.41										10	15	65					5						Hf, as above
	342.7	351.8	9.1		.67		.08		96	2.62						.07	.60										10	10	70		5			5						Hf, sp clay - st chlor in vnlts. Sp suls
	351.8	360.5	8.7		.89	103	.07	.06	91	2.59						.19	.70			SP							10	5	70		5			5						Hf; as above 6" int cpy - py.
	360.5	369.2	8.7		1.19		.06		98	2.77							1.19				Tr						10	5	80		SP			SP						Hf; mod clay - chlor Mod suls.
	369.2	378.6	9.4		.40		.05		93	2.57							.40			5		Tr					15	5	60				5	5						Hf; mod clay - chlor. 1 ft patch int chlor clay (flt?) Sp Mb; Mod suls
	378.6	388.1	9.5		.49		.06		65	2.72							.49			SP							20	30	45				Tr	SP						Hf; mod clay - sp chlor Mod suls. 1.5 ft Tt Sp Mb
	388.1	397.8	9.7		.70		.03		91	3.04							.70			10	Tr	Tr					15	15	55		SP			5						Hf; mod clay - chlor in vnlts. Sp Tt. 1 ft patch st suls.
	397.8	407.5	9.7		1.38		.02		99	2.92							1.38			5							15	10	60				5	SP						Hf; mod clay - chlor. St suls throughout

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-133
Page 2 of 3 Pages
Collar Elev 3126.14 Final Depth 455.2
Coords. N 36,209.34 E 19,393.26
Inclination Vert.
Logged by SAH - CWH - FTG
Date: Start 11-7-62 Finish 11-21-62

Depth From	Depth To	Depth Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
407.5	416.0	8.5		.83		.02		96	3.12						.08	.75			SP							10	55	30		SP	SP		SP		Tt	407.5	brkn	Tt, sp clay Mod suls in veins
416.0	424.3	8.3		.23		.03		95	3.17							.23			|							10	60	20		|	|		|				Tt; sp clay Sp suls.
424.3	430.4	6.1		.31		.03		97	2.78							.31			|							10	45	30		|	|		10				Tt, as above to 428.9 Patches white Hf
430.4	438.8	8.4		.30		.03		99	2.74							.30			|							10	45	35		|	Tr		5				Tt; mod clay Brkn patches. Mod patches Hf. Mod suls
438.8	448.5	9.7		.31		.03		86	3.19							.31			|							10	25	50		|	|		10		Hf	438.8	grad	Hf; sp clay Patches possib Sltst. Mod Tt. Mod suls.
448.5	453.2	4.7		.72	6.7	.03	6.7	96	2.78							.72			|		Tr					10	15	60		|	|		10				Hf; sp clay; mod suls in veins. Tt-Hf-Sltst bx from 452.0.
453.2	455.2	2.0		.57	6.6	.02	.03	42	2.76							.57			|							5	5	30		|	|		5		Dp	453.8	brkn	Hf; sp clay - sp suls to 453.8, then Dp; mod silicif. Sp chlor.
						Avg.	Rec. =	92 %																														
					END	OF	HOLE																														

Remarks

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Stong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-134
Page 1 of 2 Pages
Collar Elev 3112.99 Final Depth 4993
Coords. N 37554.91 E 18786.33
Inclination Vert
Logged by SAA - FTG - Cwh
Date: Start 11/24/62 Finish 12/13/62

Depth From	Depth To	Depth Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	JASPOSITE	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
0.0	8.0	8.0						R.B																														R.B.T
8.0	18.8	9.8		1.20		1.05		87	2.77	.90	.01	.01	.13			.15		SP	Tr						10	40	35		5		5	Tr	Tt	8.0	?	Tt, dense, silicified, Sp MS. Cu, Mod gar.
12.8	23.5	5.7		1.12		.39		97	2.63	.40	.01	.01	.57			.13				5					10	60	20		SP		5						Tt, St. gar, Mod MS. Cu, Tr Sul
23.5	31.8	8.3		.69		.58		95	3.27	.25	.01	.01	.31			.06				SP					10	75	10			Tr	SP						Tt, as above
31.8	40.9	9.1		1.38		.98		89	3.17	.20	.01	.01	.68			.48				5					15	70	5			SP							Tt, St gar, Mod Mal, Tr Sul, Sp Blk cuox
40.9	50.7	9.8		.69	96.1' @ .116	.56	96.1' @ .99	83	3.16	.15	.01	.01	.39			.04	.09			SP					15	60	15										Tt, as above
50.7	59.0	8.3		.30		.28		96	3.08	.10	.01	.01	.16		Tr?	.02									10	55	20				10			↑			Tt, St gar, Mod cuox, Sp Sul. Flt patch Mz
59.0	68.0	9.0		.69		.61		99	3.03	.10	.01	.01	.49			.08									10	75	5				Tr						Tt, as above
68.0	77.4	9.4		.68		.64		100	2.73	.10	.01	.01	.52			.04									10	75	5										Tt, " "
77.4	86.5	9.1		.66		.59		91	3.13	.05	.01	.01	.52			.07									10	50	25				5						Tt, " "
86.5	95.5	9.0		1.85		1.56		91	2.86		.01	.02	1.53			.29									10	50	20		5	Tr	SP		Hf	93.5	grad	Tt, as above to 93.5, then Hf, mod clay - lim Mod CuOx
95.5	104.7	9.2		3.40		3.07		47	3.09		.01	.01	3.05			.33				Tr					10	25	50		10		Tr		Tt	98.0	brkn	Hf, leached, mod clay, St CuOx to 98.0, then Tt, mod hem.
104.7	113.0	8.3		.34		.11		99	3.11			.01	.10			.23		Tr							10	20	60		SP		5		Hf	105.2	brkn	Tt, as above to 105.2, then Hf, sp chlor in vnlts. Sp suls.
113.0	122.6	9.6		.13		.05		91	3.09			.01	.04			.08								Tr	10	15	70				SP						Hf, as above Blebs Tt. Silicif areas
122.6	131.5	8.9		.15		.06		100	2.99			.01	.05			.09									10	15	60				10		Tt	131.0	brkn	Hf, as above w incr. gar to 131.0, then Tt, mod hem Sp CuOx.
131.5	141.3	9.8		1.14		1.10		89	2.71		.01	.01	1.08			.04		SP		SP					10	60	20				5						Tt, leached; mod hem alt. St CuOx Sp cal. vning.
141.3	150.5	9.2		.44	44.5' @ .85	.28	44.5' @ .72	100	2.71		.01	.01	.26			.16				5					10	65	15		5		SP						Tt, leached, as above Tr suls
150.5	159.2	8.7		.41		.29		92	3.27		.01	.02	.26			.12				SP					10	70	15		5								Tt, " "
159.2	168.3	9.1		.49		.43		83	2.99		.01	.01	.41			.06									10	65	15		5								Tt, Mod Leached, Tr, Suls, Mod CuOx, Mod Lim
168.3	176.0	7.7		1.90		1.58		60	3.30	.15	.01	.01	1.41			.32	Tr			5					10	70	15		SP								Tt, as above
176.0	180.8	4.8																																				No Core, cavity
180.8	182.0	1.2		.39	54' @ .85	.32	54' @ .72	100	2.93			.01	.31			.07		Tr	Tr						10	60	25		Tr			Tr					Tt, leached, Mod cuox, Tr Suls, Tr Lim
182.0	182.6	0.6		.46		.42		100	2.97			.01	.41			.04									10	60	25										Tt, as above
182.6	186.7	4.1		.49		.41		99	3.04			.01	.40			.08									10	70	15			Tr							Tt, leached, st yellow gar. Mod CuOx
186.7	189.3	2.6		.23		.10		56	2.92				.10			.13									10	75	10										Tt, as above
189.3	195.4	6.1																																				Cavity
195.4	206.2	10.8		.40		.35		65	3.50	.03		.01	.31			.05		Tr	Tr						10	65	20		SP	Tr		Tr					Tt, leached; patches st. yellow gar. Sp CuOx.
206.2	215.9	9.7		.29		.20		100	2.62			.01	.19			.09									10	60	25										Tt, sp clay. Patches Hf w mod chlor.
215.9	222.0	6.1		2.86		2.53		100	2.88	.25	.01	.02	2.25			.33		SP							10	45	30		10								Tt, areas st. leaching. St. CuOx. Flt. bx 217.0-218.0
222.0	232.0	10.0		1.09	68.6' @ .76	.98	68.6' @ .63	95	2.86	.10	.01	.03	.84			.11		5							5	50	25		5		5	SP					Tt, st gar. St CuOx. Patches possib st. silicated + silicif. Mz
232.0	241.7	9.7		.51		.38		100	2.35			.01	.37			.13		SP							5	30	40		5				Hf	232.0	brkn	Hf, st leaching. St clay alt. Mod CuOx to 238.5, then Mz, mod
																																	Mz	238.5	brkn	silicif. Possib. Dp. text
241.7	250.6	8.9		.38		.24		87	2.62			.01	.23		.14			SP	Tr		Tr				SP	5	SP		5	Tr	SP	SP	Tt	249.0	brkn	Mz; leached, mod silicif, st feldspath to 249.0, then Tt, mod clay.
250.6	259.0	8.4		.69		.59		70	2.56			.01	.58			.10									5	35	40		SP		5	5	Hf	256.0	grad	Tt, sp hem - chlor. alt Sp CuOx to 256.0, then Hf, mod chlor. Tr Mz?
259.0	264.0	5.0		.52		.28		93	2.80			.01	.27			.24									5	20	60				10	5	Tt	263.0	grad	Hf, mod chlor; sp CuOx to 263.0, then Tt, sp chlor, sp suls. Tr. Mz blebs.
264.0	273.0	9.0		.35		.29		72	2.63			.01	.28			.06									5	40	15		Tr		35	SP	Qtite	268.0	brkn	Tt, st. leaching; sp. clay; sp CuOx to 268.0, then Qtite; leached
273.0	279.1	6.1		.25				94	2.54				.20			.05												Tr	SP		SP		Mz	273.0	" "	Mz, ALT, leached, Tr MS. Cu,
279.1	289.1	10.0		.21				87	2.57				.15			.06		Tr																			Mz, ALT, EG, wx leach, Tr suls, Mod silicified
289.1	298.4	9.3		.25				93	2.57				.18			.07															5						Mz, as above.
298.4	308.2	9.8		.23				86	2.68				.18			.05														Tr	5						Mz, " " "
308.2	317.0	8.8		.09				98	2.61				.06			.03															5		Dp	311.6	brkn	Mz, as above, To 311.6, then Dp, unaltered, with Ox sed (?)
																																						Frags, Ox frags contain Ang. Qtite, inclusions
317.0	323.9	6.9		.15				85	2.60	.01		Tr	.10			.04		Tr	Tr									Tr	Tr	Tr	5	SP						Dp, unalt; in places possib int. by st. silicif. Mz
323.9	332.9	9.0		.24		.19		58	2.54	.02	Tr	.01	.16		Tr?	.05															5		Mz	331.3	brkn	Dp; int. silicif to 331.3, then Mz? st feldsp. silicif Near Hf ct?
332.9	344.3	11.4		.11		.26		55	2.90	.01	Tr	.01	.24		.01	.14											SP	SP			SP						Mz; vague Mz text masked by fold.? banding w possib sed (silicif) incl. Mod CuOx. Mz - sed ct. near?

NX → 2.400

NX → 1.875

BX → 1.432

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-134
Page 2 of 2 Pages
Collar Elev 3112.91 Final Depth 499.3
Coords. N 37554.91 E 18786.33
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 11/24/62 Finish 12/13/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JASPEROIDE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
344.3	353.0	8.7		.41	.35 @	.24	.35 @	45	2.60	.02		.01	.21		.02	.15		Tr	Tr											Tr	Tr	SP	SP					Mz; brkn, leached; mod clay - feldspath
353.0	363.6	10.6		.72	.50	.43	.30	78	2.66	.02		.01	.40		.02	.25	.02	1	1											1	1	1	1	S	Dp	357.5	brkn	Mz, as above w mod CuOx to 357.5, then Dp; vnlt areas. Mod silicif
363.6	371.4	7.8		.41		.23		86	2.55	.01		.01	.21		.05	.13		1	1											1	1	1	1	Tr	Mz	364.7	brkn	Dp, as above to 364.7, then Mz; st silicif (almost Qtzte), feldspath area
371.4	382.0	10.6		.16				96	2.58				.03		.10	.03		1	1											1	1	1	Tr		Dp	381.2	brkn	Mz, as above to 381.2, then Dp, st silicif Tr incl
382.0	389.3	7.3		.13				63	2.59				.04		.07	.02		1	1											1	1	1	1					Dp; as above. Unalt areas. Tr Feldspath
389.3	398.4	9.1		.09				89	2.57				.02		.05	.02		1	1											1	1	1	1					Dp; mod silicif Sp Mz text
398.4	407.2	8.8		.15				91	2.60				.02		.10	.03		1	1					Tr						1	1	5	1					Dp; mod silicif - feldspath. Sp Mz text
407.2	416.6	9.4		.21				97	2.57				.03		.15	.03		1	1					1						1	1	5	1					Dp; mod silicif Sp Mz text Tr suls
416.6	425.8	9.2		.13				98	2.62				.01		.10	.02		1	1						1					1	SP	5	1					Dp; as above. Patches st silicif. Tr possib Mz
425.8	436.4	10.6		.14				90	2.60				.01		.10	.03		1	1						1					SP	1	5	1					Dp; as above. May be near Mz dike.
436.4	445.0	8.7		.16				63	2.58				.01		.12	.03		1	1											1	1	5	1					Dp, " "
445.0	454.3	7.6		.13				69	2.62				.01		.10	.02		1	1											1	1	5	1	Tr				Dp; dense, siliceous, Tr mafics, Tr sul
454.3	464.0	7.6		.17				75	2.62				.01		.14	.02		1	1										Tr	1	1	10	1	1				Dp, as above, cont Tr mafics, Tr suls
464.0	472.8	7.8		.21				79	2.60				.01		.19	.01		1	1										SP	1	1	Tr	1	1				Dp; " " " Tr leaching, Tr sec.
472.8	482.0	8.2		.21				90	2.65				.01		.19	.01		1	1										Tr	1	1	1	1	1				Dp; dense, siliceous, Tr sul, patch Mz
482.0	489.1	6.6		.17				97	2.60						.16	.01		1	1											1	1	1	1					Dp; as above, Mod Mz Text
489.1	499.3	10.2		.16				92	2.61						.15	.01		1	1											1	1	1	SP					Dp, Tr alt. Tr suls. Mod Mz. text

Av. Rec = 85 %

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) > 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. Q-135
Page 1 of 2 Pages
Collar Elev. 2898.41 Final Depth 489.7
Coords. N 37554.35 E 19388.19
Inclination Vert
Logged by SAA - GWH - FTG
Date: Start 11-23-62 Finish 12-13-62

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	BARITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	22.4	22.4						Rock	Bit																													Rock Bit
.4 c →	22.4	32.3	9.9		.33		.23		39	3.16	.10	.01	.02	.10			.10		SP	Tr							SP	50	30		10	Tr		SP		Tt	22.4	-	Tt, leached; sp clay incr to mod clay. Sp CuOx
2 x 10	32.3	42.0	9.7		.120	19.5' @ .81	.94	19.5' @ .63	49	3.09	.80	.01	.01	.12			.26		1	1							Tr	50	30		10	1	5	Tr				-	Tt; leached; mod clay Tr Hf. St CuOx.
	42.0	51.8	9.8		.42		.33		79	2.49	.30	.01	.01	.01			.09		1	1							1	30	45		5	1	10	1	Tr	Hf	42.3	brkn	Tt, as above to 42.3, then Hf, mod clay. St blk oxide (Mn?); leached
	51.8	59.5	7.7		.24		.14		100	2.50	.10	.01	.01	.02			.10		1	1							1	35	40		10	1	5	1	1	Tt	55.0	grad	Hf, as above. to 55.0, then Tt, st clay. leached
	59.5	67.2	7.7		.37		.23		59	3.64	.20	.01	.01	.01			.14		1	1							1	65	20		5	1	SP	1					Tt, leached, small cavities. Massive pink gar. throughout.
	67.2	76.3	9.1		-		-	-	-	-																													Drift.
	76.3	85.1	8.8		.63		.39		98	2.79	.30	.01	.01	.07			.24		10	1							20	15	50		5	Tr				Hf	76.3	brkn	Hf, mod clay. St CuOx. Patches int lim. Mod Mb.
.4 c →	85.1	92.3	7.2		.87	40.9' @ .64	.32	40.9' @ .46	96	2.96	.30		.01	.01			.25		5	1							SP	80	5		SP	1				Tt	85.1	"	Tt, Leached, vuggy, st gar, mod lim, Mod cuox, Tr suls
1 x 8.5	92.3	102.7	10.4		1.19		.90		73	3.04	.75			.15			.29		5	1							SP	80	5		SP	1							Tt, as above, patches. St. lim
	102.7	113.0	10.3		.24		.20		45	3.62	.20						.04		SP	1							5	85	5		1	1							Tt, " " " " incr cuox
	113.0	117.2	4.2		.42		.38		72	3.03	.30	Tr	.01	.07			.04		1	1							5	50	20		1	1		Tr					Tt, Leached, brkn, St lim, Mod cuox. Patches Mz
	117.2	123.3	6.1		.14		.12		94	2.55	.10		.01	.01			.02		1	1							5	45	20		1	1		1		Mz	122.3	brkn	Tt, as above to 122.3, then Mz, mod silicif
	123.3	132.9	9.6		.19				58	2.56	.05		.01	.10			.03		Tr	1							SP				1	1	SP	1					Mz, patches mod silicif - mod feldspath
	132.9	139.5	6.6		.24		.08		100	2.55			.01	.07			.16		1	1				Tr			10	45	35		1	1		1		Tt	132.9	brkn	Tt; sp clay, leached Sp Hf
	139.5	149.0	9.5		.43		.02		95	2.94							.43		1	1							10	30	50		1	1		1		Hf	139.5	grad	Hf, sp clay - chlor in vnlts. Tr suls. Sp Tt.
	149.0	159.0	10.0		.73	32.9' @ .56	.63	32.9' @ .38	95	2.66			.01	.62			.10	Tr	5	1							10	45	40		5	1				Tt	152.0	grad	Hf, st lim at 149.5 to 152.0, then Tt, st lim - clay leached
	159.0	169.3	10.3		.43		.36		34	3.09			.01	.35			.07		SP	1							10	70	15		SP	1							Tt, leached, vuggy, sp-mod cuox
	169.3	172.4	3.1		.87		.74		60	2.49			.02	.72			.13		5	1							Tr	65	15		5	1	5						Tt, Brkn, ggx, Mod clay, Mod. cuox
	172.4	180.0	7.6																																				No Core
	180.0	185.2	5.2		.97		.88		73	2.54			.01	.87			.09		Tr	Tr							10	5	80		SP	Tr				Hf	180.0	brkn	Hf, leached, mod clay - lim. St CuOx. Sp Tt
	185.2	189.7	4.5																																				No Core
	189.7	198.1	8.4		.08		.06		9	2.77				.06			.02		Tr	Tr							10	40	40		SP	Tr				Tt	189.7	brkn	Tt; sp clay Tr CuOx
	198.1	206.6	8.5		.21		.13		100	2.65				.13			.08		SP	1							Tr	SP	5		1	1	65	5		Siltst	201.0	grad	Tt; leached; mod clay - silicif to 201.0, then Siltst; leached
	206.6	214.0	7.4		.17		.12		81	2.71				.12			.05		1	1							5	25	5		1	1	60	5					Siltst; brkn; leached; patches mod clay. Lft patch Tt.
	214.0	222.1	8.1		.10		.04		86	2.68				.04			.06		1	1							SP	10	5		1	1	75	5					Siltst, as above. Tr Aug dike at end
	222.1	231.2	9.1		.50		.15		96	2.68				.15		30	.05		Tr	1		Tr					25	20	40		5	1	SP	10		Hf	222.3	38°	small Aug dike (2"), 72.0. Hf, wk leached, Mod patch Mb, Tr sulf.
	231.2	239.0	7.8		1.54	45.0' @ .75	.06	45.0' @ .07	99	2.51						.14	1.40			1							15	5	70	SP	5	1	Tr	SP					Hf; mod chlor - clay alt. Patches st. suls. Sp Tt
	239.0	249.7	10.7		.77		.03		51	2.54						.07	.70			1						Tr	10	25	50	1	5	1	1	5		Mz	249.0	brkn	Hf; as above to 249.0, then Mz, mod clay alt
	249.7	257.3	7.6		.19		.06		57	2.48						.04	.15			1										Tr	10	1		Tr					Mz; brkn, mod - st. clay alt.
	257.3	267.1	9.8		.75		.07		81	2.58						.05	.70			1							10	15	65		5	1		SP		Hf	258.7	brkn	Mz; as above to 258.7, then Hf, st. chlor alt. Patches st. suls.
	267.1	276.8	9.7		.06		.05		91	3.24						.01	.05			1		Tr					10	55	30		SP	1		Tr		Tt	267.1	grad	Tt; sp clay alt. Sp suls
	276.8	285.9	9.1		.18				83	3.21							.18			1		1					10	60	15		1	1	10	5					Tt; as above. Patches Siltst
	285.9	293.7	7.8		.27				100	2.69							.27			1		1					5	30	30		1	1	20	10					Tt as above. Areas banded chlor.
	293.7	302.4	8.7		.15				85	2.68							.15			1		1					5	30	20		1	1	35	5		Siltst	296.7	brkn	Tt, as above to 296.7, then Siltst; sp chlor. Sp suls. Sp Tt
	302.4	310.0	7.6		.27				93	2.64							.27			1		1					SP	10	20		1	1	60	5					Siltst; bleached on fractures. Patches + vnlts of epidote. Tr suls
	310.0	320.6	10.6	—	.25				100	2.66							.25			1		1					1	25	15		1	1	55	SP					Siltst, patches lt. Mod chlor - epidote. 2nd fspar? banding. Blebs qtz.
	320.6	330.9	10.3		.20				91	2.68							.20			1		1					1	15	5		1	1	65	1					Siltst, incr chlor. Banding dips ~ 45°. Tr suls
	330.9	340.4	9.5		.14				93	2.75							.14			1		1					1	SP	20		1	1	60	5					Siltst as above
	340.4	351.0	10.6		.17				85	2.79							.17			1		1				Tr	1	5	25		1	1	60	5					Siltst, bleach, vnlts. Patches Tt. Banding persists in lt buff Siltst
	351.0	359.7	8.7		.17				97	2.70							.17			1		Tr					1	5	30		1	1	50	SP					Siltst; incr lt buff ck w. chlor - epidote banding over dk. gy. Siltst
	359.7	368.5	8.8		.32		.025		92	2.91							.32			SP	1						5	35	30		1	1	10	15		Tt	361.5	grad	Siltst, as above to 361.5, then Tt, sp clay; sp cal veinlets. Tr suls.
	368.5	378.4	9.9		.62		.025		82	3.04							.62			1		1					5	55	20		1	1	SP	10					Tt, dense; mod chlor. Patches mod clay. Sp silicif. Tr suls.
	378.4	388.7	10.3		.29	28.8' @ .26	.03	28.8' @ .03	72	3.05							.29			1		1					10	45	30		1	1	5	SP					Tt, " " " Patches Siltst. Tr Suls
	388.7	398.3	9.6		.47		.04		95	2.94							.47			1		1					10	40	20		1	1	15	1					Tt, " " " Patches Hf. Tr - Sp Suls.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-135
Page 2 of 2 Pages
Collar Elev. 2898.41 Final Depth 489.7
Coords N 37554.35 E 19388.19
Inclination Vert
Logged by SAA - CWH - FTG
Date: Start 11/23/62 Finish 12/13/62

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Oz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
398.3	408.8	10.5		.34		.03		72	2.64							.34			Tr					Tr	SP	SP	10		SP	Tr	65	Tr	SITST.	401.0	Brkn	Tt, as above to 401.0, then SITST, patches Qtzite, Tr sul.
408.8	417.6	8.8		.17				91	2.67							.17			|				Tr		|	|			|	|	80	SP				SITST, patches, silicified Tt & Qtzite, Tr suls, Tr Pb
417.6	422.6	5.0		.18				77	2.63							.18			|				|			Tr			Tr		90		Qtzite	417.6	Brkn	Qtzite, Dense, F.G. Qtzite, Tr Pb
422.6	432.0	9.4		.16				90	2.63							.16			|				|	Tr		|				|	90					Qtzte; tr suls, fg; Tr bx text
432.0	437.9	5.9		.10				100	2.62							.10			|											|	95					Qtzte; fg Tr suls
Bx 1,432 → 437.9	447.5	9.6		.17				98	2.65							.17			|											|	95					Qtzte; as above. Tr banded Hf-like material (no cal)
447.5	455.9	8.4		.05				84	2.63							.05			|											|						Qtzte; tr suls. Possib int silicif Dp?
455.9	466.2	10.3		.17		.02		26	2.60							.17			|											|						Qtzte; as above
466.2	475.6	9.4		.18		.01		81	2.67							.18			|											|						Qtzte; as above
475.6	485.6	10.0		.13		.03		82	2.65							.13			|											|	95		Dp	484.7	brkn	Qtzte, as above to 484.7 then Dp? int silicif
485.6	489.7	4.1		.15				93	2.66							.15			|											|	95					Dp, int silicif. Possib ghost feldsp
					Av. Rec = 77%																																
				END OF HOLE																																	

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Toctite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif Igneous

Hole No. D-136

Page 1 of 1 Page

Collar Elev. 3128.88 Final Depth 305.2

Coords N 37,398.88 E 18,788.91

Inclination Vert.

Logged by ETG - CWH

Date: Start 12/16/68 Finish 12/31/68

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chryc	Cu (1) Pitch	Cu (1) Black	Cu (1) Blue Green	Cu (1)	Cu (1) Cu	Cu (1) Cox	Cu (1) Born	Fe (2) Lim	Fe (2) Py	Fe (2) Mag	Fe (2) Hem	Fe (2) Spec	Other (2) Galena	Other (2) Sphal	Other (2) Moly	Other (2) Calcite	Other (2) Carnet	Other (2) Silicates	Other (2) Sericite	Other (2) Clay	Other (2) Sn. Qtz	Other (2) QUARTZ	Other (2) CHLORITE	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
NQ 1.500	0.0	10.0	10.0		.96		.83		98	2.66	25	.02	.03	.53			.13		SP	Tr		Tr					15	25	50		SP	SP	5		Hf	0.0	—	Hf, leached; mod chlor; sp CuOx to 7.5, then Tt; leached,
																																			Tt	7.5	brkn	mod hem alt. Sp CuOx
	10.0	16.0	6.0		1.15		.94		71	2.66	.30	.01	.01	.62			.21		Tr	Tr							10	25	60		5	Tr	5		Hf	13.5	brkn	Tt, leached; mod clay-chlor to 13.5, then Hf; leached; mod clay-Cu
	16.0	26.0	10.0		.88		.52		49	2.92	.10	.01	.01	.40			.16		1	1		Tr					15	10	35		5	1	5					Hf; leached; mod clay-chlor incr. Tt. Sp CuOx
	26.0	35.4	9.4		.67		.58		91	2.54	.15	.01	.01	.41			.09		1	1		SP					15	35	20		SP	1	10		Tt	26.0	brkn	Tt, leached; mod hem alt. St CuOx to 31.4, then And; post
																																			And	31.4	brkn	min dike, sp cal veining
	35.4	48.0	7.6		.97	1021' @ 1.07	.84	1021' @ .88	74	2.91	.15	.01	.02	.66			.13		Tr	Tr		SP					15	30	20		10	SP	5		Tt	35.4	brkn	Tt; leached; mod hem-sp silicif to 39.2, then Mz-Hf mixed
																																			Mz-Hf	39.2	good	zone (near ct). St chlor-silicif-clay. Sp CuOx
	48.0	52.8	9.8		.60		.43		88	2.54	.10	.01	.01	.31			.17		Tr	Tr		SP					10	10	20		20		25		Tt	49.6	brkn	Mz-Hf ct zone; st lim-chlor to 49.6, then Tt; sp hem. Mod Hf
	52.8	61.9	9.1		1.99		1.59		91	2.93	.78	.01	.02	.78			.40		1	1		Tr					15	40	30		5	Tr	10					Tt, mod hem-chlor alt, leached, mod CuOx
	61.9	70.0	8.1		.99		.79		93	3.12	.40	.01	.01	.37			.20		1	1		1					15	45	30		5	1	5					Tt, leached; sp hem alt. Mod CuOx
NX 1.875	70.0	75.0	5.0		1.29	1141' @ 1.01	1.04	1141' @ .77	92	2.57	.20	.01	.02	.81			.25		1	1							15	60	25		SP	SP	SP					Tt, leached; sp hem-clay alt Mod CuOx. Sp Hf.
	75.0	82.5	7.5		1.00		.80		59	2.92	.10	.01	.03	.66			.20		5	1		SP					10	60	20		1	1	1					Tt, leached, st lim-hem alt sp CuOx
	82.5	91.7	9.2		1.26		1.08		49	3.01	.15	.01	.02	.90			.18		SP	1		5					10	65	15		1	1	1					Tt, as above St CuOx
	91.7	102.1	10.4		1.37		1.17		97	2.54	.10	.01	.01	1.05			.20		1	1		SP					10	65	15		1	1	1					Tt, leached; mod hem alt. St. CuOx
	102.1	111.6	9.5		.28		.22		90	2.82	.05	.01	.01	.15		.02	.04		1	1							15	40	25		1	1	15					Tt, as above to 104.3, then mod chlor; mod blk oxides
	111.6	121.2	9.6		.76		.45		91	2.99		.01	.01	.43			.31		1	1		SP					15	40	35		1	1	5					Tt, leached; mod hem-chlor alt to 116.5, then sp chlor-clay & sulfs
	121.2	126.1	4.9		.86		.09		100	2.66		.01	.01	.07			.19		Tr	1		Tr					10	35	45		1	Tr	5		Hf	121.2	grad	Hf, leached; mod chlor; mod blk oxides
	126.1	136.7	10.6		1.80	136' @ 1.34	1.14	136' @ .8	72	2.72	.20		.01	.93			.66		5	1							10	30	40		10	1	SP					Hf; leached, as above to 131.0, then st lim-CuOx-clay. Mod Tt
	136.7	144.1	7.4		.22		.22		98	2.77	.10		.01	.11			.50		SP	1		Tr				Tr	10	40	35		SP	SP	5		Tt	140.5	grad	Hf; mod chlor, sp CuOx-sulfs to 140.5, then Tt; mod chlor; sp CuOx
	144.1	153.5	9.4		.15				90	3.04							.15			1						1	10	60	20		1	5	5					Tt, mod chlor to 145.5, then sp clay-mod qtz veing. Tr sulfs
	153.5	161.3	7.8		.10				94	3.04			Tr				.10		Tr	1						1	10	55	30		1	SP						Tt, sp leaching, mod silicif-sp clay alt. Tr CuOx.
	161.3	171.3	10.0		.17				89	2.96			.01				.16		1	1						1	10	55	30		1	1						Tt, sp leaching. Mod qtz veing-st. gar. Sp CuOx
	171.3	180.8	9.5		.15				74	3.03			.01				.14		1	1						1	10	50	35		1	1	Tr					Tt; as above
	180.8	190.3	9.5		.20				91	2.77			.01				.19		1	1		Tr				1	10	50	30		1	5	SP					Tt, as above
	190.3	200.5	10.2		.19				53	3.01			.01	.07			.11		1	1						1	10	60	20		1	SP	1					Tt, leached; st gar grad to mod chlor alt
	200.5	204.9	4.4		.05				91	2.58				.05					1	1							SP				SP		1		And	200.5	brkn	And; post min. dike. Tr cal veing
	204.9	214.8	9.9		.10				75	3.33		Tr	.01	.04			.05		1	1							5	60	20		1	Tr	5		Tt	209.9	brkn	And, as above to 209.9, then Tt; st gar. Sp CuOx
	214.8	224.3	9.5		.09		.04		99	2.78			.01	.03			.05		1	1							5	35	15		1	1	Tr					Tt, mod gar. w. patches. mod chlor. Tr sulfs
	224.3	234.0	9.7		.40		.27		100	2.56			.01	.26			.13		1	1							5	55	25		1	1	5	1				Tt, sp clay alt Sp CuOx
	234.0	239.8	5.8		.58		.28		86	2.72	.08	.01	.01	.18			.10		1	1							10	30	45		1	1	10		Hf	234.4	grad	Tt, mod clay alt to 234.4, then Hf; leached; mod chlor-silicif
	239.8	246.2	6.4		.37		.16		51	2.56			.01	.15			.21		1	1							SP	5	25		1	1	SP	5		Dp	245.1	brkn	Hf; st silicif-mod chlor, sp CuOx to 245.1, then Dp, mod silicif
	246.2	255.4	9.2		.17				92	2.57				.10			.07		1	1											1	Tr	SP					Dp, mod silicif; leached. Patches w. tr. Mz. texture
	255.4	265.2	9.8		.19		.02		87	2.57						.14	.05		1	1											1	1	Tr		Mz	255.4	brkn	Mz; sp clay-silicif. leached
	265.2	275.7	10.5		.60	263' @ .47	.26	263' @ .25	69	2.56	.08			.18		.24	.10		1	1										Tr	1	1	SP		And	265.2	brkn	And; post min dike; Sp CuOx
	275.7	284.2	8.5		.36		.31		93	2.59				.31		.02	.03		1	1										1	1	1	1		Mz	281.3	10°	And; as above to 281.3, then Mz; leached; mod silicif
	284.2	293.4	9.2		.43		.17		85	2.59	.07			.10		.10	.16		1	1										1	1	1	1					Mz; sp clay-silicif, leached,
	293.4	302.0	8.6		.37		.14		90	2.58				.14		.15	.08		1	1										1	5	1	1					Mz; sp clay alt. Sp CuOx-sulfs
	302.0	305.2	3.2		.21		.03		85	2.55						.15	.06		SP	1										1	5	1	1					Mz; leached; mod clay-lim alt
							Av. Rec. = 83%																															
					END OF HOLE																																	

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows; Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-137
Page 1 of 2 Pages
Collar Elev. 2888.30 Final Depth 479.0
Coords N. 37,101.20 E 19,812.68
Inclination Vert
Logged by FTG - GWH
Date: Start 12/19/62 Finish 1/4/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Atach	Black	Blue Green		Cc	Cpy	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qz.	QUARTZ	CHLORITE	UNCLASS	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	6.5	6.5																																				Rock Slt
NC → 2.400	6.5	13.6	7.1		.13				51	2.60	.12		.01						Tr								SP	Tr	5		SP	Tr	5	SP		Mz	6.5	–	Mz, mod silicif. Tr chlor. Text. vague. Hf incl
	13.6	23.2	9.6		.08				75	2.63	.07		.01						1	Tr											1	1	5	1		Da	13.6	brkn	Da; sp alt. Tr ang. incl. Tr feldspath on shears
	23.2	29.0	5.8		.09				88	2.62	.08		.01						1	1											1	1	5	1					Da; as above
	29.0	37.5	8.5		.07				66	2.60	.06		.01						1	1											1	1	5	1					Da; as above. Sp silicif
	37.5	45.7	8.2		.08				90	2.53	.07		.01						1	1											1	1	5	1					Da; as above
	45.7	55.8	10.1		.10				77	3.09	.06		.01	.03					1	1							5	65	15		1	1	5	10		Tt	47.7	10°	Da; as above to 47.7, then Tt; leached; sl gray, areas mod chlor
	55.8	61.4	5.6		.15		.10		65	2.79	.06		.01	.03		.05			1	1							5	60	20		1	1		10		Hf	59.7	brkn	Tt; as above to 59.7, then Hf; leached; sp clay
	61.4	70.7	9.3		.54	1.86 .54	.50	1.86 .42	91	2.91	.24		.01	.25		.04			1	1							15	30	50					SP					Hf; leached; gray patches w. st blk oxide(?) Sp CuOx. Mod gar.
	70.7	80.8	9.3		.54				66	2.96	.15		.01	.26		.12			5	1		Tr					10	30	40		10	1		5					Hf; as above to 80, then int. blk oxide alt Brkn, leached, possible bx zone
	80.8	89.8	9.0		.20		.12		82	2.54	.08		.01	.03		.08			Tr	1							SP	SP	5	SP	10	1		SP		Mz	81.5	brkn	Hf; as above to 81.5, then Mz; mod silicif. Sp cal alt of Fspar. Mafics gone.
	89.8	94.3	4.5		.12				80	2.57	.06		.01	.02		.03			1	1							SP			Tr	10	1	5	1					Mz; st silicif. and as above.
	94.3	103.2	8.9		.09				80	2.59	.05		.01	.02		.01			1	1							1			1	10	1	5	1	Tr				Mz; brkn, sp clay - st silicif. Tr remnant bio. Tr feldspath.
	103.2	112.1	8.9		.10				92	2.51	.04		.01	.01		.04			1	1							1			1	10	1	5	1	1				Mz; as above
	112.1	121.9	9.8		.15		.13		86	2.52	.09		.01	.03		.02			1	1							1			1	10	1	5	1	1				Mz; as above grad to mt clay alt w. st CuOx.
	121.9	129.2	7.3		.96		.53		58	2.62	.32		.01	.20		.15	.28		1	1							1	10	55	1	20	1		5		Hf	121.9	brkn	Hf, mod clay - st lim - med CuOx to 127.2, then mod chlor, tr suls
	129.2	139.0	9.8		.17		.05		100	2.57			.01	.04		.07	.08			1		Tr					15	5	70	1	5	1		5					Hf; mod chlor - suls grad to sp chlor, tr suls, mod Mb.
	139.0	147.1	8.1		.19		.07		100	2.60			.01	.06		.10	.02			1		1					15	5	75		SP	1		5					Hf; mod clay - sp Mb, grad to mod chlor w. patches Tt. Sp suls
	147.1	152.2	10.1		.47	.52 .52	.06	.52 .05	95	2.68						.35	.12			1		1					15	5	70		5	1		5					Hf; mod chlor. St. cal veining. Sp suls.
	152.2	162.3	5.1		.62		.04		91	2.84						.50	.12			1		SP					15	5	20		5	1		5					Hf; mod clay - chlor. Mod suls.
NX → 1.875	162.3	166.7	4.4		.22		.04		91	2.68						.05	.17			1							15	SP	65		SP	1		15					Hf; st devel. Mb. Veinlts. chlor. Sp suls
	166.7	174.1	7.4		.20				70	2.64							.20			1							15	25	15		1	1		10		Tt	169.3	grad	Hf; as above to 169.3, then Tt; mod devel. gar; tr suls
	174.1	183.9	9.8		.36		.08		96	2.55							.36			1							15	15	50		1	1		15		Hf	175.0	brkn	Tt; sp clay, tr suls to 175.0, then Hf; sp chlor veins; tr suls
	183.9	192.9	9.0		.05		.05		100	2.68							.05			1							15	30	45		1	1		5		Tt	189.5	grad	Hf; as above to 189.5, then Tt; mod clay, sp chlor Tr suls
	192.9	201.2	8.3		.92		.04		100	3.13					Cu		.97	Cu pnts	Tr	1		Tr					15	35	20		1	5	10	5					Tt; mod clay - chlor w. sp suls, grad to massive gar w. sp hem
	201.2	211.0	9.8		.30	4.4 .52	.21	4.4 .82	81	3.47	.04				.05		.09	.12	1	1		1					10	75	5		5	Tr		SP					Tt; st devel. gar, tr hem to 207.0, then leached; mod clay, sp CuOx
	211.0	221.0	10.0		.48		.05		71	2.96							.48			1							10	45	30		SP	1		5					Tt; mod clay - chlor. Mod Hf; tr suls. Tr Siltst
	221.0	230.7	9.7		.49		.02		98	3.09							.49			1							10	55	20		1	1	5	SP					Tt; sp clay alt. Mod epy in vnlts. Sp Hf.
	230.7	239.3	8.6		.44		.02		100	3.06							.44			1							10	50	20		1	1	10	1					Tt; sp clay w. occas. blebs silica. Incr banded chlor. Sp suls
	239.3	248.9	9.6		.30		.01		93	3.30							.30			1		Tr					10	45	25		1	1	15	1					Tt; sp clay - chlor. Incr gar. Tr suls
	248.9	259.8	10.9		.32		.01		95	2.78							.32			1		1					10	45	30		5	1	5	5					Tt; sp clay grad to st gar w. sp hem in vnlts. Sp suls
	259.8	270.2	10.4		.11		.04		91	2.91							.11			1		1					5	50	20		Tr	1	20	SP					Tt; sp clay. Sp suls. Tr Siltst
	270.2	279.1	8.9		.19				88	3.34							.19			1							5	70	15		1	1	10						Tt; st gar, sp clay. Patches Siltst w 0.5" gar bands dipping ~30°.
	279.1	288.5	9.4		.14				93	3.36							.14			1		Tr					5	80	5		1	1	10	SP					Tt; as above
	288.5	296.9	8.4		.16				96	3.10							.16			1		1					5	70	15		1	1	10	1					Tt; st gar, sp Siltst throughout
	296.9	305.8	8.9		.14				95	3.14							.14			1		1					5	60	25		1	1	5	1					Tt; st gar. Sp Siltst - Hf. Sp suls
	305.8	315.1	9.3		.33		.01		100	2.83							.33			1		1					5	50	25		1	1	15	1					Tt; mod gar w. patches. interbedded gar - siliceous ck. Tr suls
	315.1	324.6	9.5		.47	30.3 .41	.02	30.3 .02	96	2.73							.47			1		1				Tr	5	25	10		1	1	50	1		Siltst	318.5	~50°	Tt; sp feldspath, sp Siltst, sp suls to 318.5, then Siltst; sp chlor, tr suls.
	324.6	335.1	10.5		.36		.02		92	2.69							.36			1							SP	Tr	Tr		1	1	90	1					Siltst; sp chlor; tr suls
	335.1	345.4	10.3		.41		.02		68	2.86							.41			1							1	10	SP		1	1	85	1		Tt	335.7	brkn	Siltst; as above to 335.7, then Tt; sp feldspath; sp Tr Siltst bands at 45°
	345.4	355.6	10.2		.18		.02		100	2.29							.18			1		Tr					1	40	20		1	1	35	1					Tt; sp feldsp - gar - Siltst banding at 40° - 50° Patches massive gar.
	355.6	362.4	6.8		.04				95	3.26							.04			1		1					5	75	15		1	1	SP	1					Tt; sp clay alt Mod greenish ck (Hf w. no cal, or Siltst?)
	362.4	371.5	9.1		.11				88	3.21							.11			1		1				Tr	5	70	10		1	1	10	Tr		Siltst	369.7	grad	Tt; as above to 369.7, then Siltst, sp Hf, sp suls
	371.5	380.9	9.4		.16				95	2.74							.16			1		1					5	20	5		1	1	60	1		Tt	378.1	5°	Siltst, dk gy, sp suls to 378.1, then Tt; sp clay - suls
	380.9	390.2	9.3		.13				90	3.23							.13			1							5	55	15		1	1	20	SP					Tt; sp clay, tr chlor in vnlts; sp suls. 2 ft patch Siltst.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes: --

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparse (Sp) < 5%, Moderate (Md) 5-50%, Strong (St) + 50%

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif Igneous

Hole No. D-137
Page 2 of 2 Pages
Collar Elev. 2888.80 Final Depth 4700
Coords N 87,701.20 E 19,812.68
Inclination Vert
Logged by FTG-CWH
Date: Start 12/14/62 Finish 1/4/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cu	Cpy	Born	Fe (2) Lim.	Py	Mag	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
390.2	398.9	8.7		.27		.01		97	2.77							.27			Tr		Tr				Tr	5	30	45		SP	SP	95	5		Hf	394.0	grad	Tt, sp clay, sp mly rimming qtz, crits to 394.0, then Hf, sp clay-silicif
398.9	408.5	9.6		.41		.01		71	2.96							.41			1		1				1	5	20	35		1	1	95	SP		Sltst	404.2	brkn	Hf; sp feldspath - st silicif to 404.2, then Sltst, tr bedding?
408.5	414.2	5.7		.19		.01		53	2.60							.19			1						1	SP	10	40		1	1	40	Tr		Hf	408.5	brkn	Hf, st clay alt, tr suls to 410.5, then Dp(?) brkn; int
																																			Dp?	410.5	brkn	silicif
414.2	416.2	2.0																																				Cavity
416.2	424.2	8.0		.20		.02		42	2.62							.20			Tr						Tr					Tr	Tr	95						Dp?, brkn, int silicif. Vague ign text
BX 1437 → 424.2	434.6	10.4		.16				38	2.63							.16			1						1					1	1	90	SP					Dp(?) brkn, int silicif. Possib qtzte Patch blk f.g. ign (And?)
434.6	444.3	9.7		.18				72	2.62							.18			1						1					1	1	95						Dp; (?) brkn, int. silicif. Tr suls
444.3	453.5	9.2		.09				64	2.67							.09			1						1					1	1	95						Dp; (?) as above
453.5	464.5	11.0		.16				72	2.63							.16			1						1					1	1	95						Dp; int silicif. Patches w. vague ign text.
464.5	470.0	5.5		.13				33	2.62							.13			1						1					1	1	95						Dp; st silicif. Tr suls
						Av. Rec =		83%																														
				END OF HOLE																																		

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Toctite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-138

Page 1 of 1 Pages

Collar Elev 3134.69 Final Depth 376.5

Coords. N 32,549.47 E 18,602.22

Inclination Vert

Logged by FTG - CWH

Date: Start 1-1-63 Finish 1-19-63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	GYPSUM	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	20.0	20.0						ROCK	BIT																														ROCK BIT
NC 2400 →	20.0	29.5	9.5		.28		.24		56	2.68			.01	.23		.04			Tr								15	20	50		5			SP	Tr		Hf	20.0	-	Hf, leached; sp clay - chlor.
	29.5	39.5	10.0		1.73		0.24		70	2.53		.01	.01	.22		.25	1.24		1	SP	Tr	Tr					15	15	30		5			25						Hf, as above to 34.5, then st. chlor. - clay alt. 2" vnlt st. suls
	39.5	48.8	9.3		1.07	31.5	0.96	3.5	83	2.88		.01	.01	.94		.05	.06		1	Tr							15	15	60		SP			Tr		Tr				Hf, leached; sp chy. Sp CuOx. Tr Tt
	48.8	53.0	4.2		.90	1.09	.81	.54	74	3.33	.15		.01	.65			.09		5	1							15	70	10		1			1	-		Tt	48.8	brkn	Tt; leached; dense, sp clay to 50.0, then mod lim - sandy text
	53.0	61.0	8.0		.40		.28		63	2.70	.05		01	.28			.12		5	1							15	50	30		1			1	Tr					Tt. leached, mod lim, sandy text to 59.7, then mod clay alt
	61.0	69.8	8.8		.27		.14		94	2.75			.01	.13			.13		Tr	1							15	75	5		1			1						Tt. leached; massive gar - qtz. alt.
	69.8	74.9	5.1		.61	1.44	.14	1.49	95	2.78	.04		.01	.09			.47		1	1							15	60	15		1			1						Tt; leached to 71.7, then sp clay - chlor alt. Tr suls
	74.9	84.2	9.3		.90	.80	.06	.09	80	2.78							.90		1	1	Tr	Tr					15	20	55		1	Tr		SP		Tr	Hf	74.9	grad	Hf; mod clay - chlor alt. Patches Tt. Tr gypsum vnlts. 2" patch And dike
	84.2	94.4	10.2		.24	1.03	.16		62	3.12	.05	.01	.01	.09			.08		SP	1							15	55	25		1	1		Tr			Tt	87.0	grad	Hf; sp chlor to 87.0, then Tt; mod silicif to 87.8, then st leaching, st CuOx
	94.4	101.0	6.6		.51	3.49	.33		18	2.54			.01	.32			.18		1	1							SP	10	70		10			1	SP		Hf	94.4		Hf; leached, st. clay alt. Sp CuOx
NC 1.875 →	101.0	110.5	9.5		1.28	35.4	1.10	3.54	72	2.25			.01	1.09			.18		1	1							5	10	70		5			1	Tr					Hf, as above
	110.5	120.0	9.5		.87	1.05	.76	.90	85	3.09			.01	.75			.11		1	1							10	5	70		5			SP	1					Hf as above plus patches of Tt
	120.0	129.8	9.8		1.37		1.21		34	2.82			.01	1.20			.16		1	1							10	25	50		5			1	1					Hf as above plus mod grn CuOx
	129.8	139.9	10.1		.07		.06		47	2.61			.01	.06					1	1							10	30	45		5			1	1					Hf & Tt, leached, brkn, sp blk CuOx
	139.9	144.4	9.5		.12				58	3.02			.01	.09			.02		1	1							10	65	10		5			1	1		Tr	139.9	Grad	Tr, mz grees of lapuc. ig. text. Badly brkn. Sp. blk ox.
	144.4	158.0	8.6		.16				22	2.64			.01	.09			.06		1	1							5	70	10		5			1	1					Tr as above except no ig. frags.
	158.0	168.0	10.0		.12				41	2.85			.01	.07			.04		1	1							SP	30	SP		5	SP		Tr	1		Mz	161.5	brkn	Tt, as above to 161.5, then Mz; mod clay alt; leached
	168.0	176.5	8.5		.20				82	3.13			.01	.15			.04		1	1							5	70	10		5				1		Tt	168.0	brkn	Tt; brkn; leached; mod clay alt
	176.5	184.1	7.6		.11				73	2.99			.01	.07			.03		1	1							5	70	10		5				1					Tt; as above
	184.1	194.3	10.2		.20				79	2.81	.04		.01	.10			.05		1	1							5	60	10		5	Tr		Tr	1		Mz	192.3	brkn	Tt; as above to 192.3, then Mz; brkn, leached, wk silicif. mod CuOx
	194.3	203.7	9.4		.06				98	3.03			.01	.04			.01		1	1							5	85	5		SP				1		Tt	194.3	brkn	Tt; sp clay - massive gar. Tr suls
	203.7	213.0	9.3		.11				92	3.12			.01	.03		.03	.04		1	1							5	70	5		1		5	Tr	1					Tt; as above to 209.0, then mod lt brf. Sltst - Tt band at 40°
	213.0	221.7	8.7		.04				87	3.14			.01	.01			.02		1	1							SP	70	5		1		15	1	1					Tt; massive gar. Patches lt gy Sltst (bleached?)
	221.7	230.0	8.3		.17				86	2.72			.01	.13		.03			1	1							1	60	5		1	Tr	5	1	1		Dp	228.5	brkn	Tt; as above to 228.5, then Dp; brkn, mod lim - silicif
	230.0	239.3	9.3		.23				91	2.73			.01	.05			.17		1	1						Tr	15	45	30		1	1		SP			Tt	234.8	brkn	Dp; mod silicif to 234.8, then Tt; sp clay, tr suls
	239.3	249.9	10.6		.20				95	3.05	.04		.01	.07			.08		1	1						1	10	70	15		1	1		Tr	Tr					Tt; mass gar. w. sp. vnlts w. yellowish clay. Tr CuOx - suls
	249.9	259.5	9.6		.13				86	3.31			.01	.03			.09		1	1							10	65	20		1	1		1	1					Tt; as above
	259.5	268.3	8.8		.41		.20		91	2.94	.05		.01	.14		.10	.11		1	1							10	55	30		1	1		1	1					Tt; " "
	268.3	277.4	9.1		.49		.33		95	2.62	.07		.01	.25		.04	.12		1	1							10	40	25		10	1		1	1					Tt; sp - mod clay alt. Sp lim - CuOx
	277.4	287.1	9.7		.50		.37		90	2.60	.10	.01	.01	.25		.08	.05		SP	1							SP	SP	5		SP	SP	SP	1	1		Mz	280.2	brkn	Tt; leached; mod clay alt. to 280.2, then Mz, mod alt. Patches Tt
	287.1	296.3	9.2		.34		.15		83	3.05	.04		.01	.10		.10	.09		1	1							1	10	10		1	1	1	1	1		Tt	287.1	brkn	Tt; leached, sp clay - chlor. Patches Mz, HF
	296.3	305.9	9.6		.58	37.4	.12	37.4	85	3.11			.01	.11		.15	.28	.03	Tr	1							10	50	35		1	Tr		5						Tt; mod clay alt. Tr suls
	305.9	316.5	10.6		.66	.61	.47	.41	81	2.63	.15	.01	.01	.30		.08	.11		1	1							5	25	5		1	1	5	SP						Tt; leached, mod clay. Incr Hf w. mod clay - grn alt. Patches Mz
	316.5	327.3	10.8		.76		.63		80	2.53	.20	.01	.01	.41		.13			SP	1							SP	10	5		10	1	5	1		Tr	Mz	322.0	brkn	Mz - Tt; mixed st. zone w. st. CuOx - lim 316.5 - 322.0, then Mz; wk alt
	327.3	337.1	9.8		.36		.28		89	2.57			.01	.27		.08			1	1							5	40	20		10	1	Tr	Tr			Tt	332.2	brkn	Mz; as above to 332.2, then Tt, leached; mod clay
	337.1	346.9	9.8		1.32		1.08		85	2.50	.60		.01	.47		.24			10	1							5	30	10		20	1		1			Mz	342.5	brkn	Tt; leached; mod lim - clay alt to 342.5, then Mz; mod clay. Sp CuOx
	346.9	356.0	9.1		.19		.12		93	2.60	.04			.03		.07			Tr	1											Tr	Tr		1			Dp	351.3	brkn	Mz; wk alt, tr suls to 351.3, then Dp, wk alt. Tr suls
	356.0	363.4	7.4		.15		.12		100	2.58	.05			.07		.03				1											1	1		1						Dp; as above 2' patch Mz
	363.4	373.7	10.3		.16				91	2.60	.08			.03		.06				1											1	1		1						Dp; as above. Sp Mz text.
	373.7	376.5	2.8		.14				83	2.61	.04			.04		.06				1											1	1		1						Dp; as above.
							Av. Rec. = 72 %																																	
						END	OF	HOLE																																

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows:
Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Dd - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undifferentiated

Hole No. D-139
Page 1 of 2 Pages
Collar Elev. 3010.15 Final Depth 394.8
Coords. N 37,717.99 E 18,896.34
Inclination Vert.
Logged by ETG - GWH
Date: Start 1-4-63 Finish 1-16-63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Limo	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	ARGILLITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	12.6	12.6						Rock	Bit																													ROCK BIT
NC 2.400	12.6	19.6	7.0		1.03	24.4 @ .61	.90	29.4 @ .54	62	3.21	.30	.01	.02	.57		.05	.03		SP	Tr		SP					15	45	20		5	SP	5	5		Tt	12.6	—	Tt; leached; sp hem - clay alt. Mod CuOx
	19.6	26.1	6.5		.48		.43		25	2.58	.10	.01	.01	.31		.04	.01		Tr	Tr		Tr									5	SP	20	SP		Mz	19.6	brkn	Mz; brkn, leached; st silicif. Sp CuOx
	26.1	37.0	10.9		.42		.37		46	2.57	.07		.01	.29		.02	.03		SP	1		1					10	15	40		10	1	5	15		Hf	31.5	brkn	Mz; as above to 31.5, then Hf; leached; st chlor w/ wk hem alt. Sp CuOx
	37.0	45.3	8.3		.37		.28		90	2.72	.03		.01	.24		.04	.05		1	1		1					5	10	50		5	Tr	SP	10		Dp.	42.5	brkn	Hf, leached; mod chlor - silicif w/ patches Dp., mod CuOx to 42.5, then Dp, leached; mod silicif. Mod Feldspath w/ Hf incl. st. st.
	45.3	55.0	9.7		.30		.27		84	2.57	.02	.01	.01	.23		.03			Tr	Tr							Tr				SP	SP	SP	Tr					Dp; leached; mod silicif. Sp CuOx. Patches w. Dp text.
	55.0	63.2	8.2		.16				84	2.57	.01	.01	.01	.10		.03			1								1				1	1	1	1					Dp; leached; spotty silicif; feldspath; chlor - Sp bx frags (Hf?)
	63.2	71.4	8.2		.25				91	2.55	.01		.01	.20		.03			1								1				1	1	5	1					Dp; as above; brkn
	71.4	80.7	9.3		.40		.13		98	2.49	.02		.01	.09		.28			1	Tr							1				1	1	10	SP		Mz	71.4	grad	Mz; leached; st feldspath. Sp chlor bx frags. Sp CuOx
	80.7	87.3	6.6		1.06		0.90		83	2.49	.25	.01	.02	.62		.16			SP								SP	5	30		10	1	5	25		Hf	86.4	brkn	Mz; as above to 86.4, then Hf, leached; st. chlor
	87.3	97.5	10.2		1.54		1.35		60	2.52		.01	.02	1.32		.19			SP			SP					10	25	10		15	1	SP	30		Tt	89.0	grad	Hf; st chlor to 89.0, then Tt; leached; sp hem - clay. Mod CuOx
	97.5	108.1	10.6		1.18	68.4 @ 1.71	0.93	68.4 @ 1.42	61	2.57		.02	.02	.89		.22			1			1					15	30	25		15	1	1	10					Tt as above. 2.5 ft patch Hf w mod clay to 100.0'.
	108.1	118.1	10.0		4.85		4.31		73	3.11	.10	.02	.03	4.16		.30	.24		5	Tr		5					5	30	20		15	1	Tr	15					Tt; leached; sp hem - mod clay. St CuOx - sp suls
	118.1	126.4	8.3		1.30		1.18		52	3.09	.05	.01	.02	1.10		.08	.10		5	1		SP					5	50	15		10	1	1	10					Tt; st leaching. Mod lim - clay - hem alt. St. CuOx. Sp chlor Hf
	126.4	131.7	5.3		1.48		1.09		80	3.13		.01	.30	.78		.25	.08		5			Tr					Tr	60	10		5	1	5	5					Tt; leached; st gar. Mod CuOx
	131.7	139.8	8.1		1.38		2.85		86	3.11	.40	.01	.01	.53		.30	.13		5	Tr							1	70	10		5	1	SP	Tr					Tt; leached; st lim alt. grad to yellow gar - clay alt. Mod CuOx
	139.8	145.7	5.9		.27		.07		94	2.62						.18	.09								Tr		8	5	25		SP		5	Tr		Hf	141.7	brkn	Tt; mod clay - gar to 141.7, then Hf; sp clay, mod chlor in vnlts Tr suls
	145.7	155.7	10.0		.26				100	2.41							.26			1	Tr						5	10	75		1			5					Hf; sp clay; chlor vnlts + pods. Sp suls. Finely diss mag
NX 1.375	155.7	165.0	9.3		.24				98	2.41							.24			1	Tr	Tr					5	10	65		1			10					Hf; as above
	165.0	174.6	9.6		.17		.07		99	2.65							.17			1	1						5	10	65		1			10					Hf; as above w incr. diss. blk. chlor
	174.6	183.7	9.1		.46		.04		87	2.92							.46			1	1						10	10	75		1			SP					Hf; mod clay - diss chlor alt. Sp suls.
	183.7	196.0	7.3		.33		.04		75	2.61							.33			1	1						10	10	70		10			Tr					Hf, as above
	196.0	200.3	9.3		.55	223 @ .48	.02	223 @ .02	73	2.50							.55			1							10	10	70		5			SP					Hf; as above, wk suls.
	200.3	208.6	8.3		.45		.01		74	3.03							.45			1							10	10	60		15			1					Hf, soft brkn, chlor alt, wk - mod clay alt, Sp diss suls
	208.6	218.3	9.7		.43		.04		93	2.68	.01						.42			1							10	10	75		SP			1					Hf, limy, blue color, Dp? Coral Type. Mod diss sulf, sp suls
	218.3	228.0	9.7		.08		.03		96	2.60							.08			1							10	10	70		5			5					Hf, wt. Tape. Tr-w-l. Type, lt color, chlor alt at some sp suls.
	228.0	237.7	9.7		.17		.03		93	2.66							.17			1		Tr					15	10	30		5			5		Mb.	230.0	Grad	Hf, very limy, brecciated, little chlor, alt as some sp. suls
	237.7	247.1	9.4		.12		.03		95	2.69							.12			1		1					85	5			SP			5					Mb, wt brkn, st chlor some leaching. Tr suls
	247.1	253.9	6.8		.95	164 @ .80	.03	164 @ .03	82	2.66							.95		Tr	1	Tr						15	5	10		5	Tr		10		Hf	249.8	Grad	Mbs above to st. Hf blu, limy, to suls. Tr leaching
	253.9	263.5	9.6		.69		.04		100	2.65							.69			1	1	Tr					15	5	65		SP	1		10		Tt	259.8	brkn	Hf; sp chlor; mod suls to 259.8, then Tt; sp clay, sp suls
	263.5	273.6	10.1		.20		.03		100	2.77							.20			1		Tr					15	45	30		1	1		SP					Tt; sp chlor in vnlts; diss hem, mod col vning. Sp suls
	273.6	282.9	9.3		.04				86	3.45							.04			1		1					10	70	10		1	1		1					Tt; mod diss chlor grad to st. gar. Sp suls
	282.9	292.8	9.8		.06				100	2.71						.01	.05		Tr	1		1					15	30	45		1	1		15		Hf.	282.9	grad	Hf; st chlor w st. col. vning. Incipient bx throughout. Sp suls.
	292.8	300.1	7.3		.19				100	2.60							.19			1		1					10	15	45		1	1		25					Hf; st chlor. Mod col blebs. Sp Tt. Tr suls
	300.1	310.0	9.9		.24		.05		93	2.59							.24		SP	1		1					10	15	40		5	1		25					Hf; st. int. chlor - clay alt. leached
	310.0	319.8	9.8		.53		.11		96	2.62						.02	.51			1							10	20	40		SP	1		20		Tt	319.1	grad	Hf; st chlor - clay. Sp leaching to 319.1, then Tt sp clay, leach
	319.8	329.8	10.0		.23		.07		92	2.68							.23			1		Tr					15	30	30		20	1		SP	Tr				Tt; mod clay alt to 326.2, then int. lim - clay alt for 3 ft.
	329.8	339.8	10.0		.30				80	2.97				01	.10		.19		Tr	1							15	45	30		5	1		Tr	1	Mz	335.0	brkn	Tt; mass. gar grad to st. clay - lim to 335.0, then Mz; dk gy, wk alt
	339.8	347.0	7.2		.18				71	2.61				01	.10		.07			1	1						SP				10	1	10	SP	1				Mz; dk. gy. Sp Dp text. 1' patch Qtzite
	347.0	351.5	4.5		.24				83	2.65				01	.16		.07			1	1						5				5	1		1	1	And	347.0	brkn	And. post min dike (Sill st text) to 350.5, then Mz; mod
																																				Mz	350.5	brkn	silicif. Tr CuOx
	351.5	357.3	6.3		.16				71	2.54				01	.05	.05	.05		Tr	Tr							Tr			Tr	5	Tr		Tr	Tr				Mz; mod alt. in patches st. clay. Patches Qtzite
	357.3	365.7	7.9		.25				75	2.67				01	.09	.10	.10		1	1										1	SP	1		1	1				Mz, int clay - gar. alt to 362.0, then sp alt, tr suls.
	365.7	375.3	9.6		.18				54	2.64	.03				.03	.08	.04		1	1										1	1	1	5	1	1				Mz, brkn, patches mod silicif. Tr suls

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-139
Page 2 of 2 Pages

Collar Elev. 3010.15 Final Depth 394.8
Coords. N 37,717.99 E 18,896.34
Inclination Vert.
Logged by PTG - CWH
Date: Start 1-4-63 Finish 1-16-63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	PY	Mag.	Hem.	Spec.	Other (2) Galena	Spinel	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JARCOSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
375.3	385.5	10.2		.19		.09		61	2.59	.04			.05		.10			Tr	Tr										Tr	Sp	Sp	Sp	Tr	Tr				Mz; brkn, int silicif
385.5	394.8	9.3		.05		.04		66	2.62	.03			.02		.01			1	1										1	1	1	5	1	1				Mz; as above
					Av	Rec. =		52%																														
				END	OF	HOLE																																

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-140
Page 1 of 2 Pages
Collar Elev. 3034.91 Final Depth 429.3
Coords. N 37,239.28 E 19,240.25
Inclination Vert
Logged by FTG - CWH
Date Start 1/12/63 Finish 1/26/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	HMOSITE	INSES YOS	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	14.0	14.0						ROCK BIT																															ROCK BIT
NC 2.400	14.0	21.8	7.8		1.26	2.33	1.15	2.33	64	3.08	.50	.01	.01	.63		.07	.04		5	Tr		Tr					5	25	10		5		Tr				Tt	14.0	-	Tt; leached; st gar w. st qtz veins. Patches mod clay. Mod CuOx
	21.8	30.9	9.1		.67	.9	.61	.9	73	2.50	.18	.01	.01	.41			.06		5			1					5	50	15		5	Tr	15	SP	Tr					Tt; leached; mod silicif - sp hem - clay. Sp CuOx. Patches blce Sltst ?
	30.9	37.3	6.4		.54	.83	.50	.73	87	2.53	.10		.01	.39			.04		SP								SP	20	10		5	1	25	1	1		Ch zone	30.9	brkn	St zone w. int silicif lgn (Mz?) Patches Sltst Brkn. leached.
	37.3	44.4	7.1		.31		.30		63	2.57	.05		.01	.24			.01		1	1							Tr	5	20		5	1	60	Tr	1		Sltst	37.3	grad	Sltst; leached, as above. Int silicif. Patches Tt, Hf.
	44.4	53.6	9.2		.50		.50		88	2.62	.10		.01	.39					1	1							5	20	45		15	1	Tr	SP	1		Hf	46.6	brkn	Sltst; as above to 46.6, then Hf; int clay - jaro alt grad to sp silicif
	53.6	58.0	4.4		.24		.22		85	3.18		.01	.01	.20			.02		1	1							10	65	15		SP	1		Tr			Tt	53.6	grad	Tt; leached, sp chlor - qtz blebs. Mod CuOx
	58.0	66.3	8.3		—		—		—	-																														Stope
NX 1.875	66.3	75.3	9.0		3.50		3.25		79	3.12		.01	.02	3.22			.25		5	Tr		SP					5	35	15		15	Tr	20	5	SP					Tt; int hem - clay alt to 72.5, then sp silicif - chlor. St CuOx
	75.3	83.9	8.6		.88		.88		98	2.93		.01	.01	.86					SP	1		1					10	55	20		SP		Tr	5	1					Tt; leached; sp chlor - hem - clay alt. Sp CuOx.
	83.9	91.2	7.3		.79	3.3	.69	4.3	100	2.68		.01	.01	.67			.10		Tr	1		Tr					15	60	15		1			SP	Tr					Tt; as above. Sp silicif
	91.2	96.4	5.2		1.44	1.46	1.29	1.32	71	3.00			.01	1.28			.15		1			1					15	10	40		25			1	1		Hf	91.2	grad	Hf; leached; grad to int lim - clay alt. Tr CuOx
	96.4	105.6	9.2		1.19		.96		79	2.90			.01	.95		.07	.16		1	Tr		1					15	30	40		10			5	1					Hf; leached, st clay - jaro alt to 103.6, then mod Mb - hem - CuOx
	105.6	114.6	9.0		.80		.72		91	2.73	.05		.01	.66			.08		1	1		1					80	SP	5		5			SP			Mb	105.6	grad	Mb; leached, patches w. mod hem. Sp CuOx
	114.6	122.7	8.1		.20		.19		99	2.66			.01	.19					1	1							95	Tr			SP									Mb; leached, tr CuOx
	122.7	131.7	9.0		.16				91	2.63			.01	.13		.02			1	1							95	1			1									Mb; as above
	131.7	141.6	9.9		.06				92	2.63			.01	.05					1	1							95	1			1									Mb; " "
	141.6	150.6	9.0		.18		.15		92	2.76			.01	.14			.03		1	1		Tr					80	SP	SP		1		10		Tr					Mb; " " Dark gy patches (CuOx?)
	150.6	155.6	5.0		.17		.13		91	2.67			.01	.13			.04		1	1		1					35	1	1		1		15		1					Mb; as above
	155.6	165.1	9.5		.12				100	2.62			.01	.09			.02		1	1							90	1	1		1				1					Mb; " "
	165.1	175.2	10.1		.24		.22		90	2.68			.01	.21			.02		1	1		Tr					90	1	1		1				1					Mb; as above to 165.3, then st hem, sp CuOx
	175.2	184.7	9.5		.94		.88		94	2.66			.01	.87			.05		1	1		SP					85	5	1		5				1					Mb; patches int hem alt w. mod CuOx.
	184.7	193.8	9.1		.26		.17		91	2.67			.01	.16			.09		1	1		Tr	Tr				65	5	25		SP				1		Hf	190.0	grad	Mb; sp hem patches w. incr clay to 190.0, then Hf, sp chlor, tr suls
	193.8	203.7	9.9		.83		.02		71	2.70						.10	.73			1	1	1				Tr	15	5	70		SP				5					Hf; mod chlor - clay alt. St suls in vnlt + diss
	203.7	211.0	7.3		.68		.02		72	2.66						.05	.63			1	1	1				1	15	5	65		1				10					Hf; mod chlor alt. St suls.
	211.0	217.5	6.5		.42		.05		95	2.76							.42			1	1	1				1	20	5	70		1				SP					Hf; sp chlor - mod clay alt. Sp suls.
	217.5	225.4	7.9		.20	66.1	.04	61	67	2.64							.20			1							15	5	75		1				1					Hf; as above
	225.4	232.9	7.5		.50	1.00	.05	.08	82	3.09							.50			1							15	5	70		1				5					Hf; sp clay alt. Sp. suls, incr to mod chlor - suls
	232.9	242.6	9.7		2.33		.05		90	2.66							2.33	.50		1	Tr						15	5	70		1			SP			Tt	241.7	brkn	Hf; st clay - mod chlor alt, st suls to 241.7, then Tt, gar sand, st clay.
	242.6	250.0	7.4		1.04		.11		57	2.53				.11			.93			1							15	55	10		10			Tr						Tt; st clay - devel gar. sand. St suls
	250.0	259.9	9.9		.95		.27		100	2.63				.27			.68	.10		Sp									5		25									Tt; int clay alt. Mod gar sand. Mod suls - sp CuOx
	259.9	273.0	13.1		—		—		—	—																														Stope
BX 1.432	273.0	276.7	3.7		1.56	18.7	.41	18.7	76	2.75				.41			1.15		Tr	1	Sp							25	10		50				1		Hf	273.0	brkn	Hf; st clay - mod chlor. St suls.
	276.7	283.9	7.2		1.02	6.86	.05	.19	100	2.49							1.02			Tr	Sp						15	20	40		10	5	SP	10						Hf; as above. Deer suls
	283.9	291.7	7.8		2.78		.06		83	3.01							2.78			5	1						15	30	30		15		1	Tr			Tt	283.9	brkn	Tt; st clay - mod chlor w. st suls grad to mod clay - sp suls.
	291.7	301.8	10.1		.23		.05		92	3.10							.23			SP	Tr	Tr		Tr			10	40	20		SP		20	5						Tt; sp clay alt. Sp suls in vnlts.
	301.8	308.7	6.9		.17				85	3.16							.17			1		1					15	40	30		1		SP	10						Tt; as above.
	308.7	318.7	10.0		.13				92	3.33							.13			Tr		1					15	20	10		1			SP						Tt; " "
	318.7	328.9	10.2		.13				98	3.01							.13			1		1					15	60	20		1			5						Tt; sp clay w. sp chlor - hem in vnlts
	328.9	334.1	5.2		.16				94	3.19							.16			1		1					15	60	15		1			10	Tr					Tt; sp clay. Tr suls
	334.1	342.6	8.5		.18				99	2.92							.18			1		1					15	50	20		1		10	5						Tt; as above.
	342.6	350.9	8.3		.10												.10			1		1					15	60	10		5		SP	Tr						Tt, bcm gar, gen CaSiO3 mine. Tr suls.
	350.9	359.8	8.9		.19												.19			1		1					15	40	30		5		Tr	5						Tt, as above, w. sc. Hf. areas.
	359.8	370.1	10.3		.16		.03										.16			1		1				Tr	15	30	30		SP		15	10			Hf	359.8	grad.	Hf w. some Tt @ start. Here incr color & qtz. RK appears to be a contact bx
	370.1	380.2	10.1		.42		.02										.42			1		1					15	20	40		1		5	15						Hf, st chlor, mod qtz. bx appears first here, then incr solid. decrease.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

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Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-140
Page 2 of 2 Pages
Collar Elev. 3034.91 Final Depth 429.3
Coords. N 37,239.28 E 19,240.25
Inclination Vert
Logged by FTG - CWH
Date: Start 1/17/63 Finish 1/26/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
380.2	383.9	3.7		24		.02										.24			Tr		Tr				Tr	15	15	40		SP			20		Hf			Hf, dense, st. schlier, bally brka. Tr. suls.
383.9	394.0	10.1		.13												.13										Tr					Tr		Tr		Dp	383.9	Brka	Dp, fresh - wk alt @ start. Hf - grn. fresh. Bed Hf inch @ start. Tr-H2S
394.0	404.6	10.6		.17												.17																						Dp, grn. fresh, tr clay alt. Tr. pink felds. Tr. Cpy & H2S2
404.6	415.8	11.2		.19												.19																						Dp, as above, one 2" dk. silt Hf inch
415.8	425.0	9.2		.18												.18																						Dp, wk alt. Tr feldspath. Sp suls in vnlts.
425.0	429.3	4.3		.21												.21																						Dp; wk alt. Tr suls
						Av.	Rec. =	86 %																														
				END	OF	HOLE																																

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 3 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Collar Elev 3034.91 Final Depth 429.5
Coords. N 37,239.28 E 19,240.25
Inclination Vert
Logged by FTG - CWH
Date: Start 1/17/63 Finish 1/26/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	ANDESITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	14.0	14.0						ROCK	BIT																														ROCK BIT
NC 2400	14.0	21.8	7.8		1.26	2.33	1.15	2.33	64	3.08	.50	.01	.01	.63		.07	.04		5	Tr	Tr						5	15	10	5		Tr				Tt	14.0	-	Tt, leached; st gar w. st qtz veins Patches mod clay Mod CuOx
	21.8	30.9	9.1		.67	.33	.61	.73	73	2.50	.13	.01	.01	.41			.06		5	1	1						5	50	15	5		Tr	15	SP	Tr					Tt, leached, mod silicif - chlor - clay Sp CuOx Patches bleo Sltst ?
	30.9	37.3	6.4		.54		.50		87	2.53	.10		.01	.39			.04		SP								SP	20	10	5	1	25	1	1		Ct zone	30.9	brkn	Ct zone w. int silicif lgn (Mz?) Patches Sltst Brkn leached
	37.3	44.4	7.1		.31		.30		63	2.57	.05		.01	.24			.01		1								Tr	5	20	5	1	60	Tr	1		Sltst	37.3	grad	Sltst leached, as above int silicif Patches Tt, Hf
	44.4	53.6	9.2		.50		.50		88	2.62	.10		.01	.39					1	1							5	20	45	15	1	Tr	SP			Hf	46.6	brkn	Sltst, as above to 46.6, then Hf, int clay - gard alt grad to sp silicif
	53.6	58.0	4.4		.24		.22		85	3.18		.01	.01	.20			.02		1	1							10	65	15	SP	1		Tr			Tt	53.6	grad	Tt, leached, sp chlor - qtz bleo Mod CuOx
	58.0	66.3	8.3		—		—		—	—																														Stope
NX 1875	66.3	75.3	9.0		3.50		3.25		79	3.12		.01	.02	3.22			.25		5	Tr	SP						5	35	15	15	Tr	20	5	SP					Tt, int hem - clay alt to 72.5, then sp silicif - chlor St CuOx
	75.3	83.9	8.6		.88		.88		98	2.93		.01	.01	.86					SP								10	55	20	SP		Tr	5	1					Tt, leached; sp chlor - hem - clay alt Sp CuOx
	83.9	91.2	7.3		.79	4.83	.69	4.83	100	2.68		.01	.01	.67			.10		Tr			Tr					15	60	15	1			SP	Tr					Tt, as above Sp silicif
	91.2	96.4	5.2		1.44	1.46	1.29	1.32	71	3.00			.01	1.28			.15		1								15	10	40	25			1	1		Hf	91.2	grad	Hf, leached, grad to int hem - clay alt Tr CuOx
	96.4	105.6	9.2		1.19		.96		79	2.90			.01	.95		.07	.16		1	Tr	1						15	30	40	10			5	1					Hf, leached, st clay - gard alt to 114.6, then mod Mb - hem - CuOx
	105.6	114.6	9.0		.80		.72		91	2.73	.05		.01	.66			.05		1		1						80	SP	5	5			SP			Mb	105.6	grad	Mb, leached; patches w mod hem Sp CuOx
	114.6	122.7	8.1		.20		.19		99	2.66			.01	.19					1								95	Tr		SP									Mb; leached tr CuOx
	122.7	131.7	9.0		.16				91	2.63			.01	.13		.02			1								95			1									Mb; as above
	131.7	141.6	9.9		.06				92	2.63			.01	.05					1								95		1										Mb; " "
	141.6	150.6	9.0		.18		.15		92	2.76			.01	.14			.03					Tr					90	SP	SP		1	10	Tr						Mb; " Dark gy patches (CuOx?)
	150.6	155.6	5.0		.17		.13		91	2.67			.01	.12			.04		1			1					35	1	1			5	1						Mb; as above
	155.6	165.1	9.5		.12				100	2.62			.01	.09			.02										90	1					1						Mb, " "
	165.1	175.2	10.1		.24		.22		90	2.68			.01	.21			.02					Tr					90	1	1				1						Mb, as above to 165.3, then st hem, sp CuOx
	175.2	184.7	9.5		.94		.88		94	2.66			.01	.87			.06		1			SP					35	5	1	5			1						Mb, patches int hem alt w mod CuOx
	184.7	193.8	9.1		.26		.17		91	2.67			.01	.16			.09					Tr	Tr				65	5	25	SP			1			Hf	190.0	grad	Mb, sp hem patches w incr clay to 190.6, then Hf, sp chlor, tr sulf
	193.8	203.7	9.9		.83		.02		71	2.70						.10	.22										Tr	15	5	70	SP			5						Hf, mod chlor - clay alt Sp sulfs in vnlt + diss
	203.7	211.0	7.3		.68		.02		72	2.66						.05	.63											15	5	65				10						Hf, mod chlor alt St sulfs
	211.0	217.5	6.5		.42		.05		95	2.76							.42											20	5	70				SP						Hf, sp chlor - mod clay alt Sp sulfs
	217.5	225.4	7.9		.20	.06 .100	.04	.06 .03	67	2.64							.20											15	5	75				1						Hf, as above
	225.4	232.9	7.5		.50		.05		82	3.09							.50											15	5	70				5						Hf, sp clay alt Sp sulfs, incr to mod chlor - sulfs
	232.9	242.6	9.7		2.83		.05		90	2.66							2.33	.50										15	5	70				SP			Tt	241.7	brkn	Hf, st clay, mod chlor alt, st sulfs to 241.7, then Tt, gar sands, st clay
	242.6	250.6	7.4		1.04		.11		57	2.53				.11			.93											15	55	10	10			Tr						Tt, st clay - devel gar sand St sulfs
	250.6	259.9	9.4		.95		.27		100	2.63				.27			.55	.10											5	25										Tt, int clay alt, Mod gar sand Mod sulfs - sp CuOx
	259.9	273.0	13.1		—		—		—	—																														Stope
BX 1432	273.0	276.7	3.7		1.56	18.7	.41	18.7	76	2.75				.41			1.15											15	50	20	5						Hf	273.0	brkn	Hf, st clay - mod chlor St sulfs
	276.7	283.9	7.2		1.02	.86	.05	.3	100	2.49							1.02											15	20	40	10	5	SP	10						Hf, as above Decr sulfs
	283.9	291.2	7.3		2.78		.06		83	3.01							2.78											15	30	30	15		1	Tr			Tt	283.9	brkn	Tt, st clay - mod chlor w st sulfs grad to mod clay - sp sulfs.
	291.2	301.8	10.1		.23		.05		92	3.10							.23			Tr	Tr		Tr				10	40	20	SP		20	5						Tt, sp chl, alt Sp sulfs in veins
	301.8	308.7	6.9		.7				85	3.16							.7										15	40	30	1		SP	10						Tt, as above
	308.7	318.7	10.0		.13				92	3.33							.13										15	30	10	1			SP						Tt, " "
	318.7	328.9	10.2		.13				98	3.01							.13										15	60	20	1			5						Tt, sp clay w sp chlor - hem in veins
	328.9	334.1	5.2		.16				94	3.4							.16										15	60	15				10	Tr					Tt, sp clay Tr sulfs
	334.1	342.6	8.5		.18				99	2.92							.18										15	50	20			10	5						Tt, as above
	342.6	350.9	8.3		.10				95	3.05							.10										15	60	10	5		SP	Tr						[illegible]
	[illegible]	[illegible]	8.9		.17				[illegible]	3.91							.17										15	40	30	5		Tr	5						[illegible]
	[illegible]	[illegible]	10.3		.16		.03		96	2.66							.16										Tr	5	20	30	SP	15	10			Hf	33.8	grad	Hf [illegible]
	370.1	380.2	10.1		.42		.02		87	3.11							.42											15	20	40		5	15						Hf st chlor [illegible]

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Stong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-140
Page 2 of 2 Pages
Collar Elev 3034.91 Final Depth 429.3
Coords. N 37,239.28 E 19,240.25
Inclination Vert
Logged by FTG - CWH
Date: Start 1/17/63 Finish 1/26/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
380.2	383.9	3.7		.24		.02		86	2.56							.24			Tr.		Tr.			Tr.	15	15	40		SP			20		Hf			Hf, dense, st. chlor, badly brkn. Tr. suls.
383.9	394.0	10.1		.13				80	2.62							.13									Tr.					Tr.		Tr.		D.p	383.9	Brkn	Dp, fresh - wk alt to start, then gen fresh. tr chl incl & start. to Hf
394.0	404.6	10.6		.17				79	2.64							.17																					Dp, gen fresh, tr clay alt. Tr pink felds. Tr Cpy & MoS2
404.6	415.8	11.2		.19				85	2.64							.19																					Dp, as above, one 2" dk. siltst incl
415.8	425.0	9.2		.18				97	2.62							.18																					Dp, wk alt Tr feldspath. Sp suls in vnlts
425.0	429.3	4.3		.21				96	2.62							.21																					Dp; wk alt Tr suls
						Av	Rec. =	86 %																													
				END	OF	HOLE																															

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows
Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-141
Page 1 of 1 Pages
Collar Elev. 3050.77 Final Depth 277.3
Coords. N 37,845.34 E 18,570.54
Inclination Vert
Logged by FTG - CWH
Date: Start 1/21/63 Finish 1/26/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pirch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	5.0	5.0						Rock	BIT																													Rock BIT
NC 2400	5.0	13.6	8.6		.11		.07		84	2.69			.01	.10					Tr			Tr					30			Sp			Tr		Mb	5.0	-	Mb; leached, Tr CuOx
	13.6	23.8	10.2		.23		.20		71	2.65	.09		.01	.10			.03			Tr							65	5	20						Hf	20.5	grad	Mb; as above to 20.5 then Hf; sp clay - gar in vnlts Tr CuOx
	23.8	34.3	10.5		.96		.83		81	2.42	.40		.01	.42			.13										10	25	45		5		10		Sltst	32.8	15°	Hf, leached; med clay - gar. Lt Tt. Mod CuOx to 32.8 then Sltst, bleq.
	34.3	43.9	9.6		.12	.39 @ .71	.05	.39 @ .72	97	2.63		.01	.07				.01		Sp								5	35	Sp		Sp	Tr	60			Tt	38.0	brkn	Sltst, bleached, brkn to 38.0, then Tt; leached, sp clay
	43.9	53.7	9.8		.22		.17		92	3.29	.27		.05	.05			.02											10	15				10	Sp					Tt, leached, st gar grad to sp clay alt Tr sulfs, CuOx
	53.7	63.7	10.0		.51		.52		91	3.02	.44		.05	.10			.02		Tr	Tr								50	30		5	Sp		Tr					Tt; leached, ggx patches, sp clay alt Sp sulfs - CuOx
	63.7	72.5	8.8		.27		.24		95	2.42	.05	.05	.04	.10			.03		Sp									65	15										Tt, leached, st gar. grad to med clay Tr CuOx
	72.5	81.5	9.0		.40		.40		97	2.43	.25		.05	.10													10	50			20	Tr	5						Tt, leached, med clay alt Sp CuOx Mod Hf
	81.5	86.3	4.8		.36		.32		88	2.76	.20		.07	.05			.04											25	15		50		Sp			Hf	81.5	grad	Hf; leached; med clay alt Sp Sltst
NX 1875	86.3	95.9	9.6		.14		.07		92	2.86			.01	.06			.07			Tr							10	15	50		15		Tr		5				Hf; sp clay - gar. Mod patches gar
	95.9	105.3	9.4		.05		.01		95	3.02				.01			.04										15	25	50		5	Sp			Tr				Hf; sp clay alt. Mod patches gar. Sp sulfs
	105.3	112.2	6.9		.58		.28		93	3.00	.20		.01	.07			.30										10	30	45		5			Sp					Hf; med clay alt Tr CuOx
	112.2	121.0	8.8		.21	41.5' @ .73	.50	41.5' @ .41	51	3.16	.35		.02	.13			.21										5	10	35		Sp		40			Qtzite	117.0	brkn	Hf; sp clay alt, Tr CuOx to 117.0, then Qtzite, st leached areas.
	121.0	129.4	8.4		.59		.51		67	3.04	.05		.01	.45			.08										5	35	10				45			Tt	124.5	brkn	Qtzite; brkn, leached to 124.5, then Tt, leached, sp clay Mod CuOx
	129.4	137.9	8.5		.110		.35		67	3.13	.05	.04	.06	.20			.75		.70									10			Sp		15						Tt; as above to 130.5, then int lim alt. Mod CuOx
	137.9	146.8	8.9		.65		.38		69	2.58	.03	.05	.05	.25			.27		.10									5				Tr	10			Mz	139.5	brkn	Tt; int lim (formerly int sulfs) decr w sp CuOx to 139.5, then Mz; med clay
	146.8	153.0	6.2		.21		.17		91	2.60	.05		.01	.11		.03	.01		Tr												Tr				Tr				Mz; leached, sp clay Tr CuOx.
	153.0	162.4	9.4		.37		.29		96	2.57	.03		.01	.25		.05	.03																						Mz; as above
	162.4	171.8	9.4		.58	19.1' @ .49'	.40	19.1' @ .32	96	2.58	.05		.01	.34		.12	.06																Tr						Mz; " "
	171.8	181.5	9.7		.41		.25		92	2.61	[illegible]		.01	.21		.10	.06																						Mz; " "
	181.5	186.3	4.8		.21		.10		86	2.55	[illegible]		.01	.09		.07	.04															20							Mz; med silicif.
	186.3	197.9	11.6		.14				88	2.57			.01	.07		.04	.02															10							Mz; as above at wk alt, gen brown [illegible]
	197.9	205.7	7.8		.13				97	2.61			.01	.06		.05	.01															95	Sp			Qt	197.9	brkn	Qt, f [illegible] 22 ft. mostly silic. sltst w a few small [illegible]
	205.7	214.1	8.4		.07				84	2.61				.03		.04																85							Qt, generally as above, leached. R [illegible] sltst & some qtz [illegible]
	214.1	219.0	4.9		.06				94	2.61				.02		.04																90							Qt, as above, wk [illegible]
	219.0	223.5	8.5		.12				95	2.61				.07		.05																90							Qt, as above, [illegible]
	223.5	237.0	9.5		.26				90	2.58			.01	.10		.10	.05									SP	SP			S		70	S		sltst	223.5	grad	Qt, as above, becoming wkly [illegible] sltst. Lt brn to blk.
	237.0	246.5	9.5		.14				76	2.63			.01	.06		.07														Sp		85	Sp			Qt	236.5	grad	sltst. wk, hard. Qtz. grad to brn w dominant sltst. [illegible]
	246.5	256.2	9.7		.15				93	2.63			.01	.05		.06	.03															90							Qt w only a few lt. grad. [illegible]
	256.2	261.0	4.8		.18				93	2.63			.01	.06		.08	.03															90							Qt, as above
	261.0	269.5	8.5		.17				91	2.66			.02	.07		.06																90							Qt, " "
	269.5	277.3	7.8		.08				90	2.57			.02	.02		.04																90	Tr						Qt, " "

Av Rec = 88%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-141
Page 1 of 1 Pages
Collar Elev. 3050.77 Final Depth 277.3
Coords. N 37,845.84 E 18,570.54
Inclination Vert
Logged by FTG - CWH
Date: Start 1/21/63 Finish 1/26/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	DOLOMITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	5.0	5.0						Rock	BIT																													Rock BIT
NC 2.400	5.0	13.6	8.6		11		.07		84	2.69			.01	.10					Tr		Tr						90			SP			Tr		Mb	5.0	-	Mb; leached; Tr CuOx
	13.6	23.8	10.2		23		.20		94	2.65	.09		.01	.10			.03		1	Tr							65	5	20	1			1		Hf	20.5	grad	Mb; as above to 20.5 then Hf, sp chy - garn in veins Tr CuOx
	23.8	34.3	10.5		.96		.83		81	2.42	.40		.01	.42			.13		1	1							10	25	45	5		10	1		Siltst	32.8	15°	Hf, leached; mod clay - garn. 1A Tt. Mod CuOx to 32.8, then Siltst, bleac.
	34.3	43.9	9.6		.12	39.9' @ .71	.05	39.9' @ .42	97	2.63		.01	.04				.07		Sp								5	35	Sp	Sp	Tr	40			Tt	38.0	brkn	Siltst; bleached, brkn to 38.0, then Tt; leached; sp clay.
	43.9	53.7	9.8		.22		.17		92	3.29	.07		.05	.05			.05		1									70	15	1	1	10	Sp						Tt, leached, st garn grad to sp clay alt Tr sulf, CuOx
	53.7	63.7	10.0		.51		.59		91	3.02	.44		.05	.10		-	.92		Tr	Tr								50	30	5	Sp	1	Tr						Tt, leached; gy patches, sp chy alt Sp sulf - CuOx
	63.7	72.5	8.8		.27		.24		95	3.42	.05	.05	.04	.18			.03		Sp									65	15	1	1	1	1						Tt, leached; st garn grad to mod clay Tr CuOx
	72.5	81.5	9.0		.40		.40		99	2.43	.25		.05	.10													10	50	1	20	Tr	5						Tt, leached, mod clay alt Sp CuOx Mod Hf
	81.5	86.3	4.8		.36		.32		88	2.76	.20		.07	.05			.04											25	15	50		Sp			Hf	81.5	grad	Hf, leached; med clay alt Sp SHst
NX 1.815	86.3	95.9	9.6		.14		.07		92	2.86			.01	.06			.07		1	Tr							10	15	50	15		Tr		5					Hf, sp clay - garn Mod patches gar
	95.9	105.3	9.4		.05		.01		95	3.02				.01			.04		1	1							15	25	50	5	Sp			Tr					Hf, sp clay alt Mod patches gar. Sp sulf.
	105.3	112.2	6.9		.58		.28		93	3.00	.20		.01	.07		-	.30		1	1							10	30	45	5	1		Sp						Hf, mod clay alt Tr CuOx
	112.2	121.0	8.8		.71	41.5' @ .73	.50	41.5' @ .41	51	3.16	.35		.02	.13			.21		1	1							5	10	35	Sp	1	40			Qtzte	117.0	brkn	Hf, sp clay alt, Tr CuOx to 117.0, then Qtzte, st leached green.
	121.0	129.4	8.4		.59		.51		67	3.04	.05		.01	.45			.08		1	1							5	35	10	1		45			Tt	124.5	brkn	Qtzte; brkn, leached to 124.5, then Tt, leached, sp clay Mod CuOx
	129.4	137.9	8.5		1.10		.35		67	3.18	.05	.04	.06	.20		-	.75		70	1								10		Sp		15						Tt, as above to 130.5, then int lim alt. Mod CuOx
	137.9	146.8	8.9		.65		.38		69	2.56	.03	.05	.05	.25			.27		10	1								5		1	Tr	40			Mz	139.5	brkn	Tt, int lim (formerly int sulf) decr w sp CuOx to 131.5, then Mz; mod clay
	146.8	153.0	6.2		.21		.17		91	2.60	.05		.01	.11		.03	.01		Tr	1										Tr	1			Tr					Mz; leached; sp clay Tr CuOx.
	153.0	162.4	9.4		.37		.29		96	2.57	.03		.01	.25		.05	.03		1	1										1	1			1					Mz; as above
	162.4	171.8	9.4		.58	181' @ .49'	.40	181' @ .37	96	2.58	.05		.01	.34		.12	.06		1	1										1	1		Tr	1					Mz; " "
	171.8	181.5	9.7		.41		.25		92	2.61	.03		.01	.21		.10	.06		1	1										1	1			1					Mz; " "
	181.5	186.3	4.8		.21		.10		86	2.55			.01	.09		.07	.04		1	1										1	1	20	1	1					Mz; mod silicf.
	186.3	197.9	11.6		.24								.01	.07		.04	.02		1	1										1	1	10	1	1					Mz, m patches of wk alt, gen fresh, SHst. Sc. dk incl at end.
	197.9	205.7	7.8		.13								.01	.06		.05	.01		1	1										1	1	95	Sp	1		Qt	197.9	brkn	Qt. first 2½ ft mostly silic siltst w a few small mz dikelets
	205.7	214.1	8.4		.07									.03		.04			1	1										1		85		1					Qt, gray wh to m celec, leached. A few sc. silic & sold qtz veinlets
	214.1	219.0	4.9		.06									.02		.04			1	1										1		90		1					Qt, as above, but no apparent inclusions.
	219.0	227.5	8.5		.12									.07		.05			1	1										1		90		1					Qt, as above, brkn, st leached w a few light green areas. Tr gra CuOx
	227.5	237.0	9.5		.26								.01	.10		.10	.05		1	1						SP	SP			5		70	5	1		SHst	233.5	grad	Qt, as above, becoming brkn, w sider? seams. SHst lt brn to blk.
	237.0	246.5	9.5		.14								.01	.06		.07			1	1										Sp		85	Sp	1		Qt	238.5	grad	SHst, blk, med. Qt, gray to brn w numerous SHst incl. leached
	246.5	256.2	9.7		.15								.01	.05		.06	.02		1	1										1		90		1					Qt w only a few dk incl leached, brn Fe stained
	256.2	261.0	4.8		.18								.01	.06		.08	.03		1	1										1		90		1					Qt, as above.
	261.0	269.5	8.5		.17								.02	.07		.08			1	1										1		90		1					Qt, " "
	269.5	277.3	7.8		.08								.02	.02		.04			1	1										1		90	Tr						Qt, " "
							Av. Rec = 88%																															
					END OF HOLE																																	

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-142
Page 1 of 2 Pages
Collar Elev 2911.79 Final Depth 642.2
Coords N 37,261.36 E 19,801.12
Inclination Vert
Logged by FTG - CWH
Date: Start 1/28/63 Finish 2/12/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	10.0	10.0						ROCK	BIT																													ROCK BIT
NC 2400 →	10.0	20.3	10.3		.19				79	2.57	.05		.01	.05		.08			Tr	Tr									Tr	SP	Tr		Tr	Tr	Dp	10.0	—	Dp; leached; wk alt
	20.3	29.0	8.7		.20				93	2.55	.05		.01	.04		.10																						Dp; as above Tr dk incl.
	29.0	38.5	9.5		.18				86	2.58	.03			.03		.12														Tr								Dp; as above
	38.5	47.7	9.2		.19				88	2.60	.04			.03		.12																						Dp; leached; brkn; patches med clay
	47.7	57.1	9.4		.37		.07		89	2.60	.04			.03		.28	.02																					Dp; wk alt, leached
	57.1	67.3	10.2		.14				88	2.62				.03		.10	.01																					Dp; wk alt Tr suls
	67.3	75.2	7.9		.17				95	2.61				.03		.10	.04																					Dp; as above
	75.2	83.9	8.7		.14				96	2.60				.03		.08	.03																					Dp; " " Sp clay on shears.
	83.9	93.0	9.1		.32				95	2.62				.03		.25	.04																					Dp; " "
	93.0	101.7	8.7		.37				94	2.61				.03		.30	.04																					Dp; " "
	101.7	110.5	8.8		.26				94	2.60				.03		.20	.03													SP								Dp; " "; leached on shears
	110.5	119.7	9.2		.32				95	2.60				.03		.25	.04		SP											S			SP					Dp; sp leaching. Sp clay. Tr A patch int lim - grad to med chlor (HF?)
	119.7	124.5	4.8		.12				95	2.57				.02		.08	.02		Tr											SP			Tr					Dp; sp leaching. Sp clay alt Tr suls
	124.5	131.7	7.2		.19				98	2.36				.02		.13	.04																					Dp; med clay & chlor alt Sp suls
NX → 1.878	131.7	141.0	9.3		.11				46	2.60				.01		.07	.03													S								Dp; brkn; sp clay - chlor alt Tr suls
	141.0	150.5	9.5		.06				95	2.59				.01		.05														S								Dp; sp clay alt grad to st jaro - clay alt Sp suls
	150.5	160.4	9.9		.09				96	2.61						.09														SP			SP					Dp; wk alt. Tr suls Silicif patches.
	160.4	170.6	10.2		.11				77	2.61						.11														S								Dp; wk alt Tr suls Gay patches
	170.6	180.3	9.7		.11				83	2.60						.11														S								Dp; brkn; sp clay alt. Tr suls
	180.3	186.9	6.6		.12				59	2.58						.12														SP								Dp; as above
	186.9	194.0	7.1		.17				71	2.57						.17														10								Dp; as above grad to st clay - lim at 191.0 - 193.0. Then wk alt.
	194.0	203.8	9.8		.23				77	2.41						.23														S								Dp; wk alt to 200.0, then grad to st jaro - clay alt Poss Flt zone
	203.8	210.6	6.8		.24				82	2.95						.20	.04									10	10	60		10			5		Hf	203.8	brkn	Hf, leached, st clay to 206.4, then sp chlor alt Tr suls
	210.6	215.7	5.1		.05				94	2.55							.05									10	5	60		5		15	5					Hf, sp clay - chlor to 214.7, then st jaro - clay alt.
	215.7	219.4	3.7						0																													No Core
	219.4	226.3	6.9		.16		.09		56	2.56			.01	.08			.07		Tr	Tr						5	5	10	Tr	5	Tr		Tr		Dp Tt	219.4 226.0	brkn brkn	Dp; brkn; st silicif, tr Mb text 226.0 then Tt; st clay alt Tr suls
	226.3	230.4	4.1		.104	21.0' @ .79	.10	21.0' @ .04	96	2.77							.104			Tr						15	30	35		10	Tr	5	Tr					Tt; patches st clay alt Sp suls.
	230.4	239.7	9.3		.80		.04		92	3.08							.80		Tr							10	35	30		5		15						Tt; sp clay - chlor Sp suls. Patches Hf.
	239.7	247.3	7.6		.61		.02		94	3.23							.64							Tr		20	45	30		Tr		5						Tt; sp clay alt, w sp gar veins. Mod Hf. St suls
	247.3	257.3	10.0		.19		.02		100	2.83							.19							.19		25	20	35				10			Hf;	251.7	grad	Tt; as above to 251.7, then Hf, wk clay Tr suls. Mod Mb
	257.3	266.7	9.4		.18		.02		90	3.10							.18									10	55	20				5			Tt	265.0	grad	Hf; sp clay - mod suls to 265.0, then Tt; sp clay Mod Hf - suls
	266.7	276.3	9.6		1.57		.03		92	3.11							1.57				Tr			Tr	3.6	10	60	20				Tr	Tr	SP	Hf	274.0	grad	Tt; sp clay, mod suls to 274.0, then Hf; mod chlor - sul veining
	276.3	285.5	9.2		1.08		.02		96	2.80							1.08								4.7	10	20	50						5	SP				Hf; st chlor - clay - sul veining grad to st clay. Sp Tt. suls.
	285.5	294.9	9.4		1.83	68.1' @ 1.07	.02	68.1' @ .02	92	3.70							1.83			SP				Tr	11.8	SP	20	10										Hf; st sul alt w 40 % of rem massive st-py. Eth. gar in st.
	294.9	303.0	8.1		.67		.02		92	3.58							.67							3	9.1	5	40	40		SP				Tr				Hf; mod sul - sp clay alt. 2.5' patch Tt w. 0.7 ft patch 100 % Pb - Zn
	303.0	309.9	6.9		.43		.01		100	2.70							.43			Tr					SP	15	30	40		1	Tr			10					Hf; sp clay - chlor alt Mod suls
	309.9	319.3	9.4		1.20		.01		100	2.73							1.20									20	20	50		5		1		5					Hf; mod clay alt St diss suls.
	319.3	328.5	9.2		.47		.01		82	3.07							.47									15	15	60		5		1		5					Hf; mod clay - chlor alt Sp suls. Mod Tt.
	328.5	333.3	4.8		.35	18.42 @ .77	.01		89	2.85							.35					Tr				15	15	50		5		1		10					Hf; mod clay - chlor. Sp suls
	333.3	339.4	6.1		.22		.01		100	2.60							.22									15	20	40		5		1	5	5					Hf; mod clay alt. Sp suls Tr Tt.
	339.4	348.4	9.0		.62		.02		89	2.93							.62					Tr				10	20	40		5		1	Sp	5					Hf; sp clay alt Sp suls. Sp chlor veins w mag - minning ax - cpy.
	348.4	357.6	9.2		.33		.06		90	3.04							.33									15	10	65		Sp		1		10					Hf; as above
	357.6	366.3	8.7		.41		.02		95	2.79							.41									15	10	60	Sp	10		1		5					Hf; mod clay alt Gay patches Sp suls

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-142
Page 2 of 4 Pages
Collar Elev. 2911.79 Final Depth 642.2
Coords. N 37,261.36 E 19,801.12
Inclination Vert
Logged by FTG - CWH
Date: Start 1/26/63 Finish 2/12/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vs. Qtz.	QUARTZ	CHLORITE	Epidote	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
366.3	375.9	9.6		.51		.03		88	2.74							.51			Sp	Tr				Tr		15	10	75		Sp	Tr		Tr					Hf, mod chlor - clay alt. Sp suls in veins
375.9	381.0	5.1		.88	.68	.02	.03	100	3.07							.88							Tr	75		5	5	80		Tr					Tt	376.5	grad	Hf, as above to 376.5, then Tt, mod clay alt. St cpx, px, sl, gn.
381.0	383.0	2.0			.57																																	Cavity
383.0	391.0	8.0		.77		.02		100	2.57							.77								Sp		15	20	55		5			5		Hf	386.5	grad	Tt, mod clay alt, mod suls to 386.5, then Hf, mod clay - chlor alt
391.0	395.5	4.5		.44		.04		100	2.60							.44								Tr		25	5	65		Sp			1					Hf, mod clay - chlor alt. Tr mag. w chlor Sp suls.
395.5	399.5	4.0																																				Cavity
399.5	404.2	9.7		.87		.05		79	2.94							.87										15	15	60				Tr	10					Hf, mod chlor alt. Mod cal vning. Mod suls
404.2	414.8	10.6		.11		.01		98	2.98							.11								Tr	10	25	65								Tt	412.8	grad	Hf, brkn; mod clay alt. Tr suls to 412.8, then Tt, mod clay
414.8	424.3	9.5		.10				100	2.99							.10										5	25	25				35	10		Sltst	419.7	grad	Tt, mod clay alt to 419.7, then Sltst, sp chlor. Tr suls. Sp Hf
424.3	433.6	9.3		.05				85	2.63							.05			Tr						Tr					Tr			Tr			Mz	424.3	brkn	Mz, sp clay alt. Par feldspars in f.g. matrix (qtz latite)
433.6	438.5	4.9		.08				88	2.63							.08																						Mz; as above
438.5	446.0	7.5		.04				79	2.62							.04							Tr											Tr				Mz; as above.
446.0	454.4	8.4		.10				76	2.55							.10																						Mz; sp clay alt. Tr Hf incl. Sp diss. py.
454.4	463.4	9.0		.07				89	2.66							.07											Sp	5	Tr	Sp			Tr					Mz; dense, sp clay alt. 0.5 ft Tt incl. Diss suls.
463.4	471.9	8.5		.05				96	2.65							.05													Sp		Tr		1					Mz; dense, sp clay alt. Tr sed incl.
471.9	480.7	8.8		.05				93	2.63							.05													Tr	Tr								Mz; as above; appears f.g. Rk qtz latite?
480.7	488.5	7.8		.17				94	2.84							.17																	Tr					As above. From 482.3 - 486.4 a Bx w/ st qtz cementing frags of Sltst & Mz. Sc blebs of py.
488.5	497.1	8.6		.09				99	2.66							.09														Tr	Tr		Tr					Mz? Gray matrix. Vlarge sc. Pink feldsparas. Late Mz?
497.1	506.9	9.8		.05				90	2.66							.05													Tr	1			1					As above.
Bx 1,432 → 506.9	513.8	6.9		.21				98	2.71							.21								Tr		Tr	SP	10		1			SP		Bx	507.9	brkn	As above to 507.9. Fr there to end Bx. Hf, st qtz, cementing Hf, sltst, & Mz frags. wk. Py, Sp cpy.
513.8	522.8	9.0		.18				98	2.73							.18			Tr		Tr					SP	SP	15	Tr	Tr	Tr	35	20		Mz	520.5	60°	Bx w Hf - Sltst frags grad to chlor Hf - Qt frags to 520.5, then Mz; ok alt
522.8	532.2	9.4		.06				100	2.64							.06					1			Tr		5	40	10	Tr	Tr	Tr		SP		Tt	529.0	50°	Mz, wk alt to 529.0, then Tt, st gar
532.2	541.0	8.8		.15				100	3.26							.15					1					5	80	10		1								Tt, st gar. Sp suls
541.0	551.0	10.0		.07				99	2.97							.07					1					5	60	10		1		20						Tt, as above. Sp Sltst (bleb) Sp banding in Tt @ 20°
551.0	560.0	9.0		.05				100	2.81							.05					1					5	60	25		1	Tr		Tr					Tt, as above.
560.0	569.2	9.2		.11				96	3.24							.11										5	65	15		1	1	10	1					Tt, st gar. Patches chlor w tr suls
569.2	576.5	7.3		.13				100	2.71							.13										10	40	30		1	1	5	10					Tt, as above grad to mod chlor alt. Tr suls
576.5	580.8	4.3		.05				100	3.00							.05										10	30	30		1	1	SP	SP		Mz	578.5	brkn	Tt, wk bx text w siliceous frags, st epidote to 578.5, then Mz; wk alt
580.8	590.4	9.6		.02				94	2.66							.02													Tr	Tr	Tr		Tr					Mz; wk alt. Sp 2nd fspars
590.4	599.9	9.5		.03				96	2.66							.03														1	1	1	1					Mz, as above
599.9	610.3	10.4		.25		.02		80	2.74							.25							3	1					SP	25	1		1	5	Qtzite	604.0	brkn	Mz, as above to 601.8, then st clay to 604.0, then Qtzite, st Ps-2m-Fldsp
610.3	619.9	9.6		.48		.01		93	2.65							.48													1	10	1	50	1					Qtzite, sl suls - clay to 612.0, then gx, dense rk Tr suls
619.9	629.0	9.1		.36		.02		92	2.71							.36														SP	SP	85			Dp	624.0	grad	Qtzite; near silicif. fit zone to 624.0, then Dp; int silicif. Tr suls
629.0	636.1	7.1		.12		.04		100	2.63							.12								Tr						1		95						Dp; int silicif. Tr suls
636.1	642.2	6.1		.21		.06		93	2.64							.21														1		95						Dp, as above. Sp suls.

Av Rec = 91%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %. Moderate (Md) 5 - 50 % Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-143
Page 1 of 1 Pages
Collar Elev 3086.45 Final Depth 340.0
Coords. N 37,175.66 E 19,132.42
Inclination Vert
Logged by FTG - CWH
Date: Start 1/28/63 Finish 2/7/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	5.7	5.7						ROCK BIT																														ROCK BIT
NC 2.400 →	5.7	13.0	7.3		.70		.55		41	2.63	.45		.01	.09		.15			Tr			Tr					.5	SP	30	5	Tr	10	45		Hf	5.7	—	Hf, leached; mt silicif, brkn to 10.0, then st chlor alt
	13.0	21.0	8.0		.27		.19		90	2.67	.05	.01	.01	.12		.05	.03			Tr		SP					15	15	20	5		10	35		Tt	17.5	grad	Hf, st chlor w tr bx text, mod silicif to 17.5, then Tt, leached, mod hem
	21.0	27.5	6.5		.91		.78		85	2.85	.10	.01	.01	.66		.07	.06					5					20	35	25	10			SP					Tt, leached; st hem alt Sp CuOx
	27.5	35.8	8.3		.51		.40		88	2.75		.01	.01	.38			.11					SP					20	20	30	20				Tr	Hf	29.5	brkn	Tt, as above to 29.5, then Hf, leached, st clay - jaro alt
	35.8	45.8	10.0		.64		.50		51	2.46			.01	.49			.14										15	SP	55	20								Hf, leached; mod clay - jaro alt Brkn patches
	45.8	56.0	10.2		1.83		1.57		77	2.57		.01	.01	1.55			.26					5					15	35	25	15					Tt	50.4	grad	Hf, as above w incr chlor - qtz vn to 50.4, then Tt, st hem alt St CuOx
	56.0	63.6	7.6		.42	116.9	.19	116.3	100	2.87			.01	.18			.23					5					15	55	15	SP								Tt, leached, mod hem alt - hem in blebs, set in cal matrix
	63.6	73.0	9.4		.24	69	.20	34	91	3.03	.05	.01	.01	.13			.04					10					20	55	10	5								Tt, leached, sp hem alt Sp CuOx
	73.0	78.2	5.2		.67		.51		98	2.78			.01	.50			.16					5					20	50	15	5								Tt, leached, sp hem alt (alt of gar?) Sp CuOx, Tr suls
	78.2	85.1	6.9		.42		.30		89	2.76			.01	.29			.12					10					20	50	15	5								Tt, as above
	85.1	95.4	10.3		.53		.50		92	2.74			.01	.49			.03					10					20	50	15	5								Tt, " "
NX 1.875 →	95.4	104.5	9.1		.41		.32		100	2.80			.01	.31			.09					5					25	40	20	5	5							Tt, " " Patches Hf
	104.5	114.3	9.8		.105		.74		94	2.72			.01	.73			.31					5					25	40	20	5	SP							Tt, " " " " Incr calcite
	114.3	122.6	8.3		.82		.65		98	2.77			.01	.64			.17					SP					25	35	25	5	1							Tt, leached, sp hem alt Mod Mb
	122.6	130.6	8.0		.32		.18		100*	2.76			.01	.17			.14					1					50	30	15	SP					Mb	123.1	grad	Tt, as above to 123.1, then Mb, impure w blebs hem Tr CuOx
	130.6	140.6	10.0		.12				91	2.69				.07			.05					1					80	15	SP	1								Mb, as above w hem conc in + near vnlts
	140.6	150.2	9.6		.09				90	2.79				.06			.03					1					80	10	5	1			SP					Mb, sp clay alt
	150.2	158.0	7.8		.37				98	2.74				.25			.12					1					80	10	5	1			SP					Mb, sp clay alt Blebs hem - chlor
	158.0	167.8	9.8		.28				96	2.75				.15			.13				Tr						70	10	10	1			5					Mb, sp clay alt
	167.8	177.5	9.7		.20				100	2.72							.20									Tr	25	45	20		Tr		SP		Tt	172.7	grad	Mb, mod chlor incr to patches Hf to 172.7, then Tt, sp hem - chlor in vnlt
	177.5	182.6	5.1		.14				97	2.59							.14										10	30	10	1	1	SP	1		Dp	178.5	~30°	Tt, sp clay - chlor w tr hem to 178.5 then Dp, sp clay alt
	182.6	189.0	6.4		.11				67	2.53							.11										10	SP	10	10			10					Dp, sp clay - chlor Tr suls 1' ft Dp ox
	189.0	197.7	8.7		.38		.03		58	2.88							.38										10	30	20	SP	1		10		Tt	195.8	grad	Dp, mod chlor alt to 192.5, then leached bx to 193.7, then Tt w st Dp text to 195.8, then Tt w st gar; mod suls
	197.7	206.8	9.1		1.46		.03		95	2.88							1.46			Tr	Tr	Tr					10	30	45	1			5		Hf	201.5	brkn	Tt, st gar, sp suls to 201.5, then Hf, mod chlor alt St suls
	206.8	213.8	7.0		.20	38.7	.04	38.3	88	3.00							.20										10	25	55	1			5					Hf, mod chlor - sp clay alt Sp suls
	213.8	223.5	9.7		1.41	1.71	.04	.04	85	3.27							1.41										10	35	40	1			5					Hf, sp clay - chlor alt w 3 ft Tt w st gar; grad to sp clay - st sul
	223.5	227.2	3.7		2.15		.05		100	2.89							2.15										10	15	50	1			20					Hf, mod chlor alt. Patches Tt, w chlor vning Mod suls.
	227.2	236.6	9.4		.73		.04		96	2.83							.73				Tr						10	40	35	1			5		Tt	229.4	grad	Hf, as above to 229.4, then Tt, st gar, sp cal vning; sp suls
	236.6	242.4	5.8		.32		.05		81	3.11							.32										10	50	25	1		Tr	10					Tt, sp chlor - clay vning. Tr suls
	242.4	248.8	6.4		.35				73	2.81							.35										10	40	35	1	Tr	1	5					Tt, massive gar. Tr suls.
	248.8	258.7	9.9		.17				78	3.14							.17									Tr	10	45	30	1	SP	1	10					Tt, sp chlor alt - vning Patches silica blebs Tr suls
	258.7	267.7	9.0		.31				84	2.99							.31									1	5	40	20	1	1	20	5					Tt, mod chlor - sul alt, grad to mod siliceous rk. St suls
	267.7	277.6	9.9		.19				75	3.09							.19										10	65	15	1	Tr	5	SP					Tt, st gar. Tr suls.
	277.6	287.1	9.5		.33				89	2.61							.33										10	70	10	1	1		1					Tt, as above.
	287.1	295.9	8.8		.16				95	3.14							.16									Tr	10	60	25	1	1		5					Tt, mod gar. Sp cal - chlor vning Sp suls in vnlts.
	295.9	304.9	9.0		.38				91	3.16							.38									1	0	60	25	1	1		5					Tt, as above.
	304.9	313.7	8.8		.25				99	2.64							.25										Sp	20	10	Tr	Sp		Sp		Dp	310.2	55°	Tt, as above to 308.4, then ch zone w chlor bx to 310.2, then Dp
	313.7	322.6	8.9		.27				97	2.60							.27									Tr				1	1							Dp; sp clay alt. Tr suls
	322.6	331.4	8.8		.21				94	2.61							.21													1	1							Dp; sp clay alt. Tr suls.
	331.4	340.0	8.6		.19				66	2.66							.19													Sp	1							Dp; as above. Patches suls.
							Av. Rec =		87%																													
						END	OF	HOLE																														

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %, or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-144
Page 1 of 2 Pages
Collar Elev. 2965.14 Final Depth 664.0
Coords. N 37,392.99 E 20,003.77
Inclination Vert
Logged by FTG - CWH
Date: Start 2/8/63 Finish 3/1/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pitch	Black	Blue Green	Cu Silicate	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galeng.	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 2400 0.0	10.0	10.0		.06		-		66	2.49	.06								Tr			Tr							10	20	Tr				Mz	0.0	-	Mz, leached, mod clay alt. Mod Dp text
10.0	20.2	10.2		.07				80	2.49	.07								1			1							15	35	1			Tr				Mz, leached, mod clay - pro alt Tr Cu Ox
20.2	28.0	7.8		.06				63	2.50	.06								1										15	30	1							Mz, as above Silicif patches
28.0	38.0	10.0		.08				48	2.21	.08								1										15	40	1							Mz leached Mod clay - sec alt
38.0	47.8	9.8		.08				99	2.43	.08								1			Tr							15	30	1			Tr				Mz, as above w incr dis hem
47.8	55.9	8.1		.11				74	2.44	.11								1			1							15	30	1			1				Mz, as above
55.9	62.3	6.4		.12				98	2.40	.12								1			SP							10	30	1			1				Mz, " "
62.3	71.9	9.6		.26		.04		93	2.31	.02					.23	.01		1	Tr									10	30	1			1				Mz, as above to 65.4, then mod clay alt, sp suls
71.9	79.2	7.3		.79		.03		79	2.53						.69	.10			1									10	20	1							Mz; brkn, mod clay alt Sp suls
79.2	87.2	8.0		.28		.02		53	2.54						.24	.04			1									10	40	1							Mz, brkn, st clay alt Sp suls
87.2	92.0	4.8		.42		.02		65	2.44						.40	.02			1									5	60	1							Mz, brkn, st. int clay alt Sp suls
92.0	97.0	5.0						0																													No Core
97.0	100.4	3.4		.67		.02		85	2.55						.60	.07			Tr									5	15	Tr							Mz, brkn, mod clay alt Sp suls
100.4	110.4	10.0		.56	95.4' @ .77	.02	95.4' @ .03	77	2.58						.50	.06			1									15	30	1							Mz, brkn, st clay alt Sp suls
110.4	121.0	10.6		.48		.01		81	2.50					.01	.42	.05			1									20	40	1							Mz, brkn, st clay alt Sp suls - dis + units Sp CuOx
121.0	130.5	9.5		.70		.03		83	2.70						.66	.04			1									20	40	1.5							Mz, as above Less silicif Dp mel
130.5	139.7	9.2		.80		.02		78	2.71				.02		.75	.03			1									10	30	1							Mz; st clay alt w silicif areas Dis + units of suls
139.7	148.0	8.3		2.49		.06		93	2.36				.06		2.40	.03			1									10	40	1							Mz as above w int alt patches
148.0	156.9	8.9		.42		.02		89	2.55						.40	.02			1									10	25	1							Mz, st clay alt Suls dis + units
NX 1875 156.9	167.3	10.4		.78		.06		61	2.59						.74	.04			1									10	30	1							Mz, as above
167.3	176.9	9.6		.34		.04		88	2.55						.32	.02			1									10	20	1							Mz, mod clay alt Silicif patches Sp suls
176.9	186.1	9.2		.62		.06		84	2.43						.60	.02			1									15	30	1							Mz, st clay alt sp 2nd feldspath Sp suls
186.1	195.2	9.1		.27		.05		75	2.58						.25	.02			1									10	20	1							Mz, as above grad to mod alt
195.2	198.7	3.5		.27		.05		97	2.55						.25	.02			1									10	20	1							Mz, mod clay alt Sp sx's Sp Dp text
198.7	207.9	9.2		.22				91	2.53						.20	.02			1									10	20	1				Dp	199.5	brkn	Mz, as above to 199.5, then Dp st clay alt Silicif patches Sp suls
207.9	215.0	7.1		.20		.02		74	2.60						.18	.02			1									5	20	1							Dp mod clay alt Sp suls
215.0	225.0	10.0		.55		.02		34	2.55						.55				1									5	30	1							Dp st clay alt Sp suls
225.0	232.8	7.8		.13		.02		58	3.79						.10	.03			1									5	20	1							Dp brkn as above
232.8	241.9	9.1		.23				87	2.54						.20	.03			1									10	25	1				Mz	236.0	brkn	Dp as above to 236.0, then Mz, brkn, int clay alt Silicif patches
241.9	250.8	8.9		.34				85	2.84						.25	.09			SP							40	10	SP	35	1	5			Tt	245.8	brkn	Mz(?) int clay alt w 100% dest text to 245.8, then Tt, mod clay alt St suls
250.8	260.1	9.3		.34				94	3.12						.25	.09			1		Tr					75	20		5		SP						Tt, mod yellow clay alt St py
260.1	270.2	10.1		.30		.01		96	2.34						.23	.07			1							70	20		SP		5						Tt, as above Patches Hf Mod suls
270.2	279.9	9.7		.35		.01		89	3.09						.20	.15			5				5			75	20		1		SP						Tt, as above to 278.0, then st gar - py - sl
279.9	287.6	7.7		.41		.01		97	3.26							.41			5				5			80	5		Tr	5	10						Tt, st gar St sl - py to 286.0, then st gar - sp chly Sp suls
287.6	290.8	3.2		.26				70	3.44							.26			SP							40	20		30	SP							Tt, as above to 289.5, then st clay - py alt
290.8	300.6	9.8		.46		.03		77	3.30							.46			5							55	25		10	1	5						Tt st clay - py alt grad to mod clay Sp suls
300.6	310.6	10.0		.85	32.4 @ .56	.08	32.4 @ .08	74	3.16						.20	.65			SP							70	10		Tr	Tr	15			Dp	300.3	brkn	Dp, st clay - silicif to 303.0, then Tt, st gar - py
																																		Tt	303.0	brkn	
310.6	321.0	10.4		.45		.04		46	3.02							.45		5	SP							50	30		5	SP		5					Tt, st gar - py grad to mod clay alt to 318.8, then mod clay - lim
321.0	328.2	7.2		1.10		.20		44	3.27		.15	.02	.03			.90		5	1							5	40	20	15			15					Tt, mod leaching w mod - st clay alt Scattered pods py
328.2	336.7	8.5		.19		.03		100	2.56							.19		SP	Tr				SP			5	50	15	SP	Tr	20	5		Sltst	334.7	brkn	Tt, as above grad to st gar w mod calcining to 334.7 then Sltst, dk gy
336.7	345.8	9.1		.13				95	2.83							.13		Tr	1							5	30	20	5	1	35	5		Tt	341.0	grad	Sltst, dk gy w tr alt + sul units to 341.0, then Tt, mod clay alt Sp suls
345.8	355.2	9.4		.15				93	3.12							.15			1		Tr					20	40	20	5	1	Tr	5					Tt, gy patches. Sp suls. Tr chlor pods.
355.2	358.6	3.4		1.20		.02		89	3.27							1.20			5		1		Tr			10	65	10	SP	5	5						Tt w one patch St s.s. (one only exp) Rest of core wk mod clay
358.6	366.5	7.9		.11		.01		87	3.03							.11			SP							80	10	5	1					Mb	363.0	grad.	Tt as incr Mb to end. Wk sx fol to 366.6 to end

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

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Note (3)
Tt - Tactite
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Mb - Marble
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Note (4)
V - Vein
F - Fault
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C - Contact
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Hole No D-144
Page 2 of 2 Pages

Collar Elev 2965.14 Final Depth 664.0
Coords. N 37,392.99 E 20,003.77
Inclination Vert
Logged by FTG - CWH
Date: Start 2/3/63 Finish 3/1/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
366.5	371.3	4.8		.11		nil		92	3.09							.11			Tr					Tr		10	50	35		5					Tr	368.2	grad.	Mb, wh to, wz. incr. patches & blebs of part silicates (?) Tr Sulfs
371.3	380.1	8.8		.48		.01		75	3.46							.48			1						1.78	25	60	10		SP		Tr			Mb	378.8	grad.	Tr in patches of Mb; also sm-color. wk-med sulfs
380.1	391.5	11.4		.06		nil		100	2.67							.06			1							60		15		Tr	20							Mb, white to blue-white, patch of Tt @ end. Patches of clay
391.5	402.3	10.8		.01				99	2.65							.01			1		Tr					50	20	20		1	5							Mb, pink in places, patches of chlor, some clay, 1 inc of py
																																						vuggy, with leaching in middle of cum. frag. sandy
402.3	411.8	9.5		.09				96	2.63							.09			Tr							85		10		SP			Tr					Mb; white, f.g., patches w mod suls grad to sp chlor.
411.8	422.2	10.4		.09				89	2.61							.09			1							15		75		1			5		Hf	411.8	grad	Hf, bl gy w vnlts blk chlor Tr cal vnlng
422.2	431.6	9.4		.13				97	2.64							.13			1							10		70		1			10					Hf, as above. Sp vnlts yellow clay w tr suls
431.6	440.0	8.4		.12		.04		99	2.98							.12			1	Tr						10		75		1			5					Hf; mod yellow clay vnlts w diss py-mag grad to st silicates
440.0	449.7	9.7		.46		.05		86	3.11							.46			1	1						10		60		1			20					Hf, buff w st silicates to 446.0, then mod clay-chlor, st py-cpy-mag
449.7	456.8	7.1		.24		.05		85	3.00							.24			1	1						15		65		5			10					Hf, st suls, mod clay-chlor grad to grnish Hf (serp-talc?) w sp chlor-suls + Tt
456.8	466.4	9.6		.32				100	2.71							.32			1		Tr					25		15		SP			5		Mb	458.8	grad	Hf, dense; st silicates to 458.8, then Mb, mod chlor-sul vnlng decr to Tr
466.4	476.0	9.6		.25				98	3.38							.25			5					Tr	2.8	60	30	SP		1			SP		Tt	471.0	grad	Mb, tr chlor-suls to 471.0, then Tt, st gar, st diss sl-cpy-py
476.0	483.0	7.0		.13				97	3.51							.13			5					1	.6	5	80	5		Tr								Tt, st gar; blebs cal; mod diss sl-py
483.0	490.1	7.1		.09				100	2.68							.09			5					Tr		5	20	65		1			5		Hf	486.0	grad	Tt as above to 486.0 then Hf, mod chlor-yell clay vnlts Mod suls
490.1	500.8	10.7		.27		.04		79	2.69							.27			5	Tr					1	10	15	70		SP			SP					Hf, mod clay-chlor in vnlts w mod suls Patches Tt w dis st
500.8	507.5	6.7		.54		.02		79	2.99							.54			5	Tr						10	10	70		1			5					Hf, st blk chlor vnlng w mod suls Sp cal vnlng Mod Tt w mod suls
507.5	516.6	9.1		.66	47.2' @ .72	.05	47.2' @ .06	98	2.64							.66			5	SP						10	5	75		1			5					Hf, st blk chlor - diss + vnlts Mod suls Patches st silicates
516.6	527.1	10.5		1.07		.06		91	2.80							1.07			5	Tr						10	10	70		1			SP					Hf, as above Patches Tt
527.1	539.0	11.9		.59		.08		76	2.69							.59			SP	1						20	5	65		1			5					Hf, as above
539.0	548.0	9.0		.65		.08		89	3.08							.65			1	1						15	SP	75		1			5					Hf, mod chlor - clay alt Mod suls
548.0	557.5	9.5		.36		.04		97	2.72							.36			1	1						15	1	75		1	Tr		5					Hf, st chlor - suls to 552.0 then sp chlor vnlts Tr suls
557.5	567.0	9.5		.13		.06		100	2.53							.13			1	1						10	1	80		1	1		5					Hf, mod blk chlor in pods + vnlts Mod cal Sp suls
567.0	576.8	9.8		.58		.18		85	3.15							.58			1	1						10	25	60		1	1		SP		Tt	572.0	brkn	Hf, mod dis + vnlt chlor w tr suls to 572.0 then Tt, mod clay
576.8	586.5	9.7		.42	45.5' @ 1.02	.05	45.5' @ .08	83	3.24							.42			1	1						10	50	30		1	1							Tt, sp-mod clay alt Mod suls
586.5	596.0	9.5		.61		.05		87	3.23							.61			1							5	60	25		5	1							Tt, sp clay-chlor Sp suls in vnlts
596.0	604.5	8.5		.95		.05		83	3.05							.95			1	Tr						10	55	20		5	1		5					Tt, mod clay alt Mod suls
604.5	612.5	8.0		2.86		.05		99	3.20							2.86			1	1				3.69		10	50	20		SP	1	SP	Tr					Tt, sp clay - st gar Patches st cpy-sl
612.5	622.0	9.5		.26		.05		96	3.13							.26			1							10	45	40		1	1	1	1					Tt, st gar. Tr suls Tr cal vnlng Tr Sltst
622.0	632.0	10.0		.20				91	3.31							.20			1							10	45	30		1	1	10	1		Sltst	630.0	grad	Tt, as above to 630.0, Sltst, mod qtz vnlng
632.0	637.0	5.0		.13				97	3.30							.13			1							5	15	5		Tr		70	1		Tt	636.0	grad	Sltst, tr cal vnlng to 636.0, then Tt, tr suls, tr cal vnlng
637.0	644.1	7.1		.09				91	3.38							.09			1							5	60	25		1			1					Tt, tr suls Vague banding of gar + wollastonite? @ 28°
644.1	654.0	9.9		.09				94	3.38							.09			1							5	55	30		1			1					Tt, as above
654.0	664.0	10.0		.18				97	2.75							.18			1							5	50	30		SP			SP					Tt, as above w incr gar

Av. Rec. = 84%

END OF HOLE

8X 1.432

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Stong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-145
Page 1 of 2 Pages
Collar Elev. 3031.29 Final Depth 725.7
Coords. N 36,647.83 E 19,995.36
Inclination Vert
Logged by FTG - CWH
Date: Start 2/12/63 Finish 2/26/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	JAROSITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 2.400	0.0	8.4	8.4		.15				42	2.57	.12	.01	.02						Tr										Tr	SP	Tr		Tr	Tr		Dp	0.0	brkn	Dp, leached, wk alt to 1.8, then Mz; leached, wk alt
																																				Mz	1.8	brkn	
	8.4	15.6	7.2		.25				74	2.59	.20	.01	.02	.02					Tr										SP	10	Tr		Tr	Tr					Mz; leached; sp clay alt. Sp CuOx
	15.6	25.2	9.6		.23				66	2.52	.10	.01	.01	.11																15									Mz; brkn; leached, sp clay alt. Sp CuOx Vague bx text.
	25.2	35.4	10.2		.21				66	2.60	.05		.01	.15								Tr							SP	20			S			Hf	35.0	brkn	Mz, brkn, leached, sp clay alt to 35.0, then Hf; st schlor. leached
	35.4	43.8	8.4		.48	.40	.38	.40	86	2.57			.01	.37			.10									5	15	55		10			S						Hf, leached, mod chlor - clay. Patches Tt, Mz. Sp CuOx
	43.8	51.4	7.6		.104	.75	.98	.67	88	2.54		.01	.02	.95			.06			Tr							10	10	55	5		10	S			Mb	50.8	brkn	Hf, leached, mod chlor alt Sp sul vning, st CuOx to 50.8, then Mb, leached
	51.4	61.7	10.3		.17		.16		99	2.64			.01	.15			.01										30	30	25	SP			S			Tt	55.0	brkn	Mb, leached, sp CuOx to 55.0, then Tt; leached; massive. Pods chlor, Mb
	61.7	70.1	8.4		.08				81	2.59			.02	.06										Tr			35	40	20		1		S						Tt; leached; sp chlor - silicat. Sp CuOx
	70.1	79.7	9.6		.06				83	2.80			.01	.05										Tr			20	65	10		1		SP	Tr					Tt; leached, dense; pods chlor - Hf. Tr CuOx
	79.7	88.7	9.0		.06				95	2.69			.01	.05										Tr	Tr		80	SP	5	1	10		Tr		SP	Mb	79.7	brkn	Mb; leached, sp vnlts gn- fluorite. Pods qtz.
	88.7	94.4	5.7		.06				88	2.69			.01	.05										Tr			85	SP	SP	1	10								Mb; leached, sp pods qtz Tr CuOx
NX 1875	94.4	103.6	9.2		Nil				96	2.69							nil										90				10								Mb; as above
	103.6	113.3	9.7		Nil				94	2.69							nil										95			Tr			Tr						Mb; as above w. incr. blue color
	113.3	122.8	9.5		Nil				100	2.61							nil										95			1			1						Mb; leached; bl-gy both dis + in vnlts Pods (vnlts) silicat Mb?
	122.8	131.7	8.9		.14				99	2.67						.04	.10			Tr							40	50		5			1			Hf	122.8	grad	Hf; sp clay alt. Dense w pods qtz. Sp Mb
	131.7	140.1	8.4		Nil				96	2.82							nil										35	60		Tr			SP						Hf; sp chlor in vnlts. Sp Mb
	140.1	150.2	10.1		Nil				94	2.71							nil										35	60		1			1						Hf; as above.
	150.2	159.0	8.8		.01				100	2.66							.01			Tr							70	25		1			1			Mb	151.8	grad	Hf; as above to 151.8, then Mb, leached
	159.0	168.9	9.9		.03				95	2.67			.02				.01		Tr								95						Tr						Mb; sp clay. Tr blk CuOx Tr wulfenite
	168.9	178.3	9.4		.01				100	2.67			.01						1								95			1									Mb; leached
	178.3	187.6	9.3		.13				95	2.69						.09	.04		1	Tr							95			1									Mb, leached Patches sp clay - CuOx
	187.6	196.8	9.2		.09				97	2.69							.09		1	1							80	5		1	Tr	10	SP			Hf	196.2	brkn	Mb; as above to 196.2, then Hf; st chlor - feldspath - qtz alt Tr sulfs
	196.8	206.6	9.8		.09				88	3.33							.09		1	1							15	60	15	1	1	5	1			Hf	198.5	grad	Hf, st chlor w patches st lim to 198.5, then Tt; sp sul - chlor vning
	206.6	216.2	9.6		.03				89	3.19							.03		1	1		Tr			Tr		40	40	10	1	1		1			Mb	214.2	grad	Tt, leached, patches mod bem - chlor to 214.2, then Mb, leached; CuOx
	216.2	225.9	9.7		.02				93	2.69							.02		1	1							90	SP		SP			SP						Mb, leached, patches H grn Hf.
	225.9	235.4	9.5		.04				91	2.72							.04		1	1							95			Tr			Tr						Mb; leached, gy patches
	235.4	244.4	9.0		.04				100	2.68			.01	.03					1	1							95			1			1						Mb; leached; sp clay
	244.4	253.5	9.1		.04				96	2.70			.01	.01			.02		1	1							95			1			1						Mb; as above
	253.5	262.9	9.4		.04				97	2.68			.01	.01			.02			1		Tr					85	5	SP	5			1			Tt	260.9	grad	Mb; as above to 260.9, then Tt; mod clay alt
	262.9	272.0	9.1		.01				100	2.60							.01			1		1					20	30	1	SP			1			Mz	262.9	brkn	Mz; wk alt to 268.5, then Tt, st gar.
																																		PYRITE		Tt	268.5	brkn	•
	272.0	281.5	9.5		.32		.05		100	2.70							.32			Tr		Tr					35	5	45	SP			S			Hf	274.0	grad	Tt, st gar; tr suls to 274.0, then Hf; sp clay - chlor. Sp sul. vnlts
	281.5	290.8	9.3		.40		.04		100	2.68							.40			1		1			Tr		25	5	55	1			S	Tr	Tr				Hf, sp clay chlor Sp sul vnlts. Tr sul vning
	290.8	300.3	9.5		.19		.04		98	2.68							.19			1							75	SP	15				S			Mb	290.8	grad	Mb, sp chlor - clay Tr sp - sl
	300.3	310.0	9.7		.25				94	2.72							.25			1					Tr	SP	90	5		Tr			SP			Hf	300.3	grad	Hf, sp clay alt. Patches chlor vning Sp suls (sl-gn) Sp Mb
	310.0	319.3	9.3		.13				88	2.99							.13			1		Tr					80	15		SP			SP			Mb	315.1	grad	Hf, sp chlor w incr Mb to 315.1, then Mb, tr hem bx frags
	319.3	328.6	9.3		.02				96	2.67							.02		Tr	1							95	Tr		SP			Tr						Mb; leached, patches Ls
	328.6	339.3	10.7		.02				86	2.70							.02		1	1							99						1						Mb; as above
	339.3	347.6	8.3		.02				98	2.70							.02			1							99	Tr					1						Mb; tr dk vnlts
	347.6	357.3	9.7		.01				97	2.67							.01			1							99	1					1			Ls	356.0	grad	Mb, as above to 356.0, then Ls; dk gy, dolomitic
	357.3	367.0	9.7		nil				96	2.67							nil			1							95			SP			1			Mb	360.2	grad	Ls, as above to 360.2 then Mb, tr lim.
	367.0	376.3	9.3		.01				99	2.69							.01		Tr	1							99												Mb, tr lim in fractures
	376.3	385.9	9.6		nil				95	2.62							nil		1	1							97			Tr									Mb, as above Tr clay alt
	385.9	395.6	9.7		nil				93	2.67							nil		1	1							95			1			Tr						Mb as above grad to f g Mb
	395.6	405.1	9.5		.04				96	2.83							.04			1							30	65		SP			SP			Hf	395.6	grad	Hf. leached; st lime - silicates

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-145
Page 2 of 2 Pages
Collar Elev 3031.29 Final Depth 725.7
Coords N 36,647.83 E 19,995.36
Inclination Vert
Logged by FTG - CWH
Date: Start 2/12/63 Finish 2/26/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Un. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
405.1	414.1	9.0		.02				96	2.75							.02			Tr							20	80		SP			SP						Hf; mod chlor vning @ 40°. Tr jarg on shears
414.1	423.2	9.1		.07				91	2.72							.07										20	80		SP			SP						Hf; patches mod clay - chlor vning.
423.2	433.0	9.8		.02				93	2.75							.02				Tr						30	65					5						Hf; diverse chlor vning. Sp clay alt
433.0	442.0	9.0		.02				96	2.84							.02										50	Tr 45											Hf; sp chlor alt. Mod dk-bl Ls
442.0	451.8	9.8		.03				91	2.83							.03										25	70											Hf; sp chlor - clay vnlts, tense
451.8	460.1	8.3		.09				100	2.78							.09				Tr							65					10						Hf; white w mod blk chlor vning. Sp suls w chlor
460.1	470.4	10.3		.14				90	2.64							.14							Tr	Tr														Hf; sp chlor alt. Tr suls
470.4	479.8	9.4		.07				100	2.69							.07										20	75					5						Hf; buff; tr cal - chlor vning.
479.8	488.9	9.1		.06				97	2.79							.06																						Hf; sp clay - chlor vning. Tr suls
488.9	498.6	9.7		.13				97	2.76							.13										25	70											Hf; sp clay alt. Ggy areas. Tr chlor - cal vning
498.6	508.5	9.9		.34		.04		90	2.61							.34										20	75											Hf, ggy areas. Mod chlor vning. Pods chlor w. sp suls.
508.5	516.9	8.4		.16		.03		100	2.84							.16										60	25					5		Mb	508.5	grad	Mb, patches st py - sl. Patches Hf.
516.9	527.6	10.7		.49		.01		79	2.76							.49										75	10					10						Mb, patches st chlor - clay. Sp suls.
527.6	536.6	9.0		.24		.01		95	2.70							.24										55	5		5			15		Hf	534.0	grad	Mb; tr chlor vning to 534.0, then Hf; st chlor - clay alt. Tr sul
536.6	544.9	8.3		.15				35	2.73							.15					Tr					20	5 40		10			15						Hf; st chlor - clay alt w. sp suls. Ggy areas
544.9	553.3	8.4		.36		.01		81	3.18							.36										15	45 25		SP	Tr	SP	5		Tt	544.9	brkn	Tt; sp cal vning. Patches mod clay. Pods st suls
553.3	558.2	4.9		.59		.02		95	3.09							.59										15	50 20				10	SP						Tt; as above
558.2	566.2	8.0		.11		.01		86	3.36							.11							5			10	60 20				SP	Tr						Tt; st gar w. cal vning. Incr chlor blebs.
566.2	575.2	9.0		.02				88	3.38							.02										15	60 10				15	SP						Tt, as above. Silty @ cont.
575.2	584.9	9.7		.05				85	2.90							.05										10	30 10				40	5		Siltst	575.2	brkn	Siltst w patches of Tt. Carb tetn, chlor on vnlts w/ sp.
584.9	594.0	9.1		.04				93	3.37							.04									Tr	5	80 5				Tr	Tr		Tt	584.9	brkn	Tt, st gar. Sc. patches of chlor. w/ sp, sp cpy.
594.0	599.9	5.9		.18				100	2.74							.18										5	60 5				20							Tt, st gar Tr suls
BX 1.432 → 599.9	609.6	9.7		.21				86	3.32							.21										5	80 5				10							Tt, st gar w patches mod chlor - cal vning. Sp suls in vnlts
609.6	618.7	9.1		.15				97	2.94							.15							Tr	Tr		5	50 35				5							Tt, st gar Patches sp clay. Siliceous patches (blea siltst). Sp suls
618.7	628.7	10.0		.27		.02		90	3.08							.27										5	50 30				15							Tt, mod blea siltst - gar banding @ 30° grad to st gar w. st suls in vnlts
628.7	638.3	9.6		1.40		.02		94	3.08							1.40			10	Tr						5	40 30				5							Tt; st suls w mod blea siltst grad to mod chlor - cal vning. St suls
638.3	648.0	9.7		1.30		nil		91	2.96							1.30			10							5	40 30				5							Tt, mod chlor - cal vning. St suls
648.0	658.7	10.7		.47	58.9	nil	58.9	97	2.78							.47			SP							5	50 20				20							Tt; as above w patches siltst to 657.0, then st silicif, mod suls
658.7	668.4	9.7		.45	.75	.03	.02	88	2.97							.45										10	50 20				10							Tt, mod silicif - yell clay, sp feldspath. Sp cal vning. St diss. suls
668.4	677.9	9.5		.51		.04		88	3.28							.51								Tr		15	45 30				SP							Tt, patches st gar Patches gerush siliceous rk. Sp suls
677.9	687.6	9.7		.40		.06		87	3.03							.40									Tr	15	55 20							Dp	686.6	brkn	Tt, as above to 686.6, then Dp, brkn, st silicif. Sp suls
687.6	697.6	10.0		.20		.05		95	2.64							.20											Tr			Tr		5						Dp, sp silicif. Sp suls in vnlts
697.6	707.3	9.7		.17				89	2.64							.17			Tr								1			1	1	SP	Tr					Dp; as above
707.3	716.5	9.2		.10				41	2.73							.10					Tr						1			1	1	1	1					Dp " "
716.5	725.7	9.2		.15				94	2.65							.15											1			1	1	1	1					Dp " "

Av. Rec. = 91%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Stong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-146
Page 1 of 2 Pages
Collar Elev. 3087.45 Final Depth 633.5
Coords. N 36,504.65 E 20,004.60
Inclination Vert
Logged by FTG - CWH
Date: Start 2/26/63 Finish 3/1/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Un Qtz	QUARTZ	CHLORITE	JAROSITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 2.400	0.0	6.0	6.0		1.55		1.54		51	2.85	.30	.01	.03	.20					Tr								15	60	20		SP				Tr		Tt	0.0	–	Tt, leached, mod clay alt Mod CuOx
	6.0	7.0	1.0																																					CAVITY
	7.0	17.0	10.0		.19		.19		76	3.19	.02		.01	.16					Tr								10	80	5		SP				Tr					Tt, leached, sp clay alt Sp CuOx
	17.0	22.8	5.8		.32		.27		67	3.14	.07	.01	.01	.18			.05			Tr							15	65	10		S									Tt, leached, mod clay - jaro alt Tr CuOx
	22.8	32.7	9.9		.47		.35		88	2.67	.20	.01	.01	.13			.12			Tr							10	60	25		SP									Tt, leached, mod clay - silicif. Patches st jar Sp CuOx
NX 1.875	32.7	41.0	8.3		1.28	38.0 @ .99	1.09	38.0 @ .98	98	2.53	.85	.01	.01	.22			.19										15	20	60									Hf	32.7	grad	Hf, leached, mod clay alt Mod Tt Mod CuOx
	41.0	50.9	9.9		1.28		1.16		91	2.76	.60	.01	.01	.54			.12										15	20	60			Tr								Hf, leached, sp clay alt. Patches Tt St CuOx
	50.9	60.8	9.9		.96		.94		85	2.99	.40	.01	.01	.52			.02										15	40	40									Tt	55.9	grad	Hf, leached, mod clay - CuOx to 55.9, then Tt sp clay - sp CuOx
	60.8	71.1	10.3		.19				80	3.19	.05	.01	.01	.06		.01	.05										15	60	15											Tt; leached; sp clay - cal veining Tr CuOx
	71.1	79.6	8.5		.17				83	3.34	.04	.01	.01	.07			.04										10	70	10									Mz	77.4	brkn	Tt, as above to 77.4, then Mz; leached, sp clay - silicif.
	79.6	89.5	9.9		.12				69	2.55	.04		.01	.03		.04																Tr	Tr							Mz; leached; sp clay alt. Tr CuOx
	89.5	99.5	10.0		.13		.02		80	2.54	.01			.01		.11																			SP					Mz, leached, mod clay - jaro alt. Sp CuOx m. veinlts
	99.5	108.2	8.7		.43		.14		92	2.48	.08		.01	.09		.05	.24										5	40	10									Tt	104.5	brkn	Mz, leached, mod clay alt to 104.5, then Tt, st clay grad to st jar
	108.2	114.7	6.5		.14		.04		96	2.42	.03			.01			.10										5	50	20				15		Tr					Tt; leached, sp. mod clay. Sp CuOx
	114.7	123.2	8.5		.25				61	2.57	.01		.01	.20		.03											SP	5	Tr		5		5					Mz	115.0	brkn	Tt, as above to 115.0, then Mz, brkn, leached; sp clay - CuOx
	123.2	133.1	9.9		.24				83	2.99	.16	.01	.01	.03			.03		SP								15	20	50		5			SP				Hf	123.2	bx	Hf, bx w lim matrix to 125.0, then sp clay alt Tr CuOx
	133.1	142.0	8.9		.15				90	2.83	.02		.01	.12					Tr								65	10	20		SP							Mb	135.0	grad	Hf, sp clay to 135.0, then Mb; leached, sp clay
	142.0	151.0	9.0		.17				77	2.67	.02		.01	.12			.05										10	10	60		5	Tr	5	5				Hf	142.0	grad	Hf, sp clay - chlor alt. Patches Silist - Tt Tr CuOx
	151.0	161.7	10.7		.04				77	2.99			.01	.03										Tr			5	10	60		SP	1	10	5	1	Tr				Hf, mod silicif. Pods chlor. Tr CuOx Sp gr - fluor
	161.7	171.2	9.5		.03				94	2.71				.03													65	5	15		1	1	5	5	1	1	Mb	164.0	grad	Hf, as above to 164.0, then Mb; leached
	171.2	180.6	9.4		.04				96	2.65				.04													85	5		Tr		5		1					Mb, leached, 1' patch mod chlor - clay
	180.6	189.7	9.1		.02				98	2.69				.02													95				1				1					Mb, leached, tr chlor - clay Tr CuOx Tr gn - fluor
	189.7	199.1	9.4		.02				94	2.68				.02													95				1				1					Mb, as above
	199.1	208.3	9.2		.02				96	2.70				.02													95				1			Tr	1		Ls	205.5	grad	Mb, as above to 205.5, then Ls, sp clay alt
	208.3	217.8	9.5		.04				95	2.70				.04										Tr			95				SP			1	1			Mb	214.5	grad	Ls, sp clay - chlor(?) to 214.5, then Mb, leached
	217.8	227.2	9.4		.04				97	2.69				.04						Tr							95				Tr			1						Mb, as above
	227.2	236.8	9.6		.03				94	2.68				.03													95				1									Mb, " "
	236.8	246.1	9.3		.04				96	2.62				.04													85	5			1			10						Mb, patches Ls, chlor
	246.1	255.5	9.4		.03				95	2.82				.03			.03										10	SP	80		1		SP	SP				Hf	246.1	grad	Hf, sp clay alt, dense Mod Mb
	255.5	264.5	9.0		.02				93	2.79				.02			.02										15	Tr	80		SP			SP						Hf, sp clay - cal veining Tr sulfs
	264.5	273.8	9.3		.08				99	2.66				.08			.08		Tr								10	1	75		1			10	Tr					Hf, as above
	273.8	283.1	9.3		.06				96	2.65			.01	.02			.03										95				Tr							Mb	273.8	grad	Mb; tr clay - tr sulfs
	283.1	292.6	9.5		.04				93	2.64				.01			.03							Tr			95				1				Tr					Mb, as above
	292.6	302.4	9.8		.14				89	2.68							.14										90				5			SP	1					Mb, tr chlor veinlts Gray areas
	302.4	312.1	9.7		.05				95	2.67							.05							Tr			90		SP		SP		Tr		1	5				Mb, mod fluor - tr gn.
	312.1	321.7	9.6		.03				94	2.70							.03										95		Tr		Tr				1					Mb; tr lim - chlor in veinlts
	321.7	331.2	9.5		.05				95	2.68							.05										95				SP									Mb, as above
	331.2	340.6	9.4		.02				94	2.77							.02										95				Tr			Tr						Mb, " "
	340.6	350.1	9.5		.05				95	2.69							.05		Tr								95		Tr					1						Mb, " "
	350.1	359.7	9.6		.05				96	2.70							.05										100													Mb, " "
	359.7	369.1	9.4		.06				97	2.67							.06										100													Mb, " "
	369.1	378.6	9.5		.06				94	2.70							.06										100													Mb, " "
	378.6	388.1	9.5		.04				97	2.67							.04										100									Tr				Mb, " " Tr H. W. Ls.
	388.1	397.4	9.3		.04				96	2.70							.04										95		5		Tr			Tr						Mb, as above
	397.4	406.9	9.5		.04				98	2.69							.04										90		5		1			1		SP				Mb, as above Tr Hf

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Toctite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-146
Page 2 of 2 Pages
Collar Elev 3087.45 Final Depth 633.5
Coords N 36,504.65 E 20,004.60
Inclination Vert
Logged by FTG - CWH
Date: Start 2/26/63 Finish 3/11/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JASPOIDE	Plum-Tt	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
406.9	416.2	9.3		.03				98	2.16							.03			Tr						90		5		sp			Tr			Mb			Mb; blgy bands dipping 25° Ggy area Tr asbestos?
416.2	425.6	9.4		.02				97	2.70							.02			1				Tr	Tr	95		sp		Tr					sp				Mb, tr clay vnlts Dk banding @ 40° Sp bs
425.6	435.2	9.6		.05				94	2.65							.05			1	Tr	Tr				30		60		Tr			5			Hf	427.6	grad	Mb, as above to 427.6 then Hf, patches mod clay, sp chlor vning, suls
435.2	444.6	9.4		.02				93	2.77							.02			1						15		75		1		5	SP	Tr					Hf, sp chlor - diss + vnlts, tr suls w mer Tt + blea sltst?
444.6	453.9	9.3		.15				96	2.73							.15			1						15		80		1			1						Hf, mod chlor - diss + vnlts Tr suls
453.9	462.9	9.0		.07				91	2.97							.07			1						10		85		1			Tr	Tr					Hf, sp chlor Tr suls Sp vnlts yellow clay
462.9	473.1	10.2		.33				83	3.30							.33			SP	Tr			Tr	Tr	5	30	50		1			10						Hf, mod clay - chlor alt 1 ft area mass blk chlor w mod suls.
473.1	482.4	9.3		.12				99	2.74							.12			Tr						15	20	60		1			Tr						Hf, sp chlor - clay alt Tr suls
482.4	493.0	0.6		.13				84	3.07							.13									10	5	80		SP			1	Tr					Hf, as above
493.0	503.1	10.1		.13				94	2.80							.13			1	SP					10	SP	80		1			5	1					Hf, as above
503.1	512.5	9.4		.09				95	2.70							.09			1						70	1	15		1			5			Mb	505.5	grad	Hf as above to ct, then Mb, white, coarsely xline, sp chlor
512.5	522.1	9.6		.10				100	2.71							.10		Tr	1				Tr		85		Tr		1			5						Mb, wh tr, coarsely xline; sp chlor on seams. Tr suls.
522.1	526.2	4.1		.06				100	2.71							.06		1	1						90						5	Tr						Mb as above. Tr leached, vuggy, turning to oxd fr 528.8 to end.
526.2	529.2	3.0																																					Cavity
529.2	534.2	5.0		.10				90	2.77							.10		Tr	Tr						90				Tr				SP						Mb, as before, w Fe staining on vugs & start of rem. sp chlor
BX 1632 → 534.2	543.4	9.2		.20				99	2.75							.20			1						95				1				Tr						Mb, as above.
543.4	552.9	9.5		.34		.03		94	2.66							.34			SP	Tr	Tr				15		70		1			5			Hf	544.0	brkn	Mb, as above to 544.0, then Hf, mod blk chlor vning Sp suls
552.9	563.1	0.2		.54		.02		87	2.66							.54			1	1	1				15	10	60		1			10						Hf, as above w patches st clay - suls
563.1	573.7	10.6		.55	45.0 @	.01	40.0 @	78	3.08							.55			1				Tr		15	5	70		1			5			Tt	570.5	brkn	Hf, sp clay - chlor vning to 570.5, then Tt, sp clay, suls
573.7	583.4	9.7		.63	.53	nil	.01	84	3.21							.63			1						15	60	15		SP				Tr						Tt, st gar Tr suls
583.4	592.9	9.5		.41		nil		95	2.97							.41			1						20	50	25		1	Tr		1						Tt, sp chlor - ent - sul vning
592.9	599.3	6.4		.35		nil		96	2.81							.35			1						10	30	25		1	1	30	1						Tt, as above Mod suls
599.3	604.0	4.7		.21				99	2.77							.21			1						10	65	15		1	1	SP	1						Tt, as above w mod Sltst
604.0	613.7	9.7		.20				90	2.63							.20			Tr						10	40	20		1	1	20	1						Tt, as above
613.7	623.6	9.9		.15				95	2.78							.15			1						5	30	20		1	1	30	5						Tt, " "
623.6	633.5	9.9		.15				88	3.14							.15			1						5	50	20		1	1	15	5						Tt, st gar w tr chlor sul vnlts

Av. Rec. = 90%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

D-147 Hole No. [illegible]
Page 1 of 2 Pages
Collar Elev 2987.19 Final Depth 730.3
Coords N 37,249.33 E 2,000,2[illegible].89
Inclination Vert
Logged by FTG - CWH
Date: Start 3/2/63 Finish 3/21/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Cu (1) Patch	Cu (1) Black	Cu (1) Blue Green		Cu (1) Cc.	Cu (1) Cov.	Cu (1) Born	Fe (2) Lim.	Fe (2) Py	Fe (2) Mag.	Fe (2) Hem.	Fe (2) Spec.	Other (2) Galena	Other (2) Sphal.	Other (2) Molyb.	Other (2) Calcite	Other (2) Garnet	Other (2) Silicates	Other (2) Sericite	Other (2) Clay	Other (2) Un. Qtz.	Other (2) QUARTZ	Other (2) CHLORITE	Other (2) JAROSITE	(3) Rock Type	Structures (4) Depth	Structures (4) True Dip	Remarks
NC 2.400	0.0	10.5	10.5		.14				91	2.49	.14								Tr		Tr								5	5	Tr			Tr	Dp	0.0	-	Dp; leached; sp clay - jaro alt Sp hem - lim in vnlts + diss
	10.5	18.9	8.4		.06				71	2.43	.06																		SP	10									Dp; leached; sp clay - med jaro alt. Wk hem - lim Tr ang. incl.
	18.9	27.5	8.6		.09				84	2.55	.09																			5				SP					Dp; leached vnlts. Tr clay - jaro alt Tr dis. suls Tr dk. ang. incl
	27.5	30.8	3.3		.07				95	2.41	.07																			SP				Tr					Dp; as above
	30.8	39.9	9.1		.06				90	2.53	.04					.02																						Dp; leached, med clay alt Tr hem - lim - jaro in vnlts.
	39.9	49.7	9.8		.06				86	2.48	.04					.02			Sp											5								Dp; leached; sp clay - jaro Incr diss hem - lim.
	49.7	58.7	9.0		.08				92	2.51	.04		.02			.02														Sp								Dp; leached; sp - mod clay alt. Mod diss. hem - lim.
	58.7	67.0	8.3		.10		nil		85	251						.10			Tr	Tr																		Dp; leached; as above
	67.0	76.7	9.7		.58		.04		95	2.60						.58														5								Dp; sp - med clay alt Sp suls in vnlts. Tr torbernite.
	76.7	86.0	9.3		.46		.06		90	2.54						.46														5								Dp; as above
	86.0	95.8	9.8		.79		.07		84	2.48						.79														15								Dp; mod clay alt Mod shearing. Sp jaro on shears. Mod suls
	95.8	104.2	8.4		.55		.01		90	2.53						.55														20								Dp; mod - st clay - jaro alt to 100.0 then sp clay alt Mod suls
	104.2	114.1	9.9		.48	100.0 @ .52	.05	100.0 @ .03	81	2.54						.45	.03							Tr			Tr			10								Dp sp clay alt. Sp suls.
	114.1	123.6	9.5		.36		.01		92	2.56						.35	.01													SP				SP				Dp, sp clay alt. clay - jaro - chlor? on shears. Sp. suls.
	123.6	131.0	7.4		.30		.01		94	2.58						.28	.02													5								Dp; as above w shattered effect middle ½ of run.
	131.0	139.5	8.5		.67		.04		90	2.62						.66	.01							Tr						5								Dp, sp clay alt, tr. jar & chlor. sp suls.
NX - 1.835	139.5	148.0	8.5	55 100	.56		.02		95	2.63						.50	.06													5								Dp, sp clay alt, wk jar & chlor, tr lim. tr suls.
	148.0	158.1	10.0		.54		.03		87	2.57						.50	.04													SP			Tr					Dp as above. Ap dike Fr 156.0 - 157.8. Pass 142 Fr there toward
	158.1	167.8	9.7		.40		.01		88	2.70						.35	.05											Tr			Tr		Tr	And	165.8	brkn	Dp, sp clay Tr suls Patches bx text to 165.8, then And, post middle
	167.8	177.1	9.3		.11		.01		86	2.63						.09	.02																		Dp	167.8	brkn	Dp; sp clay alt Tr suls in vnlts.
	177.1	186.7	9.6		.05				89	2.62						.05																						Dp, as above
	186.7	196.0	9.3		.04				94	2.64						.04													Tr									Dp, " "
	196.0	205.0	9.0		.03				96	2.66						.03																	SP					Dp, " "
	205.0	214.0	9.0		.03				95	2.63						.03																	Tr					Dp, " " St yellow clay (jaro ?) in vnlts.
	214.0	219.6	5.6		.06				89	2.55						.06																						Dp; as above
	219.6	229.1	9.5		.08				87	2.66						.04	.04						Tr										SP					Dp, " "
	229.1	237.9	8.8		.14				94	2.61						.07	.07																					Dp, tr clay alt Tr suls.
	237.9	246.8	8.9		.06				75	2.60						.02	.04													5								Dp, mod clay alt Tr suls Mod jaro (?) in vnlts.
	246.8	252.6	5.8		.05				69	2.57						.02	.03													5				5				Dp; as above
	252.6	259.0	6.4		.07				92	2.53							.07													SP			SP	SP				Dp; sp clay alt grad to mod feldspath; tr chlor - suls.
	259.0	268.5	9.5		.16		.01		88	2.79							.16																	Tr					Dp, sp clay - mod feldspath. Sp suls Mod Mz text
	268.5	277.7	9.2		.59		.01		92	2.60							.59								10										Tt	276.5	brkn	Dp; as above grad to sp clay to 276.5, then Tt; tr chlor - hem veing
	277.7	287.2	9.5		.11		.01		77	3.54							.11				Tr				Tr	75	20					Tr	Tr		Hf	282.5	grad	Tt, sp hem - clay alt to 282.5, then Hf, dense, sp chlor alt
	287.2	296.4	9.2		.09		nil		100	2.52							.09									5	45	45										Hf, lt grn; sp chlor - sp cal veing Tr suls
	296.4	306.1	9.7		.96		.01		100	2.76							.96							SP		20	50	20				SP			Tt	296.4	grad	Tt; wk chlor - clay - silic. C. Sp jar banding Mod sl, tr cpx
																																			Mb	302.2	grad	to 302.2, then Mb tr chlor veing
	306.1	315.9	9.8		.22		.02		95	2.69						.02	.18	.02						SP		40	20	25		Tr			SP		Hf	311.5	grad	Mb, tr chlor veing to 311.5, then Hf, sp chlor alt. Mod cal veing, jar
	315.9	324.7	8.8		.23				57	2.69							.23						Tr	5		40	20	25										Mb, tr jar veins Mod jar - sl - py peds
	324.7	334.3	9.6		.26				96	2.76							.26							Tr		35	Tr	Tr					Tr					Mb; tr jar veins. 1 ft patches massive jar (Tt)
	334.3	343.9	9.6		.07				93	2.67							.07									35												Mb, sp clay Sp sul veing.
	343.9	353.3	9.4		.04				100	2.64							.04									40	25	20				5	5		Tt	349.5	grad	Mb, patches jar - chlor to 349.5, then Tt, sp chlor, tr cal veing
	353.3	358.1	4.8		.04				97	2.72							.04				Tr					10	50	20				10	10		Hf	356.9	brkn	Tt, st jar to 356.9, then Hf, st chlor, mod cal veing
	358.1	366.5	8.4		.23				83	3.41							.23				Sp		Tr	SP		20	40			Tr			15		Tt	360.2	grad	Hf; chlor bx frags in s.c. matrix, grad to mod chlor w sp cal veing, hem to 360.2, then Tt; st jar, sp sl w Mb
	366.5	376.4	9.9		.09				85	2.72							.09									30	40	SP					Tr		Mb	367.9	grad	Tt, st jar to 367.9, then Mb, tr clay

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Note:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) +50 %

Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Collar Elev 2787.19 Final Depth 730.3
Coords N 37,249.33 E 20,002.89
Inclination Vert
Logged by F.T.G. - C.W.H.
Date: Start 3/2/63 Finish 3/21/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Clays	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
376.4	385.8	9.4		.03				92	2.87							.03			Tr							75	5	15					Tr		Hf	383.9	grad	Mb; tr clay, mod Hf to 383.9, then Hf, tr clay-chlor alt
385.8	395.2	9.4		.04				94	2.83							.04										10	20	40				25	1		Sltst	389.0	grad	Hf, tr clay alt to 389.0, then Sltst, dk gy, patches gar
395.2	405.0	9.8		.03				93	2.68							.03										40	5	5				40	1		Mb	398.0	grad	Sltst, dk gy w. gar. blebs to 398.0, then Mb, sp. Hf-Tt.
405.0	414.5	9.5		.05				85	3.25							.05								Tr		40	50	10		Tr					Tt.	405.0	grad	Tt, patches st gar. Tt w siliceous rk. Sp Mb; Sltst. Tr sulfs
414.5	423.9	9.4		.16				95	2.77							.16										80	5	10		1					Mb	414.5	grad	Mb; patches Hf, tr sul-chlor vning. Tr qtz blebs
423.9	433.3	9.4		.13				94	2.75							.13										10	5	80		1			5		Hf	425.5	grad	Mb; as above to 425.5, then Hf, mod blk chlor-sul vning
433.3	442.7	9.4		.10				94	2.64							.10										5		80					10					Hf; mod blk chlor vning. Sp yellow blebs (?) - lim'e sul. mineral?
442.7	452.7	10.0		.12				87	2.82							.12										5		80					10					Hf; sp blk chlor vning. Sp vnlts yellow mineral
452.7	461.7	9.0		.10				99	2.77							.10										5		85					5					Hf; as above
461.7	471.4	9.7		.06				93	2.79							.06										5		85					5					Hf; dense, massive; patches sp chlor vning
471.4	481.0	9.6		.06				66	2.99							.06				Tr						5		85					5					Hf, as above
481.0	489.4	8.4		.05				92	2.76							.05										5		90					SP					Hf. " "
489.4	499.1	9.7		.10				95	2.83							.10								Tr		10	Tr	40		SP		35	1		Bx	493.5	brkn	Hf, as above to 493.5, then Bx w Dp, Tt, Hf, Qtzite frags in ⅓ mat.
499.1	508.8	9.7		.20				95	2.83							.20										10	1	70		1		15	Tr		Hf	501.6	grad	Bx; as above w sp chlor-cal to 501.6, then Hf, sp chlor vning. Mod Mb
508.8	511.2	2.4		.25				68	2.75							.20										90	1	Tr		Tr			SP		Mb	508.8	grad	Mb, sp sul vning
Bx 1.432 → 511.2	520.3	9.1		.29		.07		100	2.69							.29				Tr						55	1	30		SP			5					Mb, sp sul vning. 40% run is Hf w sp chlor-sul vning
520.3	530.2	9.9		.69		.04		91	2.70							.69										85	1	5		1			5					Mb; patches st sulf. in vnlts. Sp Hf-Tt
530.2	539.6	9.4		.38		.04		98	2.60							.38										5	50	30		1			SP		Tt	530.2	grad	Tt, sp clay w st gar to 535.9, then Hf; sp siliceous rk w
																																			Hf	535.9	grad	mod chlor vning
539.6	548.1	8.5		1.31		.06		99	2.66							1.31			5	SP						15	30	50		Tr			SP		Tt	546.1	grad	Hf, mod chlor alt. St sulfs to 546.1, then Tt, mod sul vning. St gar.
548.1	558.1	10.0		.65		.06		83	3.05							.65			SP	Tr						10	50	35		1	Tr		1					Tt, sp clay, mod sul vning. Mod Hf
558.1	567.7	9.6		.33		.02	113.4	84	3.27							.33										10	60	25		1	1		Tr					Tt, sp clay alt w. sp sandy devel. Sp sulfs
567.7	576.0	8.3		.90	113.4 @ .61	.05	@ .04	93	3.04							.90									Tr	10	65	20		SP	1							Tt, st gar in sandy text. Mod sul-qtz vning
576.0	585.5	9.5		1.23		.04		81	3.40							1.23								532	1	10	65	15		5	1							Tt, st gar in dense rk w mass. st grad to sandy text Tt w mod sulfs
585.5	594.9	9.4		.16		.07		91	3.21							.16									1	10	50	20		Tr	1	15						Tt, dense, sp sul vning. Mod siliceous rk (blea Sltst)
594.9	604.2	9.3		.43		.02		87	3.27							.43									2	1	10	55	25		5	1	5						Tt, mod devel gar. w sp bleb Sltst. Mod sul vning
604.2	614.5	10.3		.31		.03		85	2.87							.31				F						10	5	70		SP	1	10			Hf	604.2	grad	Hf, st diverse chlor-sul vning. Sp Mb
614.5	623.9	9.4		.53		.04		88	3.19							.53										10	10	70		1	1	5			Tt	623.6	grad	Hf, mod chlor-sul vning, to 623.6, then Tt, sp chlor-sul vning
623.9	633.7	9.8		.47		.05		99	2.84							.47										10	50	35		1	1							Tt, sp clay alt. Sp sulfs. Patches mod chlor-cal
633.7	643.7	10.0		.28		.03		86	3.09							.28									Tr	10	40	20		1	1	20						Tt, mod diss chlor-sulfs. Tr cal vning
643.7	653.6	9.9		.09				91	3.33							.09										10	65	20		Tr	1	5						Tt, st gar. Tr sul vning
653.6	663.1	9.5		.05				86	3.35							.05								Tr		15	60	20		1	1	5						Tt, as above to 654.5, then calcite-cem chlor bx
663.1	672.6	9.5		.11				89	3.01							.11										15	50	20		1	1	5	10					Tt, chlor bx in cal cem to 667.0, then st gar. Sp Sltst
672.6	681.6	9.0		.19				92	2.90							.19										5	5	5	Sp			80	Sp		Sltst	672.6	grad	Sltst, dk gy, patches Tt. Patches blea Sltst-buff
681.6	690.8	9.2		.08				92	3.38							.08										5	70	20				5	Tr		Tt	682.6	grad	Sltst, as above to 682.6, then Tt, st gar. Tr sulfs
690.8	700.4	9.6		.10				88	3.41							.10										5	70	20				5	1					Tt, st gar. Sp cal vning. Tr sulfs
700.4	709.9	9.5		.10				92	3.25							.10										10	65	20				5	1					Tt, as above
709.9	720.1	10.2		.13				81	3.33							.13										5	70	20		Tr		5	Sp					Tt, gy areas. Patches bounded Tt + blea Sltst. Tr sulfs
720.1	730.3	10.2		.25				78	3.35							.25										5	75	20		1		Sp	1					Tt, as above

Av Rec - 89%

END OF HOLE

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

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Collar Elev 3033.81' Final Depth 3047
Coords N 36,348.42 E 19,002.98
Inclination Vert
Logged by F.T.G. - C.W.H.
Date: Start 3/12/63 Finish 3/18/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	ASBESTOS	ANDESITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	5.0	5.0																																					Rockbit
NX 2.788 5.0	15.0	10.0		.45	30.2 @ .89	.32	30.2 @ .54	76	2.86	.08	.01	.02	.21			.13		Tr	Tr		Tr					15	25	40		10	SP	5			Hf	5.0	—	Hf, st zone w st lim-clay w tr Mz, Tt to 12.5, then st. chlor. (And?)
NX 1.873 15.0	25.0	10.0		.29		.17		87	3.02		.01	.01	.15			.12										15	15	60		SP	Tr		SP					Hf, leached, sp clay-cal veing Mod Tt.
25.0	35.2	10.2		1.33		1.12		73	2.79	.80	.01	.02	.29			.21		10								15	10	50		15				Tr				Hf, mod chlor to 31.5, then int lim-clay alt. Sp CuOx. Asbestos
35.2	44.7	9.5		.19		.11		81	2.71	.02	.01	.01	.07			.08		Tr								15	5	70		SP	Tr							Hf, sp clay-chlor Tr CuOx, asbestos in veins.
44.7	49.1	4.4		.28		.18		100	3.00	.03	.01	.01	.13			.10										10	65	15							Tt	44.7	beks	Tt, mod clay grad to st gar w. tr. CuOx
49.1	55.9	6.8		.52		.23		81	3.19	.05	.01	.01	.16			.29		5								10	40	15		20		10						Tt, mod chlor to 54.0, then st lim-clay alt.
55.9	66.0	10.1		.28				88	2.56			.01	.15			.12		SP												Tr		Tr		Tr	Dp	55.9	beks	Dp; leached w tr suls, mod silicif
66.0	75.4	9.4		.13				93	2.60			.01	.04			.08													SP	SP								Dp; leached w tr l lim. Diss. lim. Sp silicif
75.4	84.6	9.2		.16				99	2.54			.01	.06			.09															Tr							Dp; leached, sp silicif - jaro alt
84.6	93.7	9.1		.10				96	2.57			.01	.04			.05		Tr																				Dp, leached w sp l. lim. Patches mod silicif
93.7	103.2	9.5		.11				94	2.47			.01	.04			.06														5								Dp; leached w sp l. lim., sp jaro alt of fspars. Gqy patches.
103.2	108.8	5.6		.16				75	2.47			.01	.05			.10													5	15								Dp; leached, mod clay - silicif
108.8	114.2	5.4		.07				81	2.50			.01	.04			.02													SP	5								Dp; as above grad to sp clay-silicif
114.2	123.7	9.5		.14				90	2.53			.01	.04			.09													Tr	SP								Dp, leached, mod silicif. Patches mod clay-jaro
123.7	133.7	10.0		.19				79	2.60			.01	.07			.11														5								Dp; as above Tr CuOx
133.7	143.3	9.6		.20				87	2.57		.01	.01	.06			.12														SP								Dp, leached, sp clay alt Tr suls in centers of leached veins
143.3	152.5	9.2		.14				75	2.59			.01	.05			.08																						Dp; leached, sp clay - silicif. Tr dk incl. Tr CuOx
152.5	158.7	6.2		.14				65	2.58			.01	.04			.09																SP						Dp, brkn; leached, sp clay - mod. silicif. Tr Bx text
158.7	164.2	5.5		.10				86	2.55			.01	.03			.06																S						Dp; leached, dk gy w. mod silicif grad to brkn w. mod clay alt
164.2	174.3	10.1		.16		.13		78	2.57			.01	.12			.03																SP						Dp; leached, sp silicif. Sp jaro on shears
174.3	183.7	9.4		.88	1.33 @ .63	.17	1.33 @ .11	85	2.56			.01	.16			.71																						Dp, as above to 179 then dk rk w per fspars (Dp of dks?)
183.7	193.6	9.9		.40		.06		84	2.56			.01	.05			.34																						Dp; dk facies to 186.0, then sp clay alt
193.6	202.7	9.1		.10		.04		91	2.57			.01	.03			.06														Tr								Dp; alt leached - tr suls Sp clay alt
202.7	212.9	10.2		.14				81	2.59			.01	.06			.07																						Dp; grad to mod clay alt
212.9	222.6	9.7		.22				87	2.51			.01	.03			.18													SP	15								Dp, as above w Mz text to 220.0, then int clay alt w sp suls
222.6	229.7	7.1		.24				52	2.26							.24														20								Dp; int clay alt Sp suls
229.7	235.4	5.7		.23				82	2.58							.23													Tr	5		Tr						Dp, mod grad to sp clay alt sp suls
235.4	243.1	7.7		.21				95	2.59							.21								Tr						10								Dp; sp clay alt Gqy patches Dp Bx 241.0 - 242.8 (fit?)
243.1	251.4	8.3		.24				89	2.61							.24														SP								Dp bleached, tr sul, Mz text
251.4	258.9	7.5		.24				85	2.61							.24																						Dp, as above. Tr feldspath along veins Moly assoc w feldspath
258.9	268.1	9.2		.20				84	2.60							.20																						Dp; as above
268.1	271.6	3.5		.19				73	2.61							.19																						Dp, " "
271.6	280.4	8.8		.13				95	2.61							.13																						Dp " "
280.4	289.2	8.8		.19				95	2.63							.19														Tr								Dp, " "
289.2	297.9	8.7		.16				89	2.62							.16													Tr	SP								Dp, as above to 295.3, then Dp Bx Dp w Dp frags(?)
297.9	304.7	6.8		.07				100	2.62							.07										Tr				SP		SP			And	298.4	brk	Dp, sp clay, to 298.4, then And(?) wk bleach then darkening felt phenc. Incip feldspath?

Av Rec. = 85%

END OF HOLE

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) +50 %

Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

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Page 1 of 1 Pages
Collar Elev 3694.24'
Final Depth 322.7
Coords N 36,195.38 E 18,998.30
Inclination Vert
Logged by FTG - CWH
Date: Start 3/19/63 Finish 3/26/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Red Oxides	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz	QUARTZ	CHLORITE	JAROSITE	BARITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC (STD) 2.750	0.0	8.8	8.8		.42		.36		55	2.67	.20		.01	.15			.06		Tr								80	10	5	Sp			Tr	Tr		Mb	0.0	-	Mb; leached sp clay, Sp Tt
NC 2.400	8.8	18.8	10.0		.53		.25		78	3.03	.12	.10	.01	.05			.25		5								20	60	5							Tt	8.8	grad	Tt; leached; sp clay to 16.8, then st lim-clay alt. Sp Mb
	18.8	24.0	5.2		.45		.32		85	3.08	.20	.05	.01	.06			.13		5			Tr					15	60	5				5						Tt, st hem-clay to 19.8, then sp hem veing. Sp Mb
	24.0	31.2	7.2		.68		.60		98	2.82	.45	.01	.01	.13			.08		5								15	60	10				5						Tt, med hem, med chlor in blebs. Sp CuOx, Mb
	31.2	40.6	9.4		.74		.58		94	2.82	.20	.10	.01	.27			.16		Sp								30	50	20				Sp						Tt, leached, sp hem. Blebs qtz-chlor. Mod Mb-CuOx
	40.6	49.7	9.1		.83		.70		96	2.62	.40	.05	.01	.24			.13										20	50	25	5				Tr		Hf	45.2	grad	Tt, leached, patches st lim. to 45.2, then Hf, sp chlor-jaro alt
	49.7	58.6	8.9		1.63		1.37		92	2.44	.60	.01	.01	.75			.26										15	15	45	25				Sp					Hf, leached; med clay alt grad to st clay-jaro. alt. Mod CuOx
	58.6	68.7	10.1		1.06		0.81		51	3.19	.40	.05	.01	.35			.25										15	40	30	15						Tt	66.0	grad	Hf; leached med clay-lim alt to 66.0, then Tt; st gar. Mod CuOx
	68.7	73.9	5.2		.80		.78		71	2.99	.40	.02	.01	.35			.08										15	80	5	Tr									Tt; st gar-hem. Sp CuOx
NK 1875	73.9	81.0	7.1		1.02	130.6 @ 1.05	6.8	130.6 @ .72	93	3.03	.33	.01	.01	.33		.34?											15	80	5										Tt; leached; st gar-lim. Gray patches. Tr CuOx
	81.0	84.0	3.0												Cu(?)																									Cavity
	84.0	90.0	6.0		1.01		0.41		41	2.43	.02			.02	.43	.54?			5								25	20	25	25				Tr		Hf	85.0	grad	Tt, as above to 85.0, then Hf, leached; st lim-clay. Sp CuOx
	90.0	96.2	6.2		1.25		.32		33	2.55		.02	.01	.29	50	.43?			20									5	20	50									Hf, st clay grad to int lim-clay alt
	96.2	105.0	8.8		3.19		2.24		88	2.28	.40	.01	.01	1.32	40	.55			5								Sp		30	60									Hf, int clay alt. Patches int lim. Mod CuOx
	105.0	113.1	8.1		2.11		1.09		93	2.56	.05	.01	.01	.80	22	.95		.07	5	Tr									20	Sp	60	Sp		Tr		Mz	110.0	brkn	Hf, int clay alt, dense areas, sp suls, med CuOx to 110.0, then Mz; sp CuOx
	113.1	121.9	8.8		.45		.32		94	2.60			.01	.31		.13			Sp											5									Mz; sp clay alt. Veins CuOx w. threads Cu. Sp suls in qtz veins
	121.9	130.6	8.7		.42		.30		91	2.55			.01	.29		.10	.02													Sp									Mz; as above.
	130.6	139.5	8.9		.33		.25		92	2.55			.01	.24		.08			Tr										Tr		Tr								Mz; " "
	139.5	147.9	8.4		.20				90	2.68	.02		.01	.10		.07																							Mz; as above, but no vis. suls.
	147.9	156.9	10.0		.21				88	2.56			.01	.11		.11																							Mz, sp clay, leached, sp adsorbed Cu
	156.9	167.5	8.6		.32				86	2.56			.01	.19		.12																		Tr					Mz, as above, as several dk. inclusions.
	167.5	177.4	9.9		.33		.22		82	2.57			.01	.21		.11													SP	5									Mz, sp clay, wk. alt., leached, sp adsorbed Cu. Sp cc & hem.
	177.4	185.9	8.5		.54		.05		83	2.46				.05		.49	.05													5	15									Mz, wk alt, leached at start & end, wk-mod cc in middle.
	185.9	195.2	9.3		.16		.07		87	2.44			.01	.06		.09						Tr								5	15									Mz, wk alt, becoming st. leached w mod-st hem & lim. Some bx.
	195.2	204.2	9.0		.56		.04		85	2.57				.04	Cu	.52			SP											5	5				Tr		Dp	195.2		Dp; mod clay-ser alt. Tr suls
	204.2	213.3	9.1		.24		.02		88	2.60				.02	.05	.08	.09		Tr											SP	SP		Tr			SP				Dp; mod clay alt Tr suls. Tr Cu in veins. Tr barite
	213.3	223.3	10.0		.35				75	2.57						.30	.05													Tr	SP					5				Dp, patches st clay. Mod clay alt w patches st suls.
	223.3	229.7	6.4		.23				100	2.56						.20	.03								Tr					SP	5			Tr						Dp, mod clay-silicif. Gray areas. Tr suls.
	229.7	237.9	8.2		.30		.04		89	2.60						.27	.03														5									Dp; as above
	237.9	248.0	10.1		.49		.03		77	2.57						.45	.04											5		5	10						Tt	247.0	brkn	Dp; sp clay-silicif. tr suls to 247.0, then Tt; sp clay-chlor veing. Tr suls
	248.0	256.9	8.9		.35		.02		81	3.20						.20	.15											SP	45	5	10		10				Dp	256.0	brkn	Tt, med clay alt Sp suls to 256.0, then Dp, st clay alt Tr suls.
	256.9	264.1	7.2		.14				25	2.47						.10	.04													SP	10									Dp; mod-st clay alt Tr suls
	264.1	273.0	8.9		.14				26	2.60						.10	.04													SP	10									Dp, mod clay alt Tr silicif-feldspath. Tr suls
	273.0	280.7	7.7		.08				72	2.53						.05	.03													Tr	5				5		And	277.7	brkn	Dp, as above to 277.7, then And, post min dike. Tr cal veing
	280.7	290.6	9.9		.12				93	2.53						.06	.04														10				SP		Dp	281.7	brkn	And, as above to 281.7, then Dp, mod clay-silicif. Sp suls
	290.6	298.8	8.2		.12				59	2.52						.08	.04											Tr		5	25									Dp; mod clay grad to st clay alt. Sp suls
	298.8	307.0	8.2		.18		.03		78	2.60						.09	.09													Tr	SP			Tr						Sp, sp clay alt. Patches mod clay-feldspath. Tr suls
	307.0	315.0	8.0		.40		.04		87	2.66						.20	.20					Tr								SP	5									Dp, sp clay alt. Silicif patches. Tr suls
	315.0	322.7	7.7		.23		.03		88	2.53						.10	.13													Tr	SP									Dp; as above

Av. Rec. = 80%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5%, Moderate (Md) 5-50%, Strong (St) +50%

Note (3): Tt - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-150

Page 1 of 2 Pages

Collar Elev 2981.15 Final Depth 704.2

Coords N 37,115.68 E 29,008.01

Inclination Vert

Logged by FTG - CWH.

Date: Start 3/22/63 Finish 4/12/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 2.400 0.0	8.0	8.0		.12				14	2.54	.10		.02						SP											SP	10	Tr				Dp	0.0	~	Dp; leached, mod clay alt
8.0	16.7	8.7		.20				84	2.49	.19		.01						5											5	15	1		Tr					Dp, leached, mod clay - lim alt. Patches sp. silicif
16.7	26.1	9.4		.17				78	2.49	.15	.01	.01						5											5	15	1	Tr	SP					Dp; as above
26.1	33.0	6.9		.34				80	2.47	.30	.02	.02						5			Tr								5	25	1		1					Dp, leached, mod clay - grad to st clay alt. Sp silicif
33.0	42.0	9.0		.13				75	2.50	.10	.01	.02						5											5	10	1		Tr					Dp; mt clay-jaro alt to 37.0, then bx grad to sp clay alt
42.0	48.4	6.4		.14				100	2.56	.06		.01		DIORITE	.07			SP	Tr										SP	5	1							Dp, leached w grad incr suls at 45.0 Mod clay alt
48.4	57.9	9.5		.13		.09		88	2.48	.08		.01			.04			1			Tr									5	1				Dp bx	57.5	broken	Dp; leached on shears; mod dis. suls. Sp clay alt to 57.5, then Dp bx
57.9	65.4	7.5		.63	27.1	.01	27.1	93	2.53	.04	.01	.01			.47	.10		1												10	1			SP	Dp	63.3	broken	Dp bx; st chlor - sp chlor w Dp - Qtzite frags to 63.3, then Dp sp clay; suls
65.4	75.6	10.2		.35	.49	.14	.11	87	2.60				.02	.12	.18	.03		1											Tr	SP	1		Tr		Bx	74.3	75°	Dp, sp clay alt, tr suls, tr dk incl to 74.2, then Bx; Qtzite frags. Sp Cu Ox
75.6	85.0	9.4		.53		.17		96	2.62				.02	.15	.30	.06		1												1	1	SP			Dp	76.4	~30°	Bx; dense, silicif, sp Qtzite frags, sp Cu Ox to 76.4, then Dp, sp clay-suls
85.0	90.0	5.0		.24				89	2.62						.12	.12		Tr												1	1							Dp; sp clay alt. Tr suls. Tr dk incl
NX 1.875 90.0	98.7	8.7		.24				100	2.63						.04	.20		1						Tr						Tr	1							Dp, wk alt Tr suls
98.7	108.0	9.3		.08				96	2.65						.01	.07		1													1	SP	S					Dp, as above; 0.5 ft Dp bx in chlor? matrix - ct w Dp @ 88°
108.0	116.4	8.4		.18				93	2.69						.03	.15		1													1		Tr					Dp, wk alt. Tr suls
116.4	125.4	9.0		.13				83	2.61						.02	.11													SP	1								Dp, sp clay alt Tr clay - chlor on shears
125.4	134.4	9.0		.05				95	2.61						.01	.04																						Dp, as above. Tr dk incl
134.4	143.6	9.2		.11				95	2.61						.03	.08																						Dp, " " " " "
143.6	152.5	8.9		.04				88	2.60						.01	.03													Tr	1								Dp, as above
152.5	160.0	7.5		.04				100	2.62						.01	.03																						Dp, wk alt Tr sul Tr dk incl
160.0	169.7	9.7		.07				84	2.61						.01	.06																						Dp; wk alt Tr jaro on shears Tr suls
169.7	179.9	10.2		.11				87	2.61						.03	.08																						Dp, as above Bx 177.5 - 179.0 w Dp frags in clay matrix
179.9	188.8	8.9		.10				91	2.63							.10																						Dp, sp clay alt. Tr jaro on shears. Tr suls
188.8	197.9	9.1		.10				88	2.60							.10																						Dp, as above
197.9	205.9	8.0		.12				100	2.62							.12																						Dp; " "
205.9	216.0	10.1		.14				83	2.75							.14												Tr.5										Dp; " "
216.0	224.4	8.4		.05				90	2.66							.05													SP									Dp; " "
224.4	232.6	8.2		.04				72	2.62							.04																						Dp; sp clay alt Tr suls.
232.6	242.0	9.4		.03				90	2.68							.03																						Dp, sp clay - feldspath Tr suls.
242.0	251.4	9.4		.01				92	2.62							.01													Tr									Dp; as above
251.4	260.9	9.5		.06				98	2.61							.06				Tr									SP			SP						Dp, as above w silicif patches
260.9	265.6	4.7		.07				93	2.60							.07																						Dp; as above w tr dk incl
265.6	275.3	9.7		nil				91	2.63							nil											SP											Dp, as above
275.3	284.2	8.9		.03				95	2.64							.03											Tr											Dp " "
284.2	293.6	9.4		.04				93	2.65							.04																						Dp " "
293.6	301.9	8.3		.12				100	2.61							.12																						Dp
301.9	305.5	3.6		.10				51	2.57							.10																						Dp; sp clay - silicif Tr suls
305.5	314.0	8.5		.26				75	2.83							.26											.5					5						Dp; as above to 309.5, then st epidote alt set mod grad to st clay @ 312
314.0	322.8	8.8		.30				93	2.57				.15			.15		5														5						[illegible] Mod leaching w sp [illegible] Dark staining
322.8	332.4	9.6		.03				94	2.53			.01				.03		Sp														Sp	Tr					Dp sp [illegible] Mod leach
332.4	339.0	6.6		.41	1.0	.13	1.0	69	2.59			.01	.12		.26	.04		Sp			Ar					.5							Tr		Mb	336.1	broken	Dp, as above to 336.1, then Mb, banded, mod clay - lim & [illegible]
339.0	348.4	9.4		1.67	115	.15	14	66	2.55			.08	.13		1.42	.10		.5	Tr	Tr	30	M	1.75		66					25								Mb, initially [illegible] bed w patches st clay + st gn [illegible] - floor
348.4	358.0	9.6		.13				88	2.70				.13					Tr									.85											Mb, sp clay, [illegible]
358.0	364.5	6.5		.06				79	3.11			.01	.05					1						Tr			.85			5			Tr		Tt	360.0	broken	Mb, as above to 360.0, then Tt, sp clay chlor, sp suls in veins
																																			Dp	362.0	broken	[illegible] to 362.0, then Dp, sp clay - mod feldspath. Mod Mb text
364.5	373.8	9.3		.05				95	2.61				.02			.03		Tr	Tr		Tr						.10	.20		SP	Tr		Tr	Tr	Tt	371.3	broken	Dp, as [illegible] to 371.3, then Tt, sp clay alt Tr suls

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5-50 %
Strong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-150
Page 2 of 2 Pages
Collar Elev. 2981.15 Final Depth 704.2
Coords. N 37,115.68 E 20,008.01
Inclination Vert
Logged by F.T.G.- CWH.
Date: Start 3/22/63 Finish 4/12/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N.S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	GYPSUM		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
378.8	383.2	9.4		.04				85	2.90							.04			Tr						Tr	30	5	60		SP			SP			Mb	378.0	brkn	Hf, sp clay - chlor to 378.0, then Mb; tr chlor vning
383.2	392.0	8.8		.04				93	3.02							.04										50	5	35		1			1			Hf	385.0	brkn	Mb; as above to 385.0, then Hf, sp - mod chlor blebs - veins
392.0	400.4	8.4		.15				86	3.37							.15				Tr			SP			20	45	30		1			5			Tt	392.0	brkn	Tt, st diss sl to 395, then st gar w. patches Mb.
400.4	409.6	9.2		.15				99	2.47							.15										15	25	45		5			5			Hf	400.4	brkn	Hf, sp clay w patches chlor - clay. Patches st Tt
409.6	419.2	9.6		.37				98	2.68							.37							SP			45	10	35		5			5			Mb	409.6	brkn	Mb, tr chlor vning w 30% cvn. st gar w pods st Tt asbestos on shears
419.2	429.3	10.1		.04				89	2.68							.04										80	Tr	15		SP	SP		Tr			LS	419.7	Good	Mb as above, thin blue bds, F.G., wt sc Hf-bl. of Hf. Mod actinolite
429.3	439.1	9.8		.10				91	2.59							.10										85		5		Tr			5						Blue bds wt sc Mb areas chlor & lt yellow-green min on seams.
439.1	448.2	9.1		.02				94	2.78							.02										20		65		1			10			Hf	439.1	good	Hf, mod dark lime silicates Mod chlor on sh. Mod Mb
448.2	457.9	9.7		.04				94	2.77							.04										25		65		1			5						Hf, mod diss chlor - py.
457.9	466.5	8.6		.05				100	2.78							.05										30		65		1			5						Hf, mod diss chlor - veins yellow min (lime silicate) Mod Tt
466.5	474.5	8.0		.08				91	2.86							.08										20	20	50		1		5	5						As above w blebs of lime silicates. Mod chlor & calcite veins
474.5	485.7	11.2		.07				78	3.09							.07										15	5	70		1			5	SP					Hf, dense, argillite, sandstone? on fracts. Poss Flt bx @ 480.1'
485.7	495.4	9.7		.11				92	3.07							.11										Tr	5	90		1			Tr						Hf, dense, sp clay alt. Mod talc - serp? Mod Tt
495.4	504.8	9.4		.09				98	2.72							.09									4	5	10	70		SP			5						Hf, dense, sp clay alt Sp diss sl.
504.8	513.8	9.0		.05				89	2.81							.05										10	5	80		1			5						Hf, sp chlor vning grad to chlor - cal pods. Tr ornagonite
513.8	523.0	9.2		.06				92	2.60							.06										15	SP	80		1			SP						Hf, mod clay alt. Mod Mb.
523.0	532.3	9.3		.03				96	2.73							.03										15	1	80		1			1						Hf, mod Mb grad to sp chlor vning
532.3	540.0	7.7		.06				93	2.66							.06										10	1	85		1			1						Hf, mod diss chlor Sp cal vning Tr asbestos
Bx 7.438' 540.0	548.6	8.6		.07				99	2.79							.07										15	1	80		1			1						Hf, sp clay alt. Tr suls.
548.6	558.2	9.6		.05				86	2.93							.05										40	1	50		1			1			Mb	553.9	brkn	Hf, sp clay alt to 553.9, then Mb mod diss. chlor. Tr suls.
558.2	568.1	9.9		.02				84	3.45							.02				Tr						10	60	20		1			1			Tt	558.2	brkn	Tt, sp diss chlor - clay alt
568.1	578.1	10.0		.04				91	2.60							.04										10	40	25		1		20	1			Sltst	573.0	brkn	Tt, as above to 573.0, then Sltst, sp cal - chlor vning
578.1	588.9	10.8		.03				79	2.72							.03										5	55	5		1		30				Tt	586.1	brkn	Sltst, dk gy w. tr sul vning to 586.1, then Tt, tr sul vning
588.9	598.4	9.5		.08				70	3.14							.08				Tr						SP	75	15		1		SP	Tr						Tt, st gar. Tr. sul - cal vning.
598.4	607.6	9.2		.10				81	3.28							.10								Tr		5	70	10		1		1	5						Tt, patches mod chlor - clay alt Tr banding w blea Sltst. Tr suls
607.6	617.4	9.5		.08				100	3.09							.08										5	75	10		1		Tr	5						Tt, tr sul - cal vning Patches sp chlor.
617.4	627.0	9.9		.15				96	2.87							.15										5	70	10		1		10	SP						Tt, mod banding w blea Sltst @ 40° w mod grad to dk gy Sltst.
627.0	637.0	10.0		.02				85	3.30							.02										10	60	15		1		5	5						Tt, mod chlor in pods. St. gar.
637.0	642.1	5.1		.02				100	2.97							.02										10	65	10		1		5	5						Tt, sp diss chlor - them Sp cal vning
642.1	648.4	6.3		.10				98	2.68							.10										5	60	20		1		SP	10			Dp	648.0	brkn	Tt, mod diss chlor - cal vning grad to cal cem. chlor bx to 648.0, then Dp, st silicif
648.4	657.7	9.3		.10				92	2.61							.10										Tr	SP	10		5		20	SP			Dp bx	648.4	brkn	Dp bx, st silicif w sp qtzte + epidote frags grad to int feldspath
657.7	667.6	9.9		.07				87	2.61							.07										1		SP		SP		15	1						Dp bx; silicif int rk w. qtzte - Hf frags. Int feldspath possib. frags
667.6	676.5	8.9		.06				95	2.64							.06										SP		10		1		15	5						Dp bx; feldspath - silicif matrix w Sltst - qtzte - epid frags (60% core)
676.5	686.0	9.5		.38				86	3.40							.38										5	70	10		1		5	5			Tt	677.0	60°	Dp bx; as above to 677.0, then Tt, st banded Sltst - epidote grad to st gar
686.0	695.4	9.4		.10				99	2.75							.10										5	60	15		1		15	5			Sltst	687.0	25°	Tt, st gar to 687.0, then Sltst; buff - blk banding @ 27° w sp gar - epid
695.4	704.2	8.8		.09				90	3.13							.09				Tr						5	50	15		1		20	5			Tt	695.4	brkn	Tt, sp pods chlor - sp cal vning Tr sul vning

Avg. Rec = 89%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) > 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No: U-151
Page 1 of 3 Pages
Collar Elev. 3195.23 Final Depth 325.3
Coords. N 36,196.34 E 13,988.79
Inclination Vert
Logged by FTG - CWH
Date: Start 3/27/83 Finish 4/12/83

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JASPEROIDE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	6.3	6.3																																				Rockbit
NC 2.480	6.3	16.5	10.2		.16		.12		71	3.09	.07		.01	.04			.04		SP								50	25	20		SP			Tr		Mb	6.3	-	Mb; leached; mod clay alt. Patches Tt
	16.5	21.9	5.4		.52		.40		89	2.46	.30		.02	.08			.12		S								10	20	60		S	Tr		Tr		Hf	17.5	broken	Mb; as above to 17.5, then Hf; leached, mod clay alt. Sp Siltst, Tt
	21.9	31.2	9.3		.25				97	2.57	.11	.01	.01	.10			.02		SP								5	15	70		SP			S					Hf leached; sp clay alt. grad to mod chlor. alt. Tr CuOx
	31.2	41.0	9.8		.39				90	2.81	.10	.01	.01	.25			.02					Tr					20	30	40				5	S		Mb	37.0	broken	Hf leached; mod gar.- chlor to 37.0, then Mb; leached, sp clay.
	41.0	51.3	10.3		.13				76	2.68				.03		.08	.02			Tr				Tr			50	20	25					Tr					Mb, leached; patches w mod Tt - Hf
	51.3	61.2	9.9		.24				82	2.65			.01	.20			.03										45	20	30					SP					Mb; as above to 56.0, then Hf; leached; mod chlor alt. Sp gx areas
	61.2	68.6	7.4		.21				89	2.97			.01	.17			.03										10	35	50				10			Mb	64.5	broken	Hf; leached; mod chlor - clay to 64.5, then Mb; leached, tr Siltst
	68.6	77.3	8.7		.11				100	2.68	.04		.01	.04			.02		Tr								80	5	10										Mb; leached; sp jaro vning Tr CuOx
	77.3	84.8	7.5		.09				96	2.65	.03		.01	.05													80	5	10										Mb; leached; tr jaro vning Mod Hf
NX 1.875	84.8	94.1	9.3		.57		.53		99	2.69	.30	.01	.01	.21			.04			Tr							60	5	25		S								Mb; leached; patches int lim-jaro Mod Hf Sp CuOx
	94.1	102.2	8.1		.24	.316	.16	.316	76	3.13	.05		.01	.10			.08										40	5	45		SP		5			Hf	94.1	grad	Hf; patches st lim Sp jaro vning. Mod Mb.
	102.2	110.0	7.8		.68	.49	.32	.39	75	2.94	.10		.01	.42			.15										15	25	50		S								Hf; leached; sp clay - jaro alt Sp CuOx.
	110.0	116.4	6.4		.45				95	2.53	.05		.01	.26			.13		S								10	10	30	Tr	10					Da	113.0	broken	Hf; sp clay - jaro alt w incr silicif to 113.0 then Da; st silicif sp CuOx.
	116.4	125.8	9.4		.24		.16		100	2.61			.01	.15			.08		SP											1	S	Tr	S	Tr						Da; 100% dest text Mod feldspath moving out from vnlts. Mod silicif
	125.8	134.5	8.7		.19				96	2.60			.01	.19			.04										SP	SP	15	1	S	1	5	1	1	Hf	131.0	broken	Dp; wk bleaching w diss chlor; st silicif to 131.0, then Hf; mod silicif
	134.5	140.7	6.2		.22				99	2.88			.01	.11		.03	.07		Tr								10	40	45		SP								Hf; leached; sp clay - chlor. Patches 2nd pink feldspath (pink Mn vnlts)
	140.7	150.1	9.4		.05				91	2.86				.03			.02										15	30	50					Tr					Hf; leached, sp clay alt Mod Tt
	150.1	158.3	8.7		.31				100	2.83				.05			.26							Tr			10	30	50				5						Hf; as above
	158.3	166.3	7.5		.07				49	2.50				.04			.03										40	10	40				5						Hf " " w silicif areas. Sp Mb
	166.3	174.9	8.6		.08				74	2.59				.03			.05										30	15	50				Tr						Hf, leached, mod clay alt. Sp Siltst
	174.9	184.4	9.5		.10				79	3.12				.06			.04										10	30	45				1	5	Tr				Hf, leached, sp clay - chlor. Sp cal vning Mod Tt
	184.4	191.0	6.6		.19				97	2.54			.01	.09			.09										5	10	30		10		30	10					Hf, leached, sp clay - chlor Mod Siltst
	191.0	195.9	4.9		.15				75	3.18			.01	.09			.05					Tr					10	25	45		SP		Tr	15		Tt	195.0	broken	Hf, leached; mod chlor - cal vning to 195.0 then Tt, sp clay
	195.9	204.5	8.6		.09				100	2.78			.01	.03			.05										10	35	25				25	5		SHst	201.0	broken	Tt, leached, mod cal vning to 201.0, then Siltst, leach on vnlts Sp sulf
	204.5	213.4	8.9		.11				85	2.56			.01	.04	.02		.04		S								Tr				S		SP			Mz	207.0	broken	Siltst; as above to 207.0, then Mz; leached; sp clay - silicif
	213.4	220.2	6.8		.06				48	2.62				.03			.04		Tr												Tr	Tr		Tr					Mz; leached; mod clay - silicif.
	220.2	228.2	8.0		.03				91	2.55				.01			.02													Tr	SP								Mz, as above
	228.2	236.2	8.0		.06				100	2.59				.01			.05														Tr								Mz; sp clay - feldspath
	236.2	245.4	9.2		.07				90	2.63				.01			.06												Tr							SHst	243.6	broken	Mz; as above to 243.6, then SHst; leaching along vnlts
	245.4	254.1	8.7		.08				100	2.92				.03			.05					Tr					5	60	15		S	S		S		Tt	247.4	broken	SHst, leaching along vnlts to 247.4, then Tt, mod chlor - hem alt, sp cal vning, tr bx w hem matrix to 252.0, then Mz; sp clay
																																				Mz	252.0	45°	
	254.1	264.6	10.5		.36				69	2.85				.10			.26		Tr	Tr							Tr	5			10	Tr	65	10		Tt	254.1	broken	Tt; st hem - CuOx grad to st gar to 257.5, then SHst, dk gx, mod clay - chlor - lime calc? leach outward from sul vnlts.
																																				SHst	257.5	broken	
	264.6	270.3	5.7		.07				100	3.14							.07			SP											5		85	5					SHst, as above w gtz blebs. Incip feldspath. Pseudo fossil remnant
	270.3	278.1	7.8		.04				40	3.05							.04														5		85	5					SHst, as above
	278.1	287.3	9.2		.03				88	3.00							.03		Tr								Tr	10	5	Tr	10		65	5		Tt	284.4	bx	SHst, as above to 284.4, then then st white siliceous ck grad to Tt, st gar.
	287.3	297.1	9.8		.19				79	3.23				.04			.15			Tr		Tr					30	20	25		SP		10	10		Mb	294.1	grad	Tt, mod clay alt w Tt; patches chlor bx w sul cement; patches gray - white siliceous ck to 294.1, then Mb; sp clay alt
	297.1	306.2	9.1		.08				95	2.67				.02			.06		Tr	Tr							70				5		5	15					Mb; tr suls - chlor to 304.0, then Mb bx; clay - chlor gg w gtz - Hf frags
	306.2	314.8	8.6		.13				93	2.68		.01					.12										70	10			5	Tr		5					Mb sp - mod clay - chlor alt
	314.8	324.0	9.2		.28				94	2.66		.05				23			Sp								95	Sp			5	Sp		Sp					Mb; sp clay; lim on shears.
	324.0	333.4	9.4		.07				96	2.62		.05				.02			Tr								90	5			5	Tr			Sp				Mb; sp clay; areas sp chlor. lim on shears
	333.4	342.4	9.0		.10				93	2.71		.02				.05	.03			Tr		Tr					30		70		Sp		Sp	Tr		Hf	333.4	broken	Hf, tr chlor vning. Tr gtz areas
	342.4	352.3	9.9		.09				88	2.78		.02				.05	.02			Sp							15		70		10	Sp		5					Hf, sp - mod clay alt Tr sul vnlts

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)
ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %, or, as follows: Trace (Tr), Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) +50 %

Note (3): Ts - Tactite, Hf - Hornfels, Mb - Marble, Qt - Quartzite, Bx - Breccia, Da - Dacite, Mz - Monzonite, An - Andesite

Note (4): V - Vein, F - Fault, D - Dike, C - Contact, Ig - Undif igneous

Hole No. D-151
Page 2 of 3 Pages
Collar Elev. 3195.25 Final Depth 825.3
Coords. N 36,196.34 E 19,988.79
Inclination Vert
Logged by FTG - GWH
Date: Start 3/27/63 Finish 4/13/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cc	Cpy	Born	Fe (2) Lim	Py	Mag	Hem	Spec	Other (2) Galena	Sphal	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sel. Qtz	QUARTZ	CHLORITE	FLUORITE	SERICITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
358.3	368.8	9.5		.21				94	2.71							.21			Sp		Sp			Tr		5		80		5	Sp	Sp	10						Hf, mod clay alt. Areas sp chlor. Sp diss. suls
361.8	371.4	9.6		.08				94	2.65							.08			Tr		Tr					5	Tr	55		15			25						Hf, mod clay alt. Areas mod chlor - clay + cal vning
371.4	379.9	8.5		.04				100	2.69							.04										90		Sp		Sp			5			Mb	371.0	grad	Hf, mod clay to 371.0, then Mb, sp clay
379.9	389.1	9.2		.02				96	2.68							.02		Tr								95		Tr		Tr			Tr						Mb, tr clay alt. Tr lim on shears
389.1	398.6	9.5		.06				96	2.70							.06										80		Sp			5		5						Mb; as above to 393.0, then Mb bx w. cal - chlor matrix to 395, then tr chlor
398.6	408.3	5.7		.34			.04	98	2.65							.34							Tr			80						10	5						Mb, bx, w. chlor + cal fillings.
408.3	414.0	9.7		.45			.06	95	2.65							.45										85		15				Tr	5	Tr					As above plus tr suls. (Py) Some bx appears to be tight fits
414.0	423.3	9.3		.06			.10	94	2.68							.06										95							Tr						Hf, white, coarse-grained, w. wk chlor + cal as vein fillings.
423.3	432.6	9.3		.10				93	2.69							.10										95													Hf as above, very pure.
432.6	442.3	9.7		.01				99	2.69							.01										95				Sp									As above
442.3	447.2	4.9		.05				89	2.66							.05										95													Hf w. patches of Hf + Ts suls (Py). Some fluorite veining
447.2	455.5	8.3		.11				97	2.69							.11							Tr			95								Tr					Hf, tr lime silicates, tr suls, tr-sp lim, mostly on fract's
455.5	465.2	9.2		.09				90	2.69							.09		15								85													Mb; as above to 460.0, then st leached ck w st glz mixed w Mb
465.2	473.2	8.0		.05				100	2.50							.05		5								80				5			5						Mb; mod leached ck grad to Mb w gyx areas.
473.2	481.8	8.6		.12				61	2.65							.12		5								90				Sp			Tr						Mb; tr cavities Tr lim on sh
481.8	491.8	10.0		.17				88	2.64							.17		5			Tr		Tr			90				1	Tr								Mb; as above
491.8	501.4	9.6		.14				97	2.61							.14		5								80				15				Tr					Mb; " "
501.4	510.0	8.6		.12				85	2.65							.12		Sp								60	5	30		5			5		1	Hf	504.3	brkn	Mb, as above to 504.3, then Hf, st chlor w mod cal vning Gry areas
510.0	519.0	9.0		1.00		.10		73	2.91						.10	.90			5	Tr						20	5	60		Sp			5		1				Hf, st chlor grad to sp chlor - mod clay. Mod suls. Tr Tt
519.0	522.6	3.6		.90	38.4 @ 1.06	.07	38.4 @ .07	86	2.56							.90			5	Sp						20	5	60		5			5		1				Hf, mod chlor vning - clay alt. Mod. sul vning
522.6	529.3	6.7		.63		.06		94	2.62							.63			5	Tr						15	5	70		Sp			5		1				Hf, mod chlor vning. Patches st clay alt. St sul vning.
BX 7.432 → 529.3	538.5	9.2		1.61		.05		90	2.75							1.61			Sp							10	5	80		5			Sp						Hf, as above.
538.5	548.4	9.9		.94		.05		90	2.53							.94										10	5	75		5			1						Hf, sp chlor vning grad to mod clay alt. Mod diss suls
548.4	557.5	9.1		.10		.03		90	2.73							.10			Tr							10	5	70		10			1						Hf, sp chlor vning - clay alt. 2 ft patch possib Da w. incip feldspath
557.5	567.1	9.6		.05				90	2.62							.05										10		85		Sp			Tr						Hf, sp clay alt. Sp cal vning
567.1	576.7	9.6		.04				90	2.67							.04										10		85		1									Hf, as above. Gry areas
576.7	586.3	9.6		.10				99	2.70							.10										15		80		1									Hf, as above. Mod Mb
586.3	594.3	8.0		.04				91	2.68							.04										15		80		1			Tr						Hf, mod Mb - clay grad to sp clay - chlor alt
594.3	604.4	10.1		.07				89	2.69							.07										15		80		1			1						Hf, sp chlor - cal vning. Sp diss chlor.
604.4	613.2	8.8		.08				100	2.69							.08										10		90		1									Hf, mod clay alt. Tr suls
613.2	622.4	9.2		.05				100	2.68							.05										10		90		1									Hf, as above
622.4	631.8	9.4		.05				94	2.69							.05										10		55		1			Tr			Mb	627.0	grad.	Hf, tr chlor vning to 627.0, then Mb; patches sp clay
631.8	639.6	7.8		.04				96	2.69							.04										85		5		1			Sp						Mb, tr chlor on shears. Tr suls
639.6	649.1	9.5		.12				88	2.73							.12										50		40		1			1			Hf	645.0	grad	Mb, as above to 645.0, then Hf, sp clay - chlor vning Tr suls.
649.1	658.9	9.8		.06				70	2.81							.06				Tr						10		85		1			1		Tr				Hf, sp clay alt. Tr jara vning
658.9	666.2	7.3		.05				80	2.71							.05				1						10		85		1			1		1				Hf, sp chlor vning - mod diss chlor. Tr suls.
666.2	674.7	8.5		.03				90	2.74							.03										15		80		1			5						Hf, as above.
674.7	684.9	10.2		.07				91	2.72							.07										15	10	70		1			Tr			Mb	680.0	grad	Hf, as above grad to sp clay to 680.0, then Mb; tr clay alt
684.9	690.0	5.1		.06				97	2.77							.06										10	5	15		1			1						Mb, sp clay - sul alt.
690.0	699.0	9.0		.08				94	2.72							.08										55	5	30		1			Sp						Mb; sp clay - sul alt. Mod. Hf w. chlor. vning
699.0	708.4	9.4		.35		.05		87	2.81							.35			Sp	Tr			Tr			20	20	55		5			Tr			Hf	701.0	grad	Mb, as above to 701.0, then Hf, sp chlor vning - clay. Sp. Tt.
708.4	718.2	9.8		.86	13.2 @ .81	.03	13.2 @ .03	93	2.61							.86			5							15	5	50		5			1						Hf, mod clay - chlor vning. Sp diss suls.
718.2	727.6	9.4		.76				85	3.13							.76			5	Sp						10	5	60		5			1						Hf, as above
727.6	737.1	9.5		.13		.04		85	3.28							.13			Sp	Tr						15	5	50		5			1			Tt	729.5	grad	Hf, as above to 729.5, then Tt, sp chlor - cal vning
737.1	746.5	9.4		.11				88	3.45							.11			1							10	45	40		5			1						Tt, st gar. Tr chlor - cal - sul vning.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) > 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-151
Page 3 of 3 Pages
Collar Elev. 3175.25 Final Depth 825.3
Coords. N 36,196.34 E 19,988.79
Inclination Vert
Logged by FTG - CWH
Date: Start 3/27/63 Finish 4/13/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov.	Sp. Gr.	Cu (1) Chys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
746.5	756.8	10.3		.18				90	2.85							.18			SP						Tr	5	60	15		Tr	10	5					Tt, blebs. qtz grad to med banded blea. Sltst w blebs gar
756.8	765.0	8.2		.26				100	2.70							.26									1	5	65	5		1	20	SP					Tt, mod Sltst grad to lst. gar. w blebs qtz
765.0	774.3	9.3		.17				87	3.19							.17									1	10	50	30		1	5	1					Tt, st gar. Sp sul vning
774.3	783.3	9.0		.67		.08		100	2.71							.67							Tr	1	5	30	5		SP	55	1			Sltst	777.0	grad	Tt, as above to 777.0, then Sltst, sp Tt blebs; sp banding @ 35°
783.3	792.5	9.2		.24				96	2.85							.24								1	SP	30	SP			1	50	1		Dp	789.0	brkn	Sltst, dk gy w sp Tt to 789.0, then Dp; st silicif. Sp sul vning
792.5	796.6	4.1		.27				91	2.68							.27								1	Tr	5	SP			1	85	1		Sltst	792.5	brkn	Sltst, dk gy w grnish blebs. Brkn - gry areas. Sp sul vning.
796.6	805.0	8.4		.45		.06		99	2.67							.45								1	SP	15	SP		1	Tr	25	Tr		Dp	797.6	brkn	Sltst; as above to 797.6, then Dp; st silicif; tr suls to
																																		Tt	802.5	brkn	802.5, then Tt, st gar, tr suls
805.0	810.0	5.0		.26				100	2.76							.26			Tr						SP	45	10		Tr		35	Tr					Tt, run about 50-50, Tt - Sltst. Sp sul vning
810.0	819.4	9.4		.25				99	2.63							.25									5	30	5		5		50	1		Sltst	810.0	grad	Sltst, dk gy w. pods of Tt. St clay @ 819.0. Sp sul vning
819.4	825.3	5.9		.13				93	2.71							.13												5	5	Tr				Dp	819.4	brkn	Dp; sp clay - silicif. Mod suls. Typical whitish bottom Dp
						Avg	Rec=	90%																													
				END	OF	HOLE																															

PRELIMINARY GEOLOGIC LOG
(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-152
Page 1 of 2 Pages
Collar Elev. 2768.30 Final Depth 667.0
Coords. N 37,339.57 E 20,191.80
Inclination Vert
Logged by FTG - GWH
Date: Start 4/15/63 Finish 5/3/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Moly.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	Veinlets	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 2.400	0.0	7.0	7.0		0.08				23	2.25	.04?					.04			Tr											T	Sp	Sp				Mz	0.0	–	Mz, leached; mod clay - ser alt. St por. text
	7.0	15.0	8.0		.08				74	2.35	.04?					.04			Sp																				Mz, leached; st clay - ser alt. Tr lim.
	15.0	25.8	10.8		.07				77	2.36	.04?					.03						Sp								Sp									Mz, leached; mod clay - ser alt. St ser vning surround pods. wk lim
	25.8	34.7	8.9		.08				85	2.50	.04?					.04																							Mz, as above
	34.7	44.8	10.1		.11				89	2.51	.04?					.07																	Tr					Mz, " " w. incr jaro.
	44.8	53.7	8.9		.06				82	2.48	.03					.03						Tr								5	5								Mz, leached, wk-mod clay alt. Tr jaro, wk-mod lim & lim
	53.7	60.7	7.0		.03				100	2.27	.03																												Mz, as above
NX 1.875	60.7	70.7	10.0		.05				92	2.30	.02					.03			Tr	Tr										15	10								Mz, leached, wk clay alt, wk lim & lim
	70.7	79.1	8.4		.09				47	2.61						.09														30	15								Mz, Tr lim, wk-mod Py for the slot. wk cc. Mod clay alt.
	79.1	87.4	8.3		.21				87	2.62						.21				Sp										50	20								Mz, st alt, st. suls (Py & Cu) Rk almost comp. broken
	87.4	94.2	6.8		.27				52	2.13						.27														70	15								Mz, as above.
	94.2	103.0	8.8		.17				100	2.44						.17														30	35								Mz, mod-st alt, mod-st suls (Py & cc)
	103.0	111.7	8.7		.25				95	2.65						.25														25	50								Mz, as above, plus sc. secondary
	111.7	121.7	10.0		.23		.03		88	2.62						.23														35	30								Mz, as above, core more solid
	121.7	130.0	8.3		.52		.02		89	2.66						.52														20	45								Mz, " " , core partly broken
	130.0	140.0	10.0		.35		.01		93	2.68						.35														20	50								Mz, mod-st alt, mod-st suls (Py & Cu) tr sil'n, core broken
	140.0	148.4	8.4		.13				95	2.64						.13														30	40								Mz, as above, plus tr chalcopyrite
	148.4	153.6	9.2		.74	178' @ .91	.01	128' @ .04	100	2.51						.74														30	45								Mz, st. alt, st suls.
	153.6	166.2	8.6		1.09		.08		98	2.57						1.09														35	50								Mz, st. alt, mod-st suls (Py, cc, cpy)
	166.2	175.3	9.1		.28		.01		92	2.57						.28														30	30								Mz, mod-st alt, mod-st suls, core not so broken
	175.3	184.8	9.5		.19				84	2.63						.19														20	20					Dp	175.3	grad	Dp, mod clay - ser alt. Mod sul vning.
	184.8	193.9	9.1		.10				93	2.62						.10														5	15								Dp, as above
	193.9	202.7	8.8		.08				98	2.53						.08														5	15								Dp; " "
	202.7	210.5	7.8		.10				94	2.63						.10														5	15								Dp; mod qtz - ser vning w. ster vein clay - jaro alt. Mod suls.
	210.5	219.7	9.2		.07				97	2.66						.06		.01												10	15								Dp; mod clay - ser alt. Mod sul vning
	219.7	228.9	9.2		.09				90	2.64						.09														5	15								Dp; as above
	228.9	235.7	6.8		.08				83	2.65						.08														5	15								Dp; mod qtz - ser vning. Mod clay alt. Sp suls
	235.7	244.3	8.6		.04				100	2.65						.04														Tr	5								Dp; sp clay alt. Sp sul vning
	244.3	253.7	9.4		.08				90	2.76						.08														Tr	SP			Tr					Dp; dk fg phase (And ?) grad to Dp; mod clay alt, sp suls
	253.7	262.8	9.1		.04				84	2.78						.04																							Dp; mod clay - silicif. Sp suls
	262.8	270.0	7.2		.08				87	2.67						.08																							Dp; mod clay alt. Tr suls
	270.0	280.3	10.3		.09				69	2.66						.09														SP	5								Dp, sp clay - silicif. Tr chlor on shears. Sp suls.
	280.3	287.0	6.7		.07				85	2.64						.07														Tr	5								Dp, as above
	287.0	296.5	9.5		.10				95	2.69						.10															SP								Dp; " "
	296.5	304.7	8.2		.12				86	2.62						.12						Tr									10								Dp; bx w. st clay to 297.8, then sp clay - silicif. Tr dk inclusions
	304.7	314.2	9.5		.11				94	2.66						.11															5								Dp; wk clay - silicif. Tr suls
	314.2	320.1	5.9		.13				97	2.64						.07	.06														5								Dp; as above. Tr dk incl.
	320.1	327.1	7.0		.12				96	2.67						.10	.02														SP								Dp; sp clay - silicif. Sp sul vning.
	327.1	336.6	9.5		.09				91	2.69						.09														SP	10								Dp; sp clay - silicif - chlor vning. Tr suls.
	336.6	345.7	9.1		.08				90	2.68						.08															5								Dp; sp clay - tr chlor vning. Tr suls
	345.7	354.6	8.9		.42		.02		95	2.67						.36	.06														SP								Dp; tr clay - silicif. Sp sul vning
	354.6	362.9	8.3		.13				81	2.91						.11	.02									Tr													Dp; as above
	362.9	372.0	9.1		.13				98	2.62						.11	.02			10					Tr		5	20	Tr			10				Hf	369.7	brkn	Dp; mod silicif grad to mod feldspath to 369.7, then Hf, st silicif - py alt.
	372.0	381.8	9.8		1.13		.10		83	3.52						.10	1.03			30	SP		Tr	SP			15	25				10	5			Tt	376.0	brkn	Hf, mod silicif, int py to 376.0, then Tt, st suls grad to sp hem - mod clay
	381.8	392.2	10.4		.08				79	3.20							.08			10	Tr						65	5				15							Tt; sp hem? vning w. mod alt st. grad to vuggy w. mod suls.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-152
Page 3 of 3 Pages
Collar Elev 2968.30 Final Depth 667.0
Coords N 37,389.57 E 80,191.80
Inclination Vert
Logged by FTG - CWH
Date: Start 4/15/63 Finish 5/3/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	Type Dip	Remarks
393.2	395.5	3.3		.19				29	2.65							.19			SP							10	80	5		Tr					Hf	394.2	brkn	Tt, vuggy, mod. suls to 394.7, then Hf, tr clay - chlor Tr suls.
395.5	404.5	9.0		.21				86	2.98							.21				Tr						20	30	45		1			SP					Hf; tr chlor vning. Tr hem in chlor veins Tr suls
404.5	414.3	9.8		.15				86	2.66							.15										20	20	50		1			F					Hf; sp cal - chlor vning Tr suls
414.3	423.6	9.3		.04				97	2.71							.04										35	15	40		1			SP		Mb	418.0	brkn	Hf; as above w mod Tt to 418.0, then Mb; sp chlor vning + pods.
423.6	433.1	9.5		.37				90	2.76							.37				Tr						45	10	30		1	SP		5					Mb; patches of chlor. Pods Hf. Sp sul vning
433.1	442.3	9.2		.09				93	2.98							.09							Tr			10	35	50		1			SP		Hf	434.0	grad	Mb; as above to 434.0, then Hf; sp chlor alt. Sp Tt.
442.3	450.7	8.4		.17				84	3.17							.17				Tr						10	5	70		1		10	SP					Hf; pods Tt, Sltst, sp chlor vning Mod suls in pods
450.7	459.8	9.1		.07				81	3.01							.07										10	15	65		1		5	1					Hf; sp chlor. Mod Tt - Sltst w. cal vning. Tr Dp
459.8	465.7	5.9		.13				90	2.69							.13							Tr			15	15	60		1		SP	1					Hf; sp clay - chlor w. Mb; Sltst, Tt patches
465.7	474.9	9.2		1.17		.09		100	2.81							.37	.80						5			15	15	50		1			5					Hf; mod chlor alt, w. tr hem diss. Mod diss + vnlt suls
474.9	484.0	9.1		.10				88	2.70							.10							SP			55	Tr	20		1	15		5		Mb	477.8	grad	Hf; as above to 477.8, then Mb; tr diss chlor. 1.5 ft milky qtz (ve?)
484.0	493.2	9.2		.08				97	2.70							.08										65	5	15		1	5		5					Mb; 0.5 ft milky qtz then tr diss chlor w. massive chlor pods
493.2	502.8	9.6		.07				76	3.23							.07										20	15	50		1			10		Hf	493.2	grad	Hf; sp clay alt. Sp Tt - Sltst
502.8	511.8	9.0		.05				95	2.78							.05										15	25	35		1	5		15		Dp	509.9	brkn	Hf; sp chlor - clay alt. tr diss hem w gar to 509.9, then Dp; sp clay alt
511.8	521.2	9.4		.07				94	2.60							.07										SP		5		1	SP		SP					Dp; sp clay alt. Tr epidote incl. Tr suls
521.2	531.1	9.9		.12				93	2.65							.12										1	15	SP		1	SP	35	Tr		Tt	530.5	brkn	Dp; sp clay alt. Incl of Sltst; to 530.5, then Tt, mod clay alt
531.1	540.4	9.3		.24				75	3.27							.24										10	45	15		1	1		1		Dp	537.5	brkn	Tt; sp chlor - sul vning to 537.5, then Dp; sp clay alt. Tr suls
540.4	548.5	8.1		.07				84	2.63							.07														1	1		1					Dp; wk clay - silicif. Tr suls
548.5	558.5	10.0		.15				83	3.01							.15										5	20	25		1	Tr		1		Tt	555.5	brkn	Dp, as above to 555.5, then Tt; dense; st gar.
558.5	567.9	9.4		.14				91	2.96							.14			Tr							10	5	50		1	1		15		Hf	565.0	brkn	Tt, dense; st gar, tr chlor vning to 565.0, then Hf, mod chlor vning
567.9	577.2	9.3		.24				83	2.79							.24										30	SP	55		5	1		10		Mb	571.9	brkn	Hf; mod chlor - garo vning to 571.9, then Mb; sp clay alt. Tr suls
577.2	587.3	10.1		.38				83	2.73							.38							Tr			90	5	Sp		5			Tr					Mb; sp clay - sul vning
587.3	595.8	8.5		.07				99	2.89							.07										95	SP	Tr		Sp			Sp					Mb; tr chlor - sul vning
595.8	605.1	9.3		.12				94	2.71							.12							Tr			90	5	Tr		1			5					Mb, as above
605.1	614.2	9.1		.05				92	2.72							.05										95	SP			1			5					Mb, " "
614.2	623.9	9.7		.09				75	3.16							.09										95	1			1			5					Mb, " "
623.9	633.1	9.2		.05				91	2.73							.05										95	1			1			5					Mb, " "
633.1	642.6	9.5		.15				85	2.68							.15										90	1			1			10					Mb; as above w pods blk chlor
642.6	651.7	9.1		.02				96	2.69							.02										95	Tr			Tr			5					Mb; tr chlor - sul vning
651.7	661.3	9.6		.01				91	2.79							.01										100	Sp			Tr			Tr					Mb; as above
661.3	667.0	5.7		.04				93	2.69							.04										100	1			1			1					Mb, white, med gr

Av. Rec. = 87%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows:
Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-153
Page 1 of 1 Pages

Collar Elev 3014.17 Final Depth 126.8
Coords. N 37,423.21 E 19,132.46
Inclination Vert
Logged by FTG - CWH
Date: Start 4/13/63 Finish 4/23/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N.S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	2.0	2.0																																				Rockbit
NC 2.400	2.0	6.2	4.2		.36		.31		35	3.09	.23	.01	.01	.06			.05		Tr								Tr	90	SP			5				Tt	2.0	–	Tt; dense, leached; tr CuOx
	6.2	13.6	6.9		1.55	12.0 @	1.41	12.0 @	92	2.82	1.00	.02	.01	.38			.14		1								SP	85	5		SP	SP							Tt; leached; sp qtz - CuOx veins
	13.1	18.2	5.1		1.18	1.39	1.08	1.27	55	3.06	.65	.01	.01	.41			.10		1									70	10		1	1				Mz	17.2	brkn	Tt; as above to 17.2, then Mz; leached; brkn; sp clay alt
	18.2	24.5	6.3						0																														No Core
	24.5	29.9	5.4		.38		.30		60	2.50	.15		.01	.14		.05	.03		Tr								Tr		5		20	SP							Mz; leached; brkn; mod clay alt. St blk oxides
	29.9	39.2	9.3		1.14	18.7 @	0.95	18.7 @	80	2.52	.30	.05	.02	.58		Tr	.19		Sp								10	40	10		30	1				Hf	31.0	brkn	Mz; as above to 31.0, then Hf; leached; sp clay alt. Sp CuOx
	39.2	48.6	9.4		1.33	1.24	1.15	1.05	47	2.47	.40	.05	.02	.68		.10	.08		1								5	15	5		15	1		5		Mz	43.0	brkn	Hf; leached, sp chlor - clay alt w mixed Mz to 43.0, then Mz; brkn; sp clay alt
	48.6	57.8	9.2		.22		.12		60	2.36	.10		.01	.01		.10			Tr												5	1	Tr	Tr					Mz; leached; brkn; sp clay - silicif. Tr ada Cu w. gen. fspars
	57.8	62.4	4.6		.22				95	2.51	.10		.01	.01		.10			1												5	1		1					Mz; leached; mod clay alt. Sp CuOx
	62.4	71.8	9.4		.34				89	2.39	.13		.02	.10		.10			Sp										Sp	Sp	10	1		1					Mz; leached; mod clay alt. Sp Hf incl
	71.8	75.7	3.9		.16				67	2.51	.05		.01			.10			Tr											Tr	5	1		1					Mz; leached; sp clay alt
	75.7	83.0	7.3		.67		.49		79	2.65	.11	.01	.01	.30		.10	.08		1								10	30	5		5		Sp	Sp		Tt	79.5	brkn	Mz; leached, sp clay w tr Hf to 79.5, then Tt; leached, mod hem-gtem
	83.0	83.7	0.7		.79		.66		42	2.62	.20	.01	.01	.44		•	.13		1			SP						10	45	30		5	1	1						Tt, as above
	83.7	94.8	11.1																																				Cavity - old stope, no recovery
	94.8	99.9	5.1		1.87	10.7 @	1.76	10.7 @	90	2.61	.10	.02	.02	.62			.11		Tr			SP						15	45	30		5	Tr	Tr						Tt, leached, sp. clay, tr. hem, mod. grn CuOx
NX 1.875	99.9	105.5	5.6		.82	1.32	.71	1.21	94	2.64	.05	.01	.01	.64			.11		1									15	45	25		5	SP	1			Mz	105.0	brkn	Tt as above to 0.1, Mz; leached, sp. clay alt.
	105.5	108.9	3.4		.31		.29		91	2.54		.01	.01	.27		.02			1									Tr		Tr	5	1	1	Tr					Mz, leached, sp clay alt, mod Fe & Cu blk oxides
	108.9	119.8	10.9		.14				27	2.52			.01	.07		.04			1											1	SP	1		1					Mz, leached; brkn; sp clay alt
	119.8	126.8	7.0		.25				56	2.57			.01	.21		.03			1			Tr					Tr	5	Tr	1	1	1		1					Mz, as above

Av. Rec. = 64%

END OF HOLE

Hole abandoned after entering large caved stope. Unable to continue

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:
(1) Est. % Cu represented by each mineral
(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-154
Page 1 of 2 Pages
Collar Elev 2904.14 Final Depth 598.4
Coords. N 37,526.85 E 19,998.79
Inclination Vert.
Logged by FTG - CWH
Date: Start 4/23/63 Finish 5/10/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vs. Qtz	QUARTZ	CHLORITE	JAROSITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	20.0	20.0																																				Rockbit
NC 2.400	20.0	30.6	10.6		.09				73	2.56	.09								SP										Tr	SP	Tr		Tr			Dp	20.0	--	Dp; leached; sp clay alt
	30.6	40.4	9.8		.12				79	2.63	.04					.08				Tr																			Dp; as above
	40.4	49.4	9.0		.10				92	2.62	.03					.07																							Dp; " "
	49.4	58.6	9.2		.08				93	2.58	.02					.06																							Dp; leached; tr clay alt; Gy patches; tr dk incl
	58.6	67.6	9.0		.11				93	2.67	.04					.07																							Dp; as above
	67.6	76.3	8.7		.11				92	2.65	.04					.07																							Dp, leach on shears; tr clay - silicif. Sp sul vning @ 69.6'
	76.3	84.0	7.7		.12				89	2.63	.04					.08																		Tr		Mz	79.6	brkn	Dp, as above to 79.6, then Mz; sp clay alt. Tr suls
	84.0	93.3	9.3		.20				93	2.69	.03					.17			Tr									Tr											Mz; sp clay alt. Tr epidote after bio. Tr suls
	93.3	102.5	9.2		.10				86	2.67						.10														5									Mz; sp clay alt Tr suls. Mod Dp? text (sugary)
	102.5	111.4	8.9		.08				93	2.63						.05	.03		Tr											SP						Dp	106.0	brkn	Mz; sp clay alt, patches Dp to 106.0, then Dp, sp clay - silicif
	111.4	115.1	3.7		.08				90	2.56						.06	.02																						Dp; sp clay - silicif. Tr suls. Tr dk incl
NX 1.875	115.1	123.3	8.2		.07				76	2.64						.05	.02																						Dp, wk clay alt. wk Mz text. Tr dk incl
	123.3	132.0	8.7		.06				90	2.69						.04	.02																						Dp; as above
	132.0	141.0	9.0		.08				90	2.68						.05	.03													5				SP		Mz	136.0	brkn	Dp, as above to 136.0, then Mz; wk alt; dk gr matrix
	141.0	150.0	9.0		.08				89	2.62						.05	.03													5						Dp	142.5	brkn	Mz; as above to 142.5, then Dp; wk alt; sp jaro on shears.
	150.0	159.1	9.1		.06				87	2.67						.04	.02													5									Dp; wk clay alt. Gy patches w mod jaro
	159.1	169.4	10.3		.10				68	2.60						.07	.03												Tr	10									Dp; sp clay grad to mod clay alt Tr suls
	169.4	178.9	9.5		.09				76	2.66						.06	.03													10									Dp; mod clay - jaro alt grad to sp clay
	178.9	187.5	8.6		.07				86	2.65						.05	.02													5									Dp, sp clay - silicif Tr sul vning. Gy patches
	187.5	195.4	7.9		.12				93	2.64						.07	.05													10									Dp, sp clay alt Tr suls Sp jaro on shears
	195.4	205.5	10.1		.14				72	2.56						.12	.02													10									Dp; as above.
	205.5	215.2	9.7		.10				83	2.61						.08	.02													10						Mz	211.8	brkn	Dp, as above to 211.8, then Mz; sp clay - jaro alt. Tr suls
	215.2	223.7	8.5		.13				91	2.60						.09	.04													5						Dp	220.0	brkn	Mz; sp clay - jaro alt to 220.0, then Dp, sp clay - silicif.
	223.7	233.7	10.0		.15				78	2.62						.11	.04													SP									Dp; sp clay alt. Gy patches. Tr suls
	233.7	241.8	8.1		.26				90	2.59						.13	.13													5									Dp, as above
	241.8	250.8	9.0		.04				91	2.62						.02	.02												Tr	SP						Mz*	241.8	brkn	Mz; sp clay alt. st par text. w. Fspar - blo phase
	250.8	260.1	9.3		.04				85	2.81						.02	.02													Tr									Mz; as above
	260.1	269.8	9.7		.16				90	2.66						.08	.08																						Mz; as above. Patches bx w. state. Dp frags
	269.8	277.7	7.9		.12				98	2.68						.06	.06																						Mz; wk alt. Sp pink fspar
	277.7	287.1	9.4		.10				92	2.59						.06	.04																						Mz; as above. Patches w Hf - state incl
	287.1	296.3	9.2		.07				90	2.66						.04	.03												Tr	5									Mz; as above grad to mod clay alt
	296.3	301.1	4.8		.25				89	2.76						.18	.07												5	20									Mz; med - st clay alt. Tr suls.
	301.1	309.7	8.6		.56	.06			88	2.73						.10	.46												Tr	10									Mz, wk - mod clay alt. Tr suls
	309.7	319.8	10.1		.30				71	2.71						.10	.20							Tr						10									Mz; st clay - ser alt. Tr suls.
	319.8	328.8	9.0		.05				95	2.65							.05													10									Mz; wk clay alt. Sp pink 2nd fspar
	328.8	337.2	8.4		.10				93	2.63						.05	.05													5									Mz; as above w gy areas.
	337.2	347.6	10.4		.10				75	2.64						.05	.05													5									Mz; as above grad to sp clay - silicif. Tr suls
	347.6	356.5	8.9		.09				88	2.69						.02	.07													Sp									Mz; sp clay - silicif. Sp. Dp text. Sp. sul vning
	356.5	366.2	9.7		.63	.03			82	2.70						.25	.38														SP								Mz; as above.
	366.2	375.0	8.8		.17				92	2.67						.07	.10																						Mz; as above w. Dp - like incl
	375.0	384.0	9.0		.17				86	2.69						.05	.12														Tr								Mz, med ser alt. Tr suls Tr Dp? incl.
	384.0	391.9	7.9		.09				94	2.69						.03	.06																						Mz; tan - pink matrix, pink felds. phase. A few Tr? incl.
	391.9	401.0	9.1		.10				90	2.76						.03	.03													Tr									Mz; as above, no incl. large pink felds, zoned. 2ndary?
	401.0	409.2	8.2		.14				98	2.69						.04	.10							Tr	Tr				Tr	SP	SP					Bx?	426.9	39°	Mz as above to ct, sharp contacts Dk which is lt gray in color w. sc. biotite

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5 - 50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-154
Page 2 of 2 Pages
Collar Elev 2904.14 Final Depth 598.4
Coords N 37,526.85 E 19,998.79
Inclination Vert
Logged by FTG - CWH
Date: Start 4/23/63 Finish 5/10/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1): Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2): Lim.	Py	Mag.	Hem.	Spec.	Other (2): Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
409.2	420.3	11.1		.40		.01		100	2.56							.40			Sp						Sp		Tr		Sp	Tr	Sp	Tr		Mz?;			Mz?; lt gray rock w. sz. bio. + trace cpy veils @ end.
420.3	430.0	9.7		.31		.02		96	2.65							.31								Tr			Sp										Mz, w varying textures and composition. 2nd folds (?)
430.0	439.3	9.3		.62		.02		97	2.67							.62																					Mz, lt gray, averaged 1½% cpy, best % showing at chlor veinlets w Py.
439.3	448.7	9.4		.33	459' @ .44	.03	459' @ .03	96	2.66							.33																					Mz, w as areas of 2nd folds. Also some chlor veins.
448.7	457.5	8.8		.57		.04		100	2.58							.57																					Mz, as above but greater % of core were measured.
457.5	466.9	9.4		.22		.01		93	2.64							.22																					Mz; lt gy matrix w sp clay alt. Patches st chy? w fspar ghosts Sp suls
466.9	475.9	9.0		.48		.02		97	2.70							.48																					Mz; as above w sp chlor svl vning. Whitish areas. sed inct?
475.9	484.2	8.3		.30		.02		97	2.67							.30																					Mz; med patches med chy alt w sp suls (inct?), grad to med silicif.
484.2	493.5	9.3		.34				96	2.65							.34															Tr						Mz; gy patches w med silicif w patches sp clay alt w. distinct wh fspars
493.5	502.1	8.6		.35				97	2.58							.35													5								Mz; as above, grad to whitish ck w. ghost fspars + sp chlor-svl vning
502.1	511.0	8.9		.17				92	2.61							.17													Sp			Sp					Mz; sp silicif w irreg patches wtd. fspars + chlor vning. Sp wh ck-med clay
511.0	519.1	8.1		.85		.04		92	2.66							.85													5								Mz; med clay alt. Whitish patches (sedinct?) w. sp chlor vnings + st cpy
519.1	527.3	8.2		.91	33.4 @ .78	.03	33.4 @ .03	92	2.64							.91			Tr										5								Mz; sp clay alt w varx bufF gy matrix. Sp suls
527.3	536.1	8.8		.64		.03		92	2.73							.64													Tr								Mz; sp clay alt w silicif - chlorit patches. Mod suls
536.1	544.4	8.3		.51		.04		99	2.68							.51													Tr								Mz; sp silicif. Mod cpy - py assoc. w. qtz vning
544.4	553.0	8.6		.23		.01		93	2.66							.23																					Mz; as above
553.0	561.8	8.8		.35		.01		94	2.66							.35																					Mz; as above w gay areas
561.8	571.3	9.5		.40		.03		90	2.71							.40															Sp	Tr					Mz; as above
571.3	579.1	7.8		.19				100	2.64							.19												Tr									Mz; sp silicif. Tr suls.
579.1	588.4	9.3		.21				98	2.67							.21																					Mz; as above
588.4	598.4	10.0		.29				98	2.64							.29																					Mz; as above

Av. Rec = 90%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-135
Page 1 of 1 Pages
Collar Elev. 3075.20 Final Depth 262.0
Coords N 37,202.39 E 69234.29
Inclination Vert
Logged by FTG - CWH
Date: Start 5/4/63 Finish 5/14/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Sn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 2.403 NX 1.875	0.0	10.0	10.0		.02				25	2.41	.02								SP	Tr		Tr							Tr	SP	Tr			Tr	Dp	0.0	-	Dp; leached; sp clay alt, 0.3" qtz inct
	10.0	17.5	7.5		.02				100	2.42	.02																											Dp; leached; sp hem flooding w sp clay alt. Sp jaro vning
	17.5	27.1	9.6		.02				94	2.50	.02																											Dp; as above
	27.1	36.4	9.3		.03				97	2.52	.03																											Dp; mixed leach w. tr suls Tr alt. Sp qtzte frags
	36.4	45.9	9.5		.04				96	2.52	.04																											Dp; as above w. patches hem-jaro. Mod clay alt @ 45.3
	45.9	55.2	9.3		.04				73	2.54	.04																											Dp; patches hem-jaro? Sp clay alt. Tr qtzte frags
	55.2	65.6	10.4		.04				94	2.45	.04																											Dp; as above.
	65.6	74.0	8.4		.07				97	2.52	.03					.04													Tr	S		SP						Dp; as above.
	74.0	83.2	9.2		.02				88	2.60	.02																			L	SP		Tr						Dp; leached; mod clay - sp silicif. Tr hem vning
	83.2	92.7	9.5		.09				93	2.56	.03					.06													SP	SP								Dp; as above to 89.0, then mod clay alt. Sp sul vning
	92.7	102.0	9.3		.39				85	2.77	.02					.37			Tr	SP									S	15								Dp; mod. clay alt. Sp sul vning
	102.0	108.4	6.4		.18				61	2.64						.18													SP	10								Dp, mod clay alt. Tr leach arsh. Sp suls
	108.4	113.1	4.7		.65		.05		92	2.59						.65													S	20								Dp; as above
	113.1	122.6	9.5		.30				89	2.54						.30													SP	S				Tr				Dp; mod clay alt. Sp suls
	122.6	132.4	9.8		.33				90	2.58						.33														S								Dp, mod clay alt w. patches st qtz vning. Sp suls
	132.4	140.9	8.5		.15				92	2.66						.15														S								Dp; as above
	140.9	150.1	9.2		.22				90	2.68						.22														S				SP				Dp; as above. Vague qtz banding @ 149.4'.
	150.1	159.3	9.2		.18				98	2.61						.16	.02												Tr	S								Dp, 0.2" qtz banding w sp qtzte incl to 152.7, then sp clay - suls.
	159.3	168.7	9.4		.18				93	2.66						.16	.02				Tr									S								Dp; sp clay alt. Sp sul vning. Tr qtzte incl.
	168.7	178.7	10.0		.10				90	2.67						.10			Tr											S								Dp; sp clay - silicif. Tr sul vning. Dp bx w sp clay - jaro 176.2'-178.7'
	178.7	188.0	9.3		.05				93	2.70						.05														S								Dp; sp clay - silicif. Tr suls Tr qtzte incl
	188.0	198.0	10.0		.03				90	2.65						.03					Tr								S	S				Tr				Dp; mod clay alt Sp sul vning. Sp Mz text.
	198.0	207.4	9.4		.03				85	2.69						.03													S	S								Dp; mod - st clay alt. Sp suls
	207.4	216.7	9.3		.06				91	2.68						.02	.04												Tr	S				Tr				Dp; sp clay - silicif. Tr suls
	216.7	221.8	5.1		.04				96	2.69						.01	.03													SP								Dp; wk alt Tr suls
	221.8	227.2	5.4		.07				99	2.55						.02	.05																Tr					Dp; as above.
	227.2	235.3	8.1		.07				88	2.68						.02	.05																					Dp; " "
	235.3	242.2	6.9		.06				71	2.70							.06																					Dp; as above Tr dk incl
	242.2	250.0	7.8		.07				95	2.69							.07													Tr								Dp, as above Sp. sul vning
	250.0	254.6	4.6		.06				93	2.67							.06																					Dp; wk alt Tr suls.
	254.6	262.0	7.4		.04				89	2.67							.04																					Dp; as above.

Av. Rec = 88%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3): Tt - Tactite; Hf - Hornfels; Mb - Marble; Qt - Quartzite; Bx - Breccia; Da - Dacite; Mz - Monzonite; An - Andesite

Note (4): V - Vein; F - Fault; D - Dike; C - Contact; Ig - Undif igneous

Hole No. D-156

Page 1 of 3 Pages

Collar Elev. 3014.63 Final Depth 842.3

Coords N 37,852.96 E 19,602.38

Inclination Vert

Logged by FTG - GWH

Date: Start 5/15/63 Finish 6/11/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	MARCASITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 2400	0.0	5.0	5.0		.06		.01		84	2.37	.06								SP										Tr	5	SP			Tr	Dp	0.0		Dp; wk-mod alt, leached, gtz-sericite vnlg.
	5.0	12.0	7.0		.05		.02		62	2.51	.05											Tr								5								Dp; as above w/ sc. lt & tR. inclusions
	12.0	21.8	9.8		.03		.02		83	2.58	.02					.01				Tr										5							Dp; as above w/ inclusions. Some flow banding?
	21.8	29.0	7.2		.03		.02		96	2.57	.02					.01														SP							Dp; wk alt, sc. inclusions, some flow banding, plent of Bx, tr pp
	29.0	37.4	8.4		.07				96	2.58	.07																										Dp, leached; sp clay - silicif; tr ang incl.
	37.4	44.1	6.7		.04				97	2.49	.04																										Dp; as above
	44.1	53.2	9.1		.03				72	2.56	.03																										Dp; as above.
	53.2	61.7	8.5		.02				90	2.52	.01					.01													SP	5							Dp; as above w/ ggy areas
	61.7	70.0	8.3		.05				98	2.41						.05														5							Dp; leached; mod clay alt. Patches w/ tr suls
	70.0	77.7	7.7		.06				78	2.50						.06														5							Dp; leached w/ mod clay alt to 73.5, then mod clay w/ mix sul-cap
	77.7	86.5	8.8		.11				90	2.55						.11														5							Dp; mix sul - cap w/ mod clay alt to 80.7, then sp clay, sp suls
	86.5	97.0	10.5		.10				84	2.52						.10														5							Dp; sp clay alt; sp suls
	97.0	106.9	9.9		.12				81	2.60						.12													5	15							Dp; as above to 103.0, then mod-st clay alt Sp suls.
	106.9	115.8	8.9		.19				99	2.62						.19													5	20			SP				Dp; mod clay alt to 110.0, then sp clay alt; tr sul vning
	115.8	124.8	9.0		.21				85	2.56						.21													5	25			Tr				Dp; brkn; st clay alt. Sp suls
	124.8	134.2	9.4		.11				71	2.66						.11													10	35				5			Dp; brkn; st clay alt; mod jaro at 129.0, sp suls
	134.2	144.4	10.2		.13				55	2.65						.13													SP	15				5			Dp; brkn; mod clay alt. Sp suls.
	144.4	154.0	9.6		.08				84	2.64						.08														10				SP			Dp; brkn; grad to sp clay alt. Sp suls.
	154.0	164.2	10.2		.07				78	2.63						.07														SP							Dp; wk alt, sp jaro on shears. Tr suls.
	164.2	173.0	8.8		.09				97	2.62						.07	.02															SP						Dp, sp silicif. Tr ang incl. Tr suls.
	173.0	176.7	3.7		.24				100	2.62						.12	.12												5	10							Dp; as above grad to mod clay alt. Tr suls.
NX 1875	176.7	185.6	8.9		.18				90	2.68						.09	.09												5	10		Tr					Dp; brkn mod clay & sp silicif. Tr suls
	185.6	195.0	9.4		.11				82	2.58						.06	.05												SP	10							Dp; mod clay alt. Possib bx @ 189.0 w/ st gg and qtzite frags. Tr suls
	195.0	204.8	9.8		.11				83	2.55						.05	.06													SP				Tr			Dp; sp clay alt. Tr suls
	204.8	213.0	8.2		.19				78	2.64						.08	.11																				Dp; sp clay alt. Tr sul vning
	213.0	222.0	9.0		.18				86	2.60						.06	.12												SP	5							Dp; sp clay alt. Tr suls
	222.0	231.8	9.8		.27		.04		90	2.61						.07	.20													5							Dp; sp clay alt grad to sp silicif. Tr epid w/ sul veins. Sp pods suls
	231.8	242.4	10.6		.41		.03		100	2.62							.41													SP							Dp; sp silicif. Tr feldspath on walls. 2 ft areas wk bx w/ mod epy, chlor-ed walls
	242.4	252.0	9.6		.14				70	2.58							.14																				Dp; sp clay alt. Sp chlor on walls. Sp feldspath. Tr suls
	252.0	259.1	7.1		.14				99	2.62							.14				Tr					Tr						SP						Dp; mod silicif. Sp clay areas. Incl chlor - feldspath. Hf. Tr suls
	259.1	269.0	9.9		.29				78	2.58							.29										SP	5		5		10	5				Dp; st silicif w/ ggy areas. Patches chlor - feldspath. Hf. Sp suls
	269.0	277.1	8.1		.12				93	2.63							.12													5		5	SP				Dp; sp silicif. Tr feldspath on walls. Tr sul vning
	277.1	286.7	9.6		.05				88	2.61							.05										5	5 SP	SP	20		SP	SP				Dp; sp clay alt; f.g text. Tr suls
	286.7	290.9	4.2		.09				96	2.57							.09										5	5?		20							Dp; st feldspath. Tr Dp text. Tr bx text w/ qtzite frags. Tr suls
	290.9	300.0	9.1		.04				82	2.60							.04										5	Sp		20							Dp, sp qtzite frags to 293.0, then 2 ft patch Mz, then mod clay - feldspath
	300.0	309.8	9.8		.07				93	2.58							.07										5	Tr		5							Dp; patches mod clay - silicif. Wk bx text throughout w/ mod cal vning.
	309.8	316.5	6.7		.08				83	2.60							.08										5			5							Dp; sp clay - cal vning. Tr chlor frags. Tr suls.
	316.5	323.0	6.5		.12				50	2.90							.12		Sp		Tr			Tr			10	30	20	Tr	10		10	20		Tt	319.7	brkn	Dp; brkn; mod clay to 319.7, then Tt; st chlor to 321.5, then mod hem. Sp suls
	323.0	327.8	4.8		.42		.03		90	2.83							.42				Sp			Tr			Sp	60	30		10	Sp	Sp	Sp					Tt; vuggy; mod hem; tr suls.
	327.8	334.6	6.8		.55		.03	353' @ .04	50	3.25							.55							43/1.t.				60	30		10		10					Tt; brkn; vuggy; sp hem - clay alt. St Pb - Zn.
	334.6	345.0	10.4		1.86	353' @ 1.29	0.05		49	3.26							1.86				Tr			16	22			40	20		10		10	10					Tt; vuggy; sp hem alt. Sp suls.
	345.0	352.2	7.2		2.38		0.03		68	2.91							2.38							Tr	Tr			40	25		5		20	5					Tt; vuggy; massive. Patches st epy. Dense - siliceous areas.
	352.2	358.3	6.1		.54		.08		20	3.43							.54								3			50	40		Sp		10	Tr					Tt; vuggy, brkn; sp clay alt. St. Zn
	358.3	366.5	8.2		.25				86	3.22							.25		Tr						Tr			60	30				10						Tt; vuggy patches. Areas sp clay alt w/ sp cal. Mod suls. Tr Sl bst
	366.5	376.9	10.4		.22				77	3.26							.22				Tr				.6			60	30				10						Tt; vuggy areas (leached oxide?). Sp clay alt w/ sandy text. Mod suls.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

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(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-156
Page 2 of 3 Pages
Collar Elev. 3014.63 Final Depth 842.3
Coords. N -37,857.96 E 19,602.38
Inclination Vert
Logged by FTG - CWH
Date: Start 5/15/63 Finish 6/11/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	•	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	Sp. Fe	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
376.9	387.0	10.1		0.49		0.05		18	2.67							.49			Tr					Tr	Tr	60	30		Sp	Tr	10	Tr	Sp				Tt, vuggy, areas mod clay-chlor. Patches st. bar. Mod suls
387.0	397.0	10.0		.22				76	2.97							.22								Tr		60	20				20	Sp					Tt, vuggy (due to leach of sul?) Sp clay alt, mod suls 2.5 ft patch dense Hf
397.0	404.7	7.7		.12				68	3.69							.12		Tr						Tr		50	35				15	Tr					Tt, vuggy; sp clay alt, mod suls to 402.0, then mod sandy text w. lim? band @ 35°
404.7	411.2	6.5		.25				81	3.33							.25										50	40				10						Tt, mod clay alt w. ggy areas. Mod sandy text. Sp lim after py. Tr suls
411.2	420.0	8.8		.07				98	2.88							.07		Sp			Tr					50	35		5		10						Tt, vuggy; mod clay alt w. ggy areas. Sandy text. Mod lim after py. Mod suls
420.0	430.0	10.0		.08				82	3.14							.08										55	30		15		10						Tt, vuggy; mod-st clay alt. Mod lim after py w. no visible leach. Mod suls
430.0	437.0	7.0		.50	.140	.07	.140	81	3.30							.50		Tr								60	15		15		10						Tt, mod clay alt. Mod suls, w patches st suls in pods bx. Sandy text.
437.0	444.0	7.0		.58	.54	.16	12	96	3.06							.58										5	60	15	10		10						Tt, mod clay alt w. lim to 440.0, then mod clay-sul alt. Col wer as sandy text decr
444.0	452.2	8.2		.08				93	2.65							.08										5		Tr	Sp	Sp	5			Mz	444.0	35°	Mz; st feldspath w ptr. xxs, bio phenos, sub py to 449.0, then Dp; st silicif, sp sul vning.
																																		Dp	449.0	brkn	
452.2	461.7	9.5		.03				94	2.46							.03			Tr							Tr		Tr	SP	Tr	SP	SP					Dp; mod silicif, feldspath patches (incl), tr dk incl, tr suls
461.7	471.2	9.5		.02				98	2.64							.02																		Mz	466.0	brkn	Dp; as above to 466.0, then Mz, wk alt, st por text, tr suls
471.2	480.1	8.9		.04				94	2.66							.04																					Mz; wk clay alt, tr suls. Tr 2nd fspar
480.1	489.3	9.2		.13				78	3.07							.13								Tr		45	15		5		5	Tr		Tt	481.9	brkn	Mz; as above to 481.9, then 0.2 ft st silicif Dp to 482.1, then
																																		Qp	487.7	brkn	Tt; mod clay alt; mod suls to 487.7, then Dp, mod silicif; tr suls.
489.3	495.3	6.0		.10				95	2.65							.10			Tr		Tr					Tr		Tr	5	Tr	SP	5		Dp bx	489.3	brkn	Dp bx; mod silicif w frags epidote (Hf?), mod vert shearing Tr suls
495.3	503.0	7.7		.23				75	2.72							.23								Tr		5	SP		5		15	5					Dp bx; mod silicif w mod silicf - Hf frags Tr 0.5" bx veins. Tr suls
503.0	513.5	10.5		.10				85	2.65							.10										SP		Tr	5		5	SP					Dp bx; " " w Hf frags, & buff-colored areas. " "
513.5	523.4	9.9		.08				85	2.66							.08										Tr			SP		5						Dp bx; " " w sc. buff-colored areas, decr towards end.
523.4	532.0	8.6		.07				98	2.68							.07					Tr		Tr	Tr			Tr				SP						Dp bx; sc dk frags; sp/l sp areas, lbl frag w tr sphal & gal.
532.0	540.0	8.0		.05				93	2.66							.05																		Dp	532.0	grad	Dp w sc dk areas, tr clay alt., tr. suls.
540.0	546.3	6.3		.05				82	2.71							.05										SP		S			15						Dp; as above w. tr Hf.
546.3	557.0	10.7		.05				89	2.63							.05												SP			SP			Mz	550.7	brkn	Dp; as above to 550.7, then Mz, sp clay alt, sp 2nd fspar. Tr suls
557.0	566.7	9.7		.13				93	2.64							.13			SP					Tr		5	20	5			Tr			Tt	564.2	70°	Mz; incr silicif to 564.2, then Tt, tr incp feldspath; sp mass suls
566.7	575.8	9.1		.27		.04		100	3.09							.27			S					SP		5	70	15			Tr	Tr					Tt, mass gar; patches vague rpo text. Patches carb band @ ~ 30° Mod suls
575.8	585.2	9.4		1.47		.06		93	3.24							1.47			S					26		5	60	20									Tt, st gar. Mod px - sl - cpx. Wk band @ 35°. Mod epidote
585.2	595.2	10.0		.07				93	3.16							.07			SP					Tr		10	55	25		SP	Tr	SP					Tt, st gar, tr clay grad to banded Tt-siliceous ck @ 40°. Silicif bx @ 594.6
595.2	604.6	9.4		.16				99	2.66							.16					Tr			Tr		10	40	30			5	SP					Tt, sp clay - hem, vuggy areas; bx areas; pods silicif Dp, sp suls.
8X 1.432 → 604.6	614.0	9.4		.17		.02		100	2.71							.17										5	40	15			5			Dp	611.5	brkn	Tt, st gar to 611.5, then Dp, mod silicif. Tr suls
614.0	622.7	8.7		1.24		.03		64	2.69							1.24										5	50	30			SP			Tt	615.0	brkn	Dp; mod silicif to 615.0, then Tt, dense; silicif patches; 3" pods Dp
622.7	630.2	7.5		.08				85	2.72							.08										SP	40	30		SP		10		Dp	629.7	brkn	Tt, as above to 629.7, then Dp, sp clay - silicif, sp veins epidote w. sp suls
630.2	640.2	10.0		.06				98	2.67							.06			Tr							Tr	SP					Tr					Dp; mod silicif; feldspath areas. Sp sul vning.
640.2	644.0	3.8		.15				94	2.67							.15																					Dp; sp silicif, tr sul vning. Tr dk incl
644.0	654.2	10.2		.04				80	2.64							.04										SP	SP	SP			5	Tr		Dp bx	653.0	grad	Dp; sp silicif. Tr suls. Vague grad to Dp bx w. siliceous Hf(?) frags @ 653
654.2	661.4	7.2		.12				73	3.06							.12					Tr					Tr		Tr			5						Dp bx; patches chlor Hf, siliceous Hf. Wk silicif of Dp.
661.4	668.6	7.2		.04				96	2.69							.04											5				5	5					Dp bx; sp silicif Dp w. frags chlor Hf grad to mod clay alt.
668.6	678.7	10.1		.07				98	2.67							.07											5				SP	15					Dp bx; sp silicif w. Qtzte frags to 4", tr Tt frags; 4 ft pod chlor Hf. Sp sul vning
678.7	685.8	7.1		.11				88	2.62							.11											5					5		Mz	684.0	brkn	Dp bx, character as above to 684.0, then Mz; tr clay, 2nd fspar. Tr suls.
685.8	695.0	9.2		.05				95	2.61							.05													Tr			SP	SP				Mz; sp 2nd fspar - feldspath. Tr cal - bar vning @ 50°. Tr suls
695.0	704.2	9.2		.04				100	2.62							.04																					Mz; as above
704.2	713.6	9.4		.03				97	2.66							.03																	Tr				Mz; st por text. Wk alt
713.6	722.0	8.4		.08				94	2.67							.08												Tr	Tr	SP	Tr	5	5	Dp	715.7	grad	Mz; as above to 715.7, then Dp, mod silicif - feldspath. Tr Dp bx. Sp suls
722.0	730.7	8.7		.07				99	2.69							.07										SP		SP									Dp, mod silicif to 723.8, then int silicif. Patches silicif Hf. Sp suls
730.7	740.3	9.6		.03				98	2.64							.03										5		5			5	5		Dp bx	730.7	grad	Dp bx; st silicif, frags Hf, Qtzte areas mod chlor. Tr suls.
740.3	748.0	7.7		.13				47	2.62							.13										SP		SP			SP	10					Dp bx, mod silicif, patches mod clay. St chlor Hf

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
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Da - Dacite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-156
Page 3 of 3 Pages
Collar Elev 3014.63 Final Depth 842.3
Coords. N 37,857.96 E 19,602.38
Inclination Vert
Logged by FTG - CWH
Date: Start 5/15/63 Finish 6/11/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
748.0	758.2	10.2		.17				86	2.64							.14	.03		SP							Tr			Tr	Tr	Tr	10	Tr		Db bx?	748.0	brkn	Dp bx? mod silicif. Pods mass. py. Veins born.
758.2	766.5	8.3		.13				76	2.73							.11	.02							Tr			Tr					15						Dp bx? mod-st silicif. Tr suls.
766.5	775.8	9.3		.06				98	2.68							.06														Tr		10						Dp bx? mod-st silicif. Sp sul veing.
775.8	785.3	9.5		.14				95	2.82							.14												SP	SP	Tr	SP	5					Dp bx; mod silicif. Patches Mz. Frags Qtzte, Ak, chlor Hf (Mod suls
785.3	794.6	9.3		.21				96	2.74							.21												Tr	Tr		10	Tr					Dp bx, mod silicif. Frags silicif. Hf. Sp suls
794.6	804.0	9.4		.06				94	2.74							.06										Tr					25						Dp bx; patches int silicif. Dp (Qtzte?). Sp silicif. Hf. Sp suls
804.0	811.4	7.4		.04				58	2.68							.04															30			Dp	804.0	grad	Dp, int silicif. Tr suls. Tr Dp bx?
811.4	822.6	11.2		.07				86	2.67							.07															55						Dp, int silicif (Qtzte). Tr suls
822.6	827.8	5.2						0																													No Core
827.8	834.6	6.8		.03				96	2.64							.03			SP							Tr			Tr	Tr	Tr	20	Tr		Mz Dp	827.8 833.6	brkn brkn	Mz, sp clay alt. Tr suls to 833.6, then Dp; int silicif. Tr suls
834.6	842.3	7.7		.04				37	2.71							.04			SP							Tr			SP	SP		60						Dp; brkn; int silicif (Qtzte) Tr suls
						Av.	Rec.	83%																													
					END	OF	HOLE																														

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

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Mb - Marble
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V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-157
Page 1 of 1 Pages
Collar Elev. 3064.14 Final Depth 385.3
Coords N 36,063.23 E 19,413.64
Inclination Vert
Logged by FTG - CWH
Date: Start 6/5/63 Finish 6/20/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	5.0	5.0																																					ROCKBIT
NC 2.400 5.0	14.0	9.0		1.54	15.4' @ 1.10	1.42	15.9' @ 1.00	36	2.75	1.30	.02	.02	.08			.12		SP	Tr							35	20	20		5	Tr	5	Tr	Tr		Mb	5.0	-	Mb; leached, pods Tt, Hf. Patches CuOx
14.0	20.4	6.4		.47		.41		93	2.69	.20	.01	.02	.18			.06		5			SP					40	20	10		10		5							Mb; leached, sp clay patches. Sp Tt - Hf. Tr CuOx.
20.4	30.5	10.1		.24				93	2.69	.15	.01	.01	.05			.02		SP			Tr					35	10	SP		SP		Tr	Tr						Mb; leached, pods chlor - CuOx. Tr gn
30.5	37.7	7.2		.09				100	2.69	.02		.01	.06					Tr								90		SP		Tr	Tr								Mb; leached, tr lim vnlts
37.7	46.2	8.5		.35		.32		99	2.64	.15	.02	.02	.13			.03		SP	Tr							80	10	SP		1									Mb, as above to 42.0, then pods Tt w seams CuOx.
46.2	54.5	8.3		.60		.56		97	2.65	.10	.02	.02	.42			.04		1			SP					50	30	1		1		5							Mb; leached, sp lim vning. Sp pods Tt w assoc. CuOx (Dioptase?)
54.5	64.1	9.6		.18				100	2.58			.01	.13			.04		Tr								75	SP	10		SP									Mb; leached, tr lim - CuOx vning
64.1	73.6	9.5		.22				94	2.68			.02	.16		.02	.02		1								55		30		5									Mb; as above w pods Hf
73.6	82.6	9.0		.37				92	2.87			.01	.27			.09		1			Tr					45	25	20		SP			Tr						Mb; leached w tr lim vning. Mod gress clayey Hf, Tt vning
82.6	91.8	9.2		.12				99	2.70			.01	.09			.03		1								85		5		SP									Mb, leached w. tr Tt - CuOx vning grad to pure Mb w tr suls
91.8	101.4	9.6		.18				95	2.66			.01	.15			.02		1								85	SP	5		1									Mb; leached w sp suls in dense, pure Mb. Sp lim - CuOx vning
101.4	110.9	9.5		.18		.12		99	2.55		.02	.05	.05			.06		1			1		Tr			85	5	5		5				Tr	Tr				Mb; leached w tr suls. Pods chlor, Tt w sp hem. Sp CuOx
NX 1.875 110.9	119.8	8.9		.79		.62		97	2.78		.12	.10	.40			.17		Sp			1		1			90	Sp	5		5			1	1	1				Mb; leached w sp lime silicates. Pods Tt w sp hem - CuOx
119.8	129.7	9.9	232' 1.05 3.85	1.02		.88		95	2.71		.05	.05	.78			.14		1			1					45	35	10		10		Sp	1			Tt	125.6	grad	Mb, leached w tr lim vnlts w incr Tt to 125.6, then Tt, tr hem, sp CuOx
129.7	138.6	8.9		.85	57.4' @ 1.32	.74	57.4' @ .65	100	2.78	.05			.69			.11		1			1					20	55	15		10		1	1						Tt, leached, sp hem - pods chlor. Mod CuOx
138.6	148.1	9.5		1.53		1.15		91	2.75		.05	.05	1.05			.38		1	Tr		1					15	65	10		5		5	1						Tt, leached w mod rem suls. Mod hem. Cal vning w. frags Tt. Mod CuOx
148.1	158.1	10.0	282' 1.00 2.28	2.54		2.48		85	2.88		.01	.02	.45			2.06		1	1		1					15	65	10		5	Tr	5	1						Tt, leached w mod suls. Sp hem - clay alt Patches chlor. Mod CuOx
158.1	168.3	10.2		1.10		.08		91	2.72		.01	.02	.05			1.02		1	Sp		1					15	65	10		5	1	5	1						Tt, leached w incr suls. Mod chlor - hem - clay alt. Tr qtz banding @ 55°
168.3	177.6	9.3		.38		.05		85	2.53			.01	.04		.23	.10		Sp			Tr					Sp	Tr	5		5	Sp	Tr	5			Mz	169.0	brkn	Tt, st gar - silicif to 169.0, then Mz; leached, mod silicif. Tr CuOx
177.6	187.6	10.0		.23				84	2.58			.01	.14		.05	.03		1	Tr												SP	1		SP					Mz, leached, wk clay, sp chlor alt. Tr pos CuOx
187.6	194.8	7.2		.32				91	2.61			.01	.08		.12	.11		1	1									Tr	5	Tr		1							Mz, as above, becoming less alt, wx to py @ end.
194.8	204.3	9.5		.36				100	2.59			.01	.06		.10	.19		1	1							5	Tr	SP	SP	SP	1		1						Mz, v/wk alt, dk, leached along frac, tr diss. py. Pod at Hf fr 202.3-203
204.3	214.9	10.6		.36				95	2.67			.01	.04		.10	.21		Tr	1					Tr				Tr	1	SP		1							Mz, " " " " " " " " "
214.9	224.1	9.2		.44		.04		95	2.56				.04		.10	.30		1	1							1		1	1	1			Tr		BARITE				Mz, tr leach on frac. Wk alt. Tr suls, CuOx.
224.1	232.8	8.7		.33		.05		95	2.55				.05		.10	.18		1	1							1		1	1	Tr		1							Mz, as above
232.8	241.6	8.8		.23		.05		94	2.60				.05		.07	.11		1	1							1		1	1	1		1							Mz; tr leach. Sp patches silicif. Tr suls
241.6	251.0	9.4		.44	19.6' @ .42	.09	19.6' @ .06	99	2.70				.05		.10	.27	.02	1	1							1	10	40	35	1	1			1	Tr	Hf	242.7	brkn	Mz, st silicif bx frags w cal cement to 242.7, then Hf, sp clay - chlor
																																				Tt	246.8	brkn	vning w st suls at ct to 246.8, then Tt, mod clay alt. Tr suls.
251.0	261.2	10.2		.40		.03		97	2.76						.05	.35			Tr							5	70	20		Tr			Tr						Tt, st gar w. sp chlor - cal vning. Pods Hf. Sp sul vning
261.2	271.3	10.1		.13		.03		94	2.64						.02	.11		Tr	1						Tr	10	60	25		1	Tr								Tt, sp clay alt w incr Hf. Sp pods Mz part alt to Tt. Tr suls
271.3	279.8	8.5		.87		.04		98	3.02							.87			1	Tr				Tr	1	10	30	45		5	1		5			Hf	273.5	brkn	Tt; mod clay, tr suls to 273.5, then Hf; mod chy - chlor vning; mod suls to
																																				Tt	279.0	20°	279.0, then Tt st gar. Tr suls
279.8	287.4	7.6		1.01		.04		92	2.84							1.01			Tr	Tr	Tr			Tr	Tr	15	45	35		SP	Tr		Tr			Hf	284.0	brkn	Tt; mod hem w. pods suls to 284.0, then Hf; mod clay - chlor w. mod sols
287.4	296.9	9.5	122.8' .79 .33	.67		.03		87	2.94							.66	.01		SP					1	1	15	55	20		5	1					Tt	289.4	grad	Hf, sp clay alt, tr suls to 289.4, then Tt, mod-st clay alt. Mod suls, sandy text.
296.9	306.5	9.6		1.03	75.2' @ 1.06	.03	75.2' @ .03	87	2.87							1.03			1					1	1	10	65	20		5	1					Hf	305.8	grad	Tt, mod-st clay alt w. mod gar sand, mod suls to 305.8, then Hf; sp chy, mod suls
306.5	314.8	8.3		1.20		.03		100	2.69							1.20			5	Tr	Tr			1	1	15	5	65		5	1		Tr						Hf, mod clay - sp gen - blk chlor alt. St sul vning
314.8	324.6	9.8		2.11		.04		95	2.87							2.11			5	1					1	15	15	60		SP	1								Hf, mod clay alt w mod sul vning. Patches st suls, grad to dense Hf, sp suls
324.6	331.0	6.4		.49		.03		86	2.94							.49			SP	1					1	10	20	55		1	1		5						Hf, dense, sp clay alt. Sp sul - chlor vning. Sp moly vning
331.0	341.0	10.0		.75		.03		69	3.00							.75			1						1	5	75	15		1	1		SP			Tt	333.0	grad	Hf, as above to 333.0, then Tt; sp clay alt, sp sul vning
341.0	346.5	5.5		1.30		.01		91	3.12						Tr	1.30			1						1	5	70	15		1	SP		Tr						Tt, sp chy alt. Sp cal - qtz vning. Sp suls.
346.5	355.7	9.2		.35		.02		97	3.03							.35			1						1	5	80	10		1			1						Tt, sp clay alt. St gar. Tr suls.
355.7	364.4	8.7		.51		.01		100	3.09							.51			1					Tr	1	5	80	10		1			1						Tt, st gar. Vert sul vning. 1" vnlt w. cal - py - sl.
364.4	374.0	9.6		.33		.02		97	3.01		Av. Rec = 92%					.33			1							5	75	10		1	1	SP	1			Dp	373.2	grad	Tt, sp clay alt. Tr sul vning to 373.2, then Dp, mod silicif. Tr suls
374.0	379.3	5.3		.36		.01		95	2.71						.18	.18			1							Tr				Tr	1	65	1						Dp, as above to 377.5, then int silicif. Bk is qtzite. Tr suls.
379.3	385.3	6.0		.38		.02		59	2.62		END OF HOLE				.19	.19			1							1				1	1	85	1						Dp, int silicif. Tr suls

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes: - -

(1) Est. % Cu represented by each mineral.

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Stong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-158
Page 1 of 3 Pages
Collar Elev. 3110.78 Final Depth 8553
Coords. N 37,973.34 E 29,078.24
Inclination Vert
Logged by FTG - CWH
Date: Start 6/12/63 Finish 7/16/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	12.2	12.2																																					Alluvium
NC 2.400	12.2	21.0	8.8		.07				68	2.40	.07								Tr										SP	5	Tr					Dp	12.2	-	Dp; leached, mod clay alt. Patches bx w. mod lim after py
	21.0	29.7	8.7		.07				85	2.51	.07																			5						Mz	21.0	brkn	Mz; leached, mod lim on shears. Sp clay alt. Sp qtz eyes
	29.7	36.8	7.1		.07				86	2.56	.07																			5				Tr		Dp	32.0	brkn	Mz; as above to 32.0, then Dp; leached, wk bx grad to sp alt.
	36.8	43.6	6.8		.07				90	2.57	.07											Tr								5									Dp; leached, brkn w. mod clay - lim on sh. Sp alt.
	43.6	51.5	7.9		.06				93	2.51	.06									Tr									5	10									Dp; as above w. ggy areas
	51.5	60.0	8.5		.44		.05		96	2.54	.05					.39													5	10									Dp; patches leached + wk suls. Mod clay on sh. Sp alt
	60.0	66.6	6.6		.08				93	2.58	.02					.06													5	5									Dp; leached, sp clay alt.
	66.6	76.6	10.0		.07				85	2.64	.02					.05													SP	5									Dp; part leached; mod clay - silicif w. sp suls.
	76.6	84.2	7.6		.07				100	2.61	.01					.06													1	5									Dp; as above
	84.2	93.0	8.8		.10				96	2.61	.02					.08												Tr	1	5									Dp; as above grad to wk alt; tr epid on sh. Tr suls
NX 1875	93.0	101.5	8.5		.07				97	2.63						.07													5	5									Dp; part leached; sp - mod clay alt. Tr qtzte bx frags
	101.5	111.0	9.5		.06				97	2.67						.06													SP	SP				Tr					Dp; patches sp clay - suls alt'on w. wk alt areas. Patches qtzte bx
	111.0	119.5	8.5		.07				95	2.73						.05	.02													5									Dp; leached on sh. Sp clay alt w. 1 ft fll bx zone. Sp aug'nd, suls.
	119.5	128.1	8.6		.06				91	2.66						.03	.03												5	5									Dp; tr leach on sh. Sp clay - silicif. Tr suls
	128.1	135.6	7.5		.12				89	2.64						.09	.03												5	5				Tr					Dp; end leach. Sp clay on sh. Tr suls
	135.6	144.7	9.1		.09				95	2.66						.07	.02												5	5									Dp; sp clay alt. Tr suls.
	144.7	153.7	9.0		.06				91	2.74						.03	.03												SP	SP									Dp; wk alt. Tr sul vning
	153.7	162.9	9.2		.04				92	2.63						.01	.03																						Dp; sp alt. Tr suls. Tr dk. ang incl.
	162.9	171.9	9.0		.06				91	2.69							.06																						Dp; as above
	171.9	180.8	8.9		.05				86	2.67							.05																Tr						Dp; sp clay alt. Tr diss suls. Tr vuggy text.
	180.8	189.6	8.8		.04				89	2.66							.04				Tr								5	5									Dp; sp clay alt. Sp bx frags w. mod clay. Tr suls. Tr epid on sh
	189.6	199.2	9.6		.04				89	2.65							.04											Tr	SP	5									Dp; sp clay alt. Tr suls. Tr epid on sh. Tr ang incl
	199.2	207.7	8.5		.03				95	2.61							.03												Tr	SP									Dp; as above
	207.7	216.7	9.0		.02				92	2.72							.02																						Dp; as above
	216.7	226.2	9.5		.03				99	2.71							.03									Tr		Tr											Dp; wk alt. Bles on sul vnlts. Tr diss epid. Tr dk ang incl
	226.2	230.0	3.8		.09				90	2.70							.09															10							Dp; as above w. 1 ft incl w. st cont qtz banding
	230.0	237.0	7.0		.03				93	2.68							.03													Tr									Dp; patches wk alt + fresh. Dp. Tr suls
	237.0	246.2	9.2		.14				95	2.70							.14				Tr																		Dp; as above grad to sp clay alt
	246.2	255.9	9.7		.06				87	2.63							.06									SP			SP	5									Dp; sp clay alt ~ mod incl. Patches mod clay w. sp suls.
	255.9	264.5	8.6		.03				95	2.73							.03									Tr			Tr	SP									Dp; sp clay alt w. sp suls. Text. sugg. mod - st. small incl.
	264.5	274.0	9.5		.03				91	2.68							.03																						Dp; as above w. ggy areas + wk alt areas.
	274.0	282.9	8.9		.02				97	2.69							.02																						Dp; wk alt. Tr suls.
	282.9	292.4	9.5		.02				96	2.65							.02																						Dp; as above grad to sp clay alt. Tr suls.
	292.4	301.9	9.5		.03				96	2.70							.03									SP													Dp; sp clay alt. Tr suls. Tr ang incl
	301.9	310.4	8.5		.04				100	2.72							.04									Tr													Dp; wk alt. Tr suls. Tr ang incl
	310.4	319.2	8.8		.03				97	2.76							.03																						Dp; sp clay alt. Tr suls. Tr ang incl
	319.2	328.4	9.2		.04				96	2.67							.04																						Dp; as above
	328.4	338.8	10.4		.06				88	2.69							.06																						Dp; as above w. wk alt patches
	338.8	348.2	9.4		.06				91	2.69							.06									Sp				Sp									Dp; as above
	348.2	357.2	9.0		.09				97	2.69							.09																						Dp; as above w. small pods cpy
	357.2	366.4	9.2		.04				98	2.68							.04																						Dp; as above
	366.4	375.5	9.1		.04				97	2.68							.04																						Dp; as above
	375.5	384.2	8.7		.08				95	2.73							.08																						Dp; as above
	384.2	393.1	8.9		.10				96	2.63							.10													5									Dp; as above to 387.0, then mod - st clay alt patches
	393.1	402.2	9.1		.06				90	2.64							.06													5									Dp; mod-st clay alt areas w. patches sp clay alt. Tr suls

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-158
Page 2 of 3 Pages
Collar Elev. 3110.78
Final Depth 855.3
Coords. N 37973.34 E 20,078.24
Inclination Vert
Logged by FTG - CWH
Date: Start 6/12/63 Finish 7/16/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
402.2	412.4	10.2		.06				89	2.75							.06			Tr							Sp				Sp	Tr		Tr	Dp			Dp, wk clay alt spotty, mainly along Frac's. Qtz-Py veing.
412.4	421.2	8.8		.05				99	2.69							.05																					Dp, as above
421.2	430.8	9.6		.06				89	2.76							.06																					Dp, as above
430.8	439.7	8.9		.05				93	2.74							.05																					Dp, as above, a few small, sc. dk inclusions.
439.7	449.2	9.5		.07				84	2.63							.07										Tr											Dp; sp clay alt Tr suls Tr dk-avg incl.
449.2	458.4	9.2		.07				96	2.70							.07																					Dp; wk alt w tr suls Tr incl
458.4	467.5	9.1		.05				94	2.77							.05																					Dp, as above.
467.5	476.7	9.2		.05				100	2.64							.05													Tr								Dp; as above
476.7	479.8	3.1		.04				97	2.72							.04											Tr										Dp; sp clay alt. Tr suls.
479.8	488.7	8.9		.02				76	2.63							.02																		Mz	484.0	brkn	Dp; as above to 484.0, then Mz; sp clay alt Tr suls
Bx 1.432 488.7	499.2	10.5		.03				82	2.65							.03																					Mz, wk alt. St par. tex. Diss py.
499.2	508.5	9.3		.04				96	2.65							.04										Sp				Sp	Tr			Dp	499.8	89°	Mz; as above to 499.8, then Dp; sp clay alt Mod incl
508.5	518.0	9.5		.05				94	2.72							.05										Tr				Tr							Dp, as above grad to wk alt. Tr sul vning
518.0	527.5	9.5		.04				96	2.69							.04																					Dp; as above
527.5	536.3	8.8		.05				92	2.81							.05																					Dp; wk alt. Tr suls
536.3	545.6	9.3		.06				96	2.75							.06							Tr	Tr													Dp, as above
545.6	555.2	9.6		.05				91	2.64							.05																					Dp, as above w tr sul vning.
555.2	560.3	5.1		.03				87	2.69							.03																					Dp; as above
560.3	567.3	7.0		.07				64	2.66							.07																					Dp; as above
567.3	575.6	8.3		.08				89	2.73							.08																					Dp; as above
575.6	585.3	9.7		.09				93	2.68							.09																					Dp, as above w. brkn patches.
585.3	591.3	6.0		.02				98	2.69							.02																					Dp; wk alt. Tr suls.
591.3	601.8	10.5		.01				79	2.71							.01																					Dp, as above Tr sul vning
601.8	610.6	8.8		.06				67	2.67							.06																					Dp, as above.
610.6	621.4	10.8		.06				93	2.71							.06																					Dp; as above
621.4	630.7	9.3		.03				97	2.69							.03																					Dp; as above
630.7	639.5	8.8		.04				97	2.69							.04																					Dp; as above
639.5	648.6	9.1		.05				98	2.67							.05																					Dp; as above
648.6	657.3	8.7		.03				96	2.73							.03															Tr						Dp; as above Incl qtzite 1" across
657.3	666.4	9.1		.05				100	2.68							.05																					Dp, wk alt to fresh Tr sul vning
666.4	673.9	7.5		.06				96	2.67							.06																					Dp, wk alt w mod incl qtzite Tr sul vning
673.9	682.9	9.0		.05				94	2.78							.05																					Dp; wk silicif. Tr sul vning
682.9	692.2	9.3		.07				100	2.61							.07																					Dp; wk alt w tr incl. Tr suls
692.2	701.5	9.3		.06				97	2.72							.06																					Dp, as above
701.5	710.6	9.1		.09				99	2.69							.09			Sp																		Dp, as above
710.6	719.8	9.2		.05				97	2.71							.05																					Dp; as above
719.8	728.9	9.1		.01				98	2.67							.01			Tr																		Dp; as above
728.9	738.6	9.7		.04				92	2.69							.04																					Dp, as above
738.6	748.2	9.6		.05				99	2.67							.05											Tr										Dp, as above
748.2	757.5	9.3		.05				97	2.70							.05																					Dp, as above
757.5	766.8	9.3		.04				95	2.69							.04																					Dp, as above
766.8	775.5	8.7		.02				100	2.70							.02																					Dp, as above
775.5	784.5	9.0		.05				99	2.65							.05											Tr										Dp; gen. fresh, wk alt in spots. sc. small Tr. suls.
784.5	794.7	10.2		.05				96	2.67							.05																		Mz	786.0	39°	Dp as above. CT. irreg. Mz lt colored, fresh-wk alt. sk py
794.7	804.8	10.1		.05				97	2.64							.05									Tr									Dp	803.7	45°	Mz as above plus sc. irreg. Silicified orthoclase phenc. C.T. brkn.
804.8	812.5	7.7		.05				96	2.68							.05																					Dp dk, gen. fresh. wk alt along frac's. Tr py.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

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Strong (St) + 50 %

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Mb - Marble
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-158
Page 3 of 3 Pages
Collar Elev. 3110.78 Final Depth 855.3
Coords. N 32,973.34 E 20,078.24
Inclination Vert
Logged by FTG - CWH
Date: Start 6/12/63 Finish 7/16/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
812.5	821.6	9.1		.07				99	2.75							.07			Tr				Tr	Tr		Tr				Tr			Tr					Dp, wk alt, mostly bleq. Tr suls.
821.6	830.4	8.8		.03				99	2.68							.03																						Dp, wk bleq w tr feldspath. Tr suls.
830.4	839.0	8.6		.02				96	2.67							.02																						Dp; as above Qtz vnlt. w. cpy - gn.
839.0	848.1	9.1		.03				98	2.64							.03																						Dp; wk bleq. Tr avg incl. Tr suls.
848.1	855.3	7.2		.03				96	2.70							.03																						Dp, as above.
						Av.	Rec. =	93%																														
				END	OF	HOLE																																

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-159
Page 1 of 2 Pages
Collar Elev. 3102.77 Final Depth 634.4
Coords. N 136,058.35 E 19,594.25
Inclination Vert
Logged by FTG - CWH
Date: Start 6/21/63 Finish 7/16/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	5.0	5.0		-			-	-	-																														ROCKBIT
NC 2.400	5.0	10.9	5.9		.06				64	2.70	.03			.03					Tr								35	60		SP			SP	Tr		Hf	5.0	-	Hf, leached, mod Mb grad to sp chlor vning
	10.9	17.0	6.1		.06				76	2.84	.03			.03													30	55					5						Hf; leached; sp chlor vning, dense
	17.0	24.1	7.1		.06				100	2.70	.02		.02	.02													50	30		20			Tr			Mb	17.0	grad	Mb; leached; whitish, dense, resembles Hf. High cal. Bl. patches.
	24.1	31.8	7.7		.19				41	3.06	.10	.01	.02	.06													20	50		30						Hf	24.1	grad	Hf, leached, mod clay alt. Mod Mb.
	31.8	41.1	9.3		.15				100	2.90	.04	.01	.02	.03		.01	.04			Tr							20	50		30									Hf, dense, part leached, sp clay - chlor vn alt. Tr suls
	41.1	51.1	10.0		.05				96	2.44	.01		.02	.01			.01										65	20		10			5			Mb	46.3	brkn	Hf, as above to 46.3, then Mb; leached; tr chlor - clay vnlts
	51.1	61.2	10.1		.05				94	2.63		.01	.02	.02					Sp								95			5			Tr							Mb; leached on vnlts, 1.5 ft patch silica.
	61.2	71.4	10.2		.02				100	2.69			.02														100			Tr										Mb; leached; tr chlor on sh.
	71.4	81.1	9.7		.04				81	2.68			.04									Tr					100			Sp										Mb; as above. Cal vnlt w. 2.5" move; 1 ft patch @ 78.8' w st clay - wulfenite.
	81.1	87.0	5.9		.05				81	2.59			.02	.03					Tr								90			5				Tr						Mb; leached; patches mod clay
NX 1.875	87.0	96.6	9.6		.03				89	2.65				.03													95			SP										Mb; as above
	96.6	105.6	9.0		.06				97	2.70				.06													95	Tr		Tr		Tr			Tr					Mb; leached, pods fluorite
	105.6	114.0	8.4		.04				100	2.69				.04													95													Mb; leached
	114.0	123.4	9.4		.08				94	2.69				.03			.05			Tr							95													Mb, leached; w a few sc areas of clay.
	123.4	132.8	9.4		.07				97	2.70							.07										95													Mb, white, etc, as above
	132.8	141.7	8.9		.02				98	2.68							.02					Tr					95	Tr					Tr		Tr					Mb, white, leached in part. Tr chlor, a few vnlts of py.
	141.7	151.7	10.0		.02				90	2.69							.02							Tr			95													Mb, leached in part, tr gar, here (Vesper?) & py. Sp chlor.
	151.7	161.0	9.3		.02				100	2.70							.02								Tr		95													Mb, white coarse-grained, tr leaching along frac's. Tr sphal.
	161.0	170.7	9.7		.01				99	2.71							.01										95													Mb, as above, no sphal.
	170.7	180.2	9.5		.03				98	2.71							.03										99													Mb, as preceding, tr here on frac.
	180.2	189.3	9.1		.03				96	2.68		.01		.01			.01										99													Mb, leached, tr mal & pitch
	189.3	198.4	9.1		.03				93	2.64				.01			.02										95	Tr						Tr						Mb, leached, some clay.
	198.4	207.4	9.0		.05				98	2.65							.05							Tr	Tr		95					Tr								Mb; patches qtz - clay Pods sl
	207.4	217.3	9.9		.05				94	2.69							.05										99													Mb; tr clay on sh
	217.3	226.4	9.1		.05				96	2.66							.05										80	15												Mb; patches mod clay. Tr chlor vning.
	226.4	236.4	10.0		.25				81	2.68		.02	.01	.12			.10										50	10		35			5	Tr		Mz	236.0	brkn	Mb; grad to st clay w clay - chlor bx to 236.0, then Mz; st clay alt
	236.4	244.6	8.2		.04				99	2.64							.04										5			SP			SP							Mz; mod clay alt grad to sp clay w tr suls.
	244.6	251.1	6.5		.08				91	2.66							.08					Tr					SP	SP		5						Mb	250.0	brkn	Mz; as above to 250.0, then Mb; brkn; sp clay alt.
	251.1	260.3	9.2		.03				94	2.68							.03							Tr	Tr		90			SP			Tr		Tr					Mb; tr vuggy text Tr gn - fluor
	260.3	269.3	9.0		.04				93	2.69							.04										95													Mb, tr clay on sh.
	269.3	278.4	9.1		.02				98	2.69							.02										95													Mb; as above. Gy areas
	278.4	287.7	9.3		.02				94	2.69							.02										95							Tr						Mb; as above
	287.7	294.4	6.7		.03				91	2.70							.03										85	5					Tr		SP					Mb; sp clay - fluor - gn - st grad to wht. Mb.
	294.4	301.4	7.0		.06				100	2.71							.06										95	Tr		Tr				Tr						Mb, bl - gy patches (ls?). Sp chlor - clay vning
	301.4	310.9	9.5		.12				100	2.57							.12			SP					Tr		25	25	35	5			SP			Mz	306.1	brkn	Mb; sp clay chlor vning to 305.5; then 1 ft patch Tt - st gar to 306.1, then Mz, st gar grad to st sul - clay alt
	310.9	317.3	6.4		.06				98	2.61							.06		Tr	Tr							SP		Tr	SP	Tr		Tr							Mz; sp clay alt
	317.3	324.2	6.9		.08				100	2.56							.08										Tr			Tr										Mz; sp clay alt Tr cal vning
	324.2	333.3	9.1		.16				93	2.64							.16										SP			SP	Tr		SP							Mz; sp clay alt Sp cal vning
	333.3	342.1	8.8		.13				97	2.68							.13																							Mz; as above
	342.1	350.8	8.7		.05				96	2.67							.05										70	5		10	5		5			Mb	343.3	brkn	Mz; grad to st clay at 342.3, then 1 ft qtz vn to 343.3, then Mb; mod chlor blebs
	350.8	360.9	10.1		.11				88	2.65							.11			SP							85	5		SP			SP							Mb; pods st suls Sp clay alt
	360.9	370.4	9.5		.19				96	2.64							.19								Tr		75	5	15				Tr							Mb; sp clay alt Pods Tt - Hf
	370.4	380.4	10.0		.10				96	2.65							.10										90		SP											Mb; sp clay alt
	380.4	390.0	9.6		.30		.06		98	2.50							.30				Tr	Tr					20	SP	65				5			Hf	381.0	grad	Mb; as above to 381.0, then Hf, sp clay - blk chlor vning Tr suls

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-159
Page 2 of 2 Pages
Collar Elev 3102.77 Final Depth 634.4
Coords. N 36,058.85 E 19,594.25
Inclination Vert
Logged by FTG - CWH
Date: Start 6/21/63 Finish 7/16/63

Depth From	Depth To	Depth Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	GARNITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
390.0	395.9	5.9		.46		.06		95	2.60							.46			SP					Tr	30	15	45		5	Tr		SP					HF; mod clay alt. Tr suls
395.9	404.6	8.7		.09				95	2.65						.02	.07		Tr	SP						15	15	45		SP					Mz	398.8	50°	HF, mod chlor pods, mod Mb to 398.8, then Mz; wk alt, wk cal vning
404.6	413.4	8.8		.04				93	2.64						.04				Tr							Tr			Tr			Tr					Mz; sp clay alt. Tr cal vning
413.4	423.8	10.4		.05				85	2.55						.02	.03										5	SP	10		SP			SP		HF	422.0	grad	Mz; as above to 422.0, then HF, sp clay - silicif. Tr suls (St alt Mz?)
423.8	433.2	9.4		.17				92	2.83							.17					Tr			Tr	70	5	15						SP	Mb	425.3	broken	HF, mod clay alt, tr suls to 425.3, then Mb; pods clay - gar. Tr suls
433.2	442.8	9.6		.15				96	2.72							.15									85	SP	5					Tr					Mb; discont veins gar Tr suls
442.8	452.7	9.9		.28				88	2.73							.28		Tr							20	SP	65					5		HF	444.9	grad	Mb, sp suls to 444.9, then HF, mod clay - chlor vning. Sp suls
452.7	462.2	9.5		.35				92	2.67							.35				Tr					10	Tr	75					10					HF, as above
462.2	471.9	9.7		.29				89	2.78							.29									10		85					SP					HF, mod diss chlor grad to mod clay alt - sp cal vning. Sp suls
471.9	477.7	5.8		.17				73	2.99							.17									5		75		10		SP						HF, mod clay - sp suls to 476.6, then Ftt - pat clay, bx frags
477.7	487.0	9.3		.22				68	2.50							.22									SP	15	70		5		5						HF, sp clay alt. Gry patches. Sp suls - Tt patches
487.0	495.7	8.7		.26		.03		97	2.99							.26			SP					Tr		10	30	55		SP					Tt	488.0	grad	HF; as above to 488.0, then Tt, mod clay - cal vning. Mod - st sul vning (vert)
495.7	505.4	9.7		.68		.03		78	3.31							.68			SP		Tr			SP		15	65	10										Tt, st vert sul - cal vning grad to mod diss suls. Patches HF
505.4	512.2	6.8		.18		.02		91	3.27							.18								Tr		10	70	15										Tt, st gar, mod sul vning
512.2	516.9	4.7		.13				100	2.65							.13										10	55	30				Tr						Tt, dense, st gar. Tr suls
516.9	524.7	7.8		.08				98	3.30							.08										10	80	5										Tt, dense, st yel gar w areas sp clay. Tr suls, cal vning. Tr blk gar?
524.7	534.1	9.4		.31		.01		91	2.64							.31				Tr						15	15	65							HF	525.0	grad	Tt, as above to 525.0, then HF, mod clay alt w sp sul vning. Sp pods Tt
534.1	543.2	9.1		.133		.01		86	2.81							.133		5	SP							5	5	65		5			15					HF, mod clay - cal vning - chlor vning. St diss + vnlt suls
543.2	552.8	9.6		.38		.02		73	2.84							.38		5	Tr							10	5	70		5			5					HF, mod clay - cal - chlor vning grad to sp clay w. sp sul vning
552.8	562.7	9.9		.44	548	.02	548	89	2.49							.44		Sp	Tr							10	Sp	65		Sp			25					HF, sp clay - suls to 557.7, then dense, st grn - blk chlor w mod sul vning
562.7	571.3	8.6		.51	.61	.02	.02	95	2.89							.51		5								10	15	55		10			5					HF, sp clay - chlor on sh. Sp diss + vnlt suls
571.3	579.0	7.7		.15		.01		91	3.25							.15		Sp								10	45	40		5	Sp		Tr		Tt	574.5	grad	HF, as above to 574.5, then Tt, st gar, areas mod clay. Tr suls.
579.0	588.9	9.9		.77		.01		86	3.11							.77		5								10	65	15		sp		5						Tt, sp clay alt. Patches st gar. Tr suls
588.9	595.2	6.3		.36				96	2.60							.36		SP						Tr	10	20	35		10	SP	SP	SP			Dp	593.4	broken	Tt, mod - st clay - chlor alt to 593.4, then Dp, wk silicif - feldspath
595.2	603.9	8.7		.11				48	2.60							.11									Tr				SP									Dp, sp clay alt. Tr blk incl
603.9	610.1	6.2		.49		.03		95	2.55							.49													5									Dp; patches sp silicif. Gry areas
610.1	619.0	8.9		.24		.01		98	2.65							.24													SP			Tr	Tr					Dp, sp silicif. Tr suls
619.0	623.3	4.3		.52		.02		86	3.04							.52										5	40	5							Tt	620.8	45°	Dp, as above to 620.8, then Tt, st gar. Tr cal vning. Mod suls
623.3	634.4	11.1		.19				75	2.67							.19			Tr							Tr	SP			Tr	Tr				Dp	623.7	45°?	Tr, tr suls, st gar. CT brkn. Dp wk alt, tr. suls.

Av. Rec. = 91%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5% Moderate (Md) 5-50% Strong (St) + 50%

Note (3)
Tt - Toctite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Docite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-166
Page 1 of 1 Pages
Collar Elev. 2957.23 Final Depth 355.6
Coords N 135,773.67 E 19,052.45
Inclination Vert
Logged by FTG - CWH
Date: Start 9/6/63 Finish 9/19/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N.S	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Wh. Qtz	QUARTZ	CHLORITE	JAROSITE	GYPSUM	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC std 2.750	0.0	7.0	7.0		.17		.14		30	2.60	.14					.03			SP											SP	5	Tr		Tr	Tr		Dp	0.0	-	Dp; leached; brkn; sp clay alt
NC 2.400	7.0	13.6	6.6		.16		.08		76	2.55	.08					.08														1	5	1		1	1					Dp; as above w ggy areas
	13.6	21.9	8.3		.11		.08		90	2.57	.08					.03														1	5	1		1	1					Dp; leached; mod clay alt w pod st jaro - 1mm
	21.9	31.2	9.3		.12		.06		83	2.59	.04	.01	.01			.06														1	5	1		1	1					Dp, leached; med clay alt w ggy patches.
	31.2	39.5	8.3		.06				32	2.55	.03		.01			.02														1	SP	1		1	1					Dp; leached; mod clay alt
	39.5	49.1	9.6		.01				63	2.38	.03		.01			.02														15	40	1			1					Dp; leached; int clay alt w patches Do bx Flt zone
	49.1	58.4	9.3		.06				86	2.53			.01	.03		.02														15	30	1			1					Dp, int clay alt w bx patches to 54.9 then sp clay alt
	58.4	64.3	5.9		.13		.12		69	2.56			.02	.10		.01														10	30	1	5		1					Dp; med clay - silicif w ggy areas, Peds Mz, grad to st clay alt
	64.3	69.5	5.2		.15		.10		89	2.53			.01	.09		.05														10	20	1			1		Mz	64.3	brkn	Mz; mod clay - feldspath Tr CuOx.
	69.5	78.2	8.7		.36				74	2.58			.02	.30		.04														5	5	1			1					Mz; leached, sp clay - feldspath Sp CuOx Tr Dp incl
	78.2	86.3	8.1		.34				94	2.56			.02	.30		.02														5	15	1			1					Mz, leached, mod clay alt Sp CuOx - ads Cu
	86.3	94.2	7.9		.37				98	2.54			.03	.20		.14				Tr										10	35				1		Dp	89.3	brkn	Mz; leached, mod clay alt to 89.3, then Dp; st clay alt, Areas blk gg (Sheared?)
	94.2	102.6	8.4		.32				95	2.56		.01	.02	.27		.02						Tr								15	45				1					Dp, leached, st clay alt w dk grn-gy incl (HF - SHst) Sp CuOx.
	102.6	112.0	9.4		.17				95	2.59		.01	.01	.11		.04														5	10				1					Dp, leached, sp alt w peds st clay alt Areas wk bx Tr sulf - CuOx
	112.0	122.0	10.0		.11				84	2.63		.01	.01	.06		.03														SP	5		Tr		1	Tr				Dp, sp clay alt Tr sulf Tr dk incl
	122.0	130.5	8.5		.08				97	2.61			.01	.04		.03														10	25				1		Mz	125.5	brkn	Dp, as above to 125.5, then Mz, leached, st clay alt. Bubbly text
	130.5	139.6	9.1		.05				84	2.44			.01	.03		.01						Tr								10	30				1		Dp	135.0	brkn	Mz, st to int clay-jaro alt to 135.0, then Dp, med clay - hem - chlor alt
	139.6	146.6	7.0						-	-																														Drift
	146.6	151.6	5.0		.03				90	2.68			.01	.02					Tr	Tr										SP	5		Tr	Tr	Tr					Dp; leached w sp sulf, mod silicif w aplitic text
NX 1.875	151.6	160.2	8.6		.06				94	2.66				.02		.02	.02					Tr					SP	SP	25	Tr	5	SP	35	5			Hf	151.7	brkn	Dp; as above to 151.7, then Hf, dense, mod silicif Sp peds Tr w sp hem
	160.2	169.5	9.3		.20				86	2.62				.02		.08											5	1	35	SP	10	1	30	20						Hf, mod silicif w chlor blebs + mod sul veining grad to mod clay Sp SHst
	169.5	176.7	7.2		.04				62	2.61				.03		.01											5		10	1	5	1	25	5						Hf - SHst, mod silicif - chlor Sp clay alt
	176.7	186.8	10.1		.03				50	2.43				.02		.01											SP		5	1	SP		10	SP		Dp	181.9	brkn	Hf - SHst, as above to 181.9, then Dp; sp alt, sp clay ends
	186.8	195.6	8.8		.03				94	2.53		Tr		.02		.01											SP			1	5			Tr						Dp, sp alt Patches mod clay - feldspath (Mz? - HF?)
	195.6	204.0	8.4		.06				86	2.64				.01		.05											Tr				SP	Tr		1						Dp, dense, sp silicif Tr sulf.
	204.0	214.8	10.8		.07				91	2.62						.07											1				1	1		1						Dp; as above 6' patch Ap
	214.8	225.1	10.3		.05				95	2.59						.05											1				1	1		1						Dp brkn; sp clay - silicif Tr sulf.
	225.1	233.5	8.4		.08				86	2.64						.08											1				Tr	1	Tr	1						Dp, sp silicif Tr bio flakes Tr sulf
	233.5	242.7	9.2		.15				92	2.64						.15											1				1	1		1						Dp, as above w sp dk incl
	242.7	252.3	9.6		.37				98	2.73						.37											1				1	1		SP						Dp, dk phase (Ap) w sp col veining grad to sp silicif Tr sulf.
	252.3	260.8	8.5		.10				94	2.63						.10											1				SP	1		Tr						Dp; sp silicif - clay on shears Tr sulf
	260.8	269.5	8.7		.07				90	2.63						.07								Tr			1				Tr	1		1						Dp, tr silicif Tr incip feldspath on sh Tr sulf, dk incl
	269.5	276.4	6.9		.04				94	2.63						.04								1	Tr		1				1	1		1						Dp patches sp clay alt Tr dk incl Tr sulf
	276.4	285.3	8.9		.05				49	2.68						.05											1				1	1		1						Dp, tr silicif Tr feldspath, sulf
	285.3	293.4	8.1		.04				94	2.67						.04											1				10	1		1						Dp; as above w ggy - brkn area
	293.4	303.3	9.9		.11				72	2.62						.11											1				SP	1		1						Dp; as above w incl Ap? Sp sulf
	303.3	309.0	5.7		.06				90	2.61						.06											1				Tr	1		1						Dp, mod shearing, sp silicif - spotty sp feldspath Tr sulf
	309.0	317.8	8.8		.04				95	2.61						.04								Tr			1				SP	1		1						Dp, wk alt Tr sulf
	317.8	326.2	8.4		.05				98	2.62						.05											1				1	1		1						Dp, as above
	326.2	335.0	8.8		.04				83	2.63						.04											1				1	1		1						Dp, mod shearing, sp alt Tr sulf
	335.0	344.6	9.6		.05				77	2.61						.05											1				1	1		1						Dp, brkn patches w sp clay alt Tr sulf
	344.6	352.4	7.8		.03				91	2.62						.03											1				1	1		1						Dp, brkn w sp alt Tr sulf
	352.4	355.6	3.2		.02				100	2.63						.02											1				1	1		1						Dp, wk alt
							Av	Rec =	83%																															
						END	OF	HOLE																																

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

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(1) Est. % Cu represented by each mineral

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Note (3)
Tt - Tactite
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V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-160
Page 1 of 1 Pages
Collar Elev 3055.91 Final Depth 2548
Coords N 36,048.96 E 19,204.47
Inclination Vert
Logged by FTG - CWH
Date: Start 7/17/63 Finish 7/31/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	5.0	5.0		—		—		—	—																													Rock bit
NS 2.400	5.0	9.4	4.4		.49		.47		64	2.56	.20	.02	.02	.25			.02		SP	Tr						20	5	60		10	5		SP	Tr	Hf	5.0	-	Hf, leached; sp clay - jaro alt
	9.4	18.0	8.6		.54		.46		91	2.85	.20	.01	.01	.24			.08		1	1						15	5	65		5	Tr		5	1				Hf, leached, sp clay alt. Patches sp chlor vning. Sp chry. Pods Tt
	18.0	26.9	8.9		.61		.46		89	2.93	.15	.04	.01	.26			.15		1	1						15	10	50		10			10	1				Hf, leached, mod chlor - sil vning. Mod Tt w, mod clay + tr hem - CuOx
	26.9	34.8	7.9		1.70	63.0 @ .89	1.47	63.0 @ .72	86	2.96	.75	.02	.03	.67			.23		5	1		Tr				10	65	15		SP			5		Tt	26.9	grad	Tt, leached, st gar w sp hem - CuOx. 1.5 ft patch garnetized Mz?
	34.8	41.0	6.2		.53		.48		95	2.71	.10		.01	.37			.05		SP	1		1				80	15	SP		1			SP		Mb	36.0	brkn	Tt, as above to 36.0, then Mb; leached; tr voggy. Tr pods lim.
NS 1.875	41.0	49.3	8.3		1.00		.87		92	2.89		.01	.01	.85		.05	.08		1	1		1				80	15	1		1			1		Tt	41.8	grad	Mb, leached, tr lim to 41.8, then Tt; leached; mod gar - hem - lim. Mod CuOx, Mb
	49.3	58.7	9.4		1.24		1.06		100	2.63	.30	.01	.01	.74		.05	.13		1	1	Tr					20	5	55		5			5	5	Hf	49.3	grad	Hf, mod jaro - chlor vning. Tr CuOx. Incr Mb
	58.7	68.0	9.3		.43		.39		84	3.03			.01	.38		.01	.03		1	1						45	10	30		5			SP	Tr	Mb	58.7	grad	Mb, leached; mod lim - gar vning w mod CuOx. Tr Hf
	68.0	77.1	9.1		.25		.24		91	2.87			.01	.23			.01		1	1		Tr				85	10	SP		SP								Mb; leached, sp lim vning. 1 ft pods Tt w st hem - CuOx
	77.1	86.1	9.0		.12		.10		93	2.70			.01	.09			.02		Tr	1						90	5	1		1								Mb; leached; sp lim vning.
	86.1	94.6	8.5		.38		.28		98	2.66		.02	.01	.25			.10		5	1		SP				90	SP	1		1								Mb; leached; sp lim - clay vning. 1 ft pod int lim - CuOx @ 93.0'
	94.6	104.4	9.8		.40		.33		91	2.68	.15	.01	.02	.15			.07		SP			Tr				100	Tr-Tr			1			Tr					Mb, leached. lim cavities. Sp pods Tt w tr hem
	104.4	113.9	9.5		.67	47.9 @ 1.07	.62	47.9 @ .94	97	2.66	.18	.02	.02	.40			.05		1	Tr		5				80	10	1		5			1					Mb, as above w incr Tt w hem vning
	113.9	123.0	9.1		.74		.66		95	2.70	.23	.02	.01	.40			.08		5	1		5				80	5	5		Sp			1					Mb, leached, pods int clay - lim - hem.
	123.0	133.2	10.2		2.27		2.01		73	2.90	.20	.05	.01	1.75			.26		5	1		15				25	40	5		10			Sp		Tt	124.4	brkn	Mb, as above to 124.4, then Tt; mod clay - hem. Patches int lim CuOx
	133.2	142.5	9.3		1.21		1.01		80	3.15	.10	.02	.01	.88			.20		5	1		15				10	50	10		10			1					Tt, as above
	142.5	152.1	9.6		.12				79	2.58			.01	.07		.02	.02		10	1				Tr	SP	10	10	40		15	SP		10		Hf	142.5	brkn	Hf, mod silicif w irreg st silicif Mz to 145.0, then chlor - sul tr grad to st lim
	152.1	160.1	8.0		.30				76	2.54				.07		.07	.16		10	SP						10	5	40		20		SP	15					Hf, alternate patches st lim - clay w chlor - sul. Mod tr throughout
	160.1	163.7	3.6		.26				66	3.04				.05		.05	.11		Tr	5						15		50		10		5	10					Hf, patches chlor grad to st qtz - py alt. Sp col vning
	163.7	174.7	11.0		.35				88	3.06						.03	.32		1	5		Tr				15		50		5			25		Dp	173.2	45°	Hf as above plus patches st. gar. Dp ct leached
	174.7	184.0	9.3		.23				86	2.66				.06			.17		1	SP					Tr	Tr				SP	5	15	Tr	SP					Dp, wk alt, gen. leached but tr of sulf. Qtz'g in areas.
	184.0	191.4	7.4		.26		.04		74	2.59				.04		.10	.12		SP	Tr						5		15		15	5		SP	1				Dp, wk alt, st. leached, tr sulf, st brkn, st qtz'g areas
	191.4	201.3	9.9		.41		.06		72	2.80		Tr	.01	.05			.30	.05	1	SP		Tr				10	35	20		15	5		1	1	Hf	192.1	brkn	Dp as above to 8.5, st leaching decr. down from ct. Hf st. chlor
	201.3	206.0	4.7		.42	33.0 @ .63	.07	33.0 @ .05	95	2.64			.01	.06			.30	.05	5	1						20	25	40		5			1	Tr				Hf, st chlor, wk sulf, mainly py. from 20 to 1, st brn col, st leach
	206.0	214.4	8.4		.42		.05		80	3.21				.05			.32	.05	SP	1						15	40	20		5	SP	10	5		Tt	206.0	brkn	Tt, partly leached w sp CuOx. Mod col vning w sp sul vning. 1 ft pod qtz
	214.4	224.4	10.0		1.12		.04		85	2.76				.04			.08		1	5						10	15	10		5	1	5	SP		Mz	217.1	grad	Tt, as above to 217.1, then Mz; sp lim - sulf. Mod silicif. Pods st sulf
	224.4	228.1	3.7		.37		.02		86	2.82							.37			5							Tr			SP		30						Mz; mod silicif. Sp sulf.
	228.1	236.2	8.1		.31		.02		85	2.61							.25	.03	.03	SP							Tr			Tr		15			Dp	230.0	brkn	Mz, as above to 230.0, then Dp; st silicif Tr sulf.
	236.2	243.9	7.7		.38		.06		89	2.54				.06			.19	.03	Tr	Tr							1			SP		SP		Tr	Mz	236.5	brkn	Dp, as above to 236.5, then Mz, sp silicif. Sp lim - jaro on sh. Tr CuOx
	243.9	252.4	8.5		.23		.15		84	2.56				.15			.06	.02	1	1							1			1	SP	10		1				Mz; as above
	252.4	254.8	2.4		.21		.05		89	2.56				.05			.18	.04	1	1							1			1	1	5		1				Mz; as above

Av Rec. = 86%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Stong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-160
Page 1 of 1 Pages

Collar Elev 3055.91 Final Depth 2548
Coords N 36,048.96 E 19,204.47
Inclination Vert
Logged by FTG - CWH
Date: Start 7/17/63 Finish 7/31/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pritch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	5.0	5.0		—		—		—	—																													Rock bit
NC 2.400	5.0	9.4	4.4		.49		.47		64	2.56	.20	.02	.02	.25			.02		SP	Tr							20	5	60		10	5	SP	Tr	Hf	5.0	-	Hf, leached; sp clay - jaro alt
	9.4	18.0	8.6		.34		.46		91	2.85	.20	.01	.01	.24			.03		1	1							15	5	65		5	Tr	5	1				Hf, leached, sp clay alt. Patches sp chlor vning. Sp chry. Pods Tt
	18.0	26.9	8.9		.61		.46		89	2.93	.15	.04	.01	.26			.15		1	1							15	10	50		10		10	1				Hf, leached, mod chlor - sul vning. Mod Tt w, mod clay + tr hem - CuOx
	26.9	34.8	7.9		1.70	63.0 .84	1.47	63.0 .72	86	2.96	.75	.02	.03	.67			.23		5	1		Tr					10	65	15		SP		5		Tt	26.9	grad	Tt, leached, st gar w sp hem - CuOx. 1.5 ft patch garnetized Mz?
	34.8	41.0	6.2		.53		.48		95	2.71	.10		.01	.37			.05		SP	1		1					80	15	SP		1		SP		Mb	36.0	brkn	Tt, as above to 36.0, then Mb; leached; tr vuggy. Tr pods lim.
NC 1.875	41.0	49.3	8.3		1.00		.87		92	2.89		.01	.01	.85		.05	.08		1	1		1					80	15	1		1		1		Tt	41.8	grad	Mb, leached, tr lim to 41.8, then Tt; leached; mod gar - hem - lim Mod CuOx, Mb
	49.3	58.7	9.4		1.24		1.06		100	2.63	.30	.01	.01	.74		.05	.13		1	1	Tr						20	5	55		5		5	5	Hf	49.3	grad	Hf, mod pro - chlor vning. Tr CuOx. Incr Mb
	58.7	68.0	9.3		.43		.39		84	3.03			.01	.38		.01	.03		1	1							45	10	30		5		SP	Tr	Mb	58.7	grad	Mb; leached; mod lim - gar vning w mod CuOx Tr Hf
	68.0	77.1	9.1		.25		.24		91	2.87			.01	.23			.01		1	1		Tr					85	10	SP		SP							Mb; leached, sp lim vning 1 ft pods. Tt w st hem - CuOx
	77.1	86.1	9.0		.12		.10		93	2.70			.01	.09			.02		Tr	1							90	5	1		1							Mb; leached; sp lim vning.
	86.1	94.6	8.5		.38		.28		98	2.66		.02	.01	.25			.10		5	1		SP					90	SP	1		1							Mb; leached; sp lim - clay vning 1 ft pod int lim - CuOx @ 93.0'
	94.6	104.4	9.8		.40		.33		91	2.68	.15	.01	.02	.15			.07		SP			Tr					10	Tr	Tr		1			Tr				Mb, leached, lim cavities. Sp pods Tt w tr hem
	104.4	113.9	9.5		.67	4.79 .1.07	.62	4.79 .94	97	2.66	.18	.02	.02	.40			.05		1	Tr		5					80	10	1		5			1				Mb, as above w incr Tt w hem vning
	113.9	123.0	9.1		.24		.66		95	2.70	.23	.02	.01	.40			.08		5	1		5					80	5	5		SP			1				Mb, leached, pods int clay - lim - hem.
	123.0	133.2	10.2		2.27		2.01		73	2.90	.20	.05	.01	1.75			.20		5	1		15					25	40	5		10		SP	1	Tt	124.4	brkn	Mb, as above to 124.4, then Tt, mod clay - hem. Patches int lim CuOx
	133.2	142.5	9.3		1.21		1.01		80	3.15	.10	.02	.01	.88			.20		5	1		15					10	50	10		10							Tt, as above
	142.5	152.1	9.6		.12				79	2.58			.01	.07		.02	.02		10	1				Tr	SP		10	10	40		15	SP	10		Hf	142.5	brkn	Hf, mod silicif w irreg st silicif Mz to 145.0, then chlor - sul bx grad to sl lim
	152.1	160.1	8.0		.30				76	2.54				.07		.07	.10		10	SP							10	5	40		20	SP	15					Hf, alternate patches st lim - clay w chlor - sul Mod bx throughout
	160.1	163.7	3.6		.26				66	3.04				.05		.05	.11		Tr	5							15		50		10	5	10					Hf, patches chlor grad to st qtz - py alt. Sp cal vning
	163.7	174.7	11.0		.35				88	3.06						.03	.32		1	5		Tr					15		50		5		25		Dp	173.2	45°	Hf as above plus patches st. gar. Dp ct leached
	174.7	184.0	9.3		.23				86	2.66				.06			.17		1	SP					Tr	Tr					SP	5	15	Tr	SP			Dp, wk alt, gen. leached, but tr of sols. Qtz'g in areas.
	184.0	191.4	7.4		.26		.04		74	2.59				.04		.10	.12		SP	Tr							5		15		15	5		SP	1			Dp, wk alt, st. leached, tr sols, st brkn, st qtz'g areas
	191.4	201.3	9.9		.41		.06		72	2.80		Tr	.01	.05		.30	.05		1	SP		Tr					10	35	20		15	5		1	1	Hf	192.1	brkn	Dp as above to ct. st leaching decr. down from ct. Hf st. chlor
	201.3	206.0	4.7		.42	33.0 .63	.07	33.0 .05	95	2.64			.01	.06		.30	.05		5	1							20	25	40		5			1	Tr			Hf, st chlor, wk sols, mainly py. From 200 to 1, st brkn cal, st lim
	206.0	214.4	8.4		.42									.05		.32	.05		SP	1							15	40	20		5	SP	10	5		Tt	206.0	brkn	Tt, partly leached w sp CuOx. Mod cal vning w sp sul vning 1 ft pod qtz
	214.4	224.4	10.0		1.12		.04		85	2.76				.04		.108			1	5							10	15	10		5	1	5	SP		Mz	217.1	grad	Tt, as above to 217.1, then Mz; sp lim - sulb Mod silicif. Pods st sulb
	224.4	228.1	3.7		.37		.02		86	2.82						.37				5							Tr				SP		30					Mz; mod silicif. Sp sulb.
	228.1	236.2	8.1		.31		.02		85	2.61						.25	.03	.03		SP							Tr				Tr		15			Dp	230.0	brkn	Mz, as above to 230.0, then Dp; st silicif Tr sulb.
	236.2	243.9	7.7		.28		.06		89	2.54				.06		.19	.03		Tr	Tr							1				SP		SP		Tr	Mz	236.5	brkn	Dp, as above to 236.5, then Mz, sp silicif. Sp lim - jaro on sh Tr CuOx
	243.9	252.4	8.5		.23		.15		84	2.56				.15		.06	.02		1	1							1				1	SP	10		1				Mz; as above
	252.4	254.8	2.4		.21		.05		89	2.56				.05		.18			1	1							1				1	1	5		1				Mz; as above

Av Rec. = 86%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-161
Page 1 of 2 Pages
Collar Elev. 3079.54 Final Depth 650.0
Coords. N 38,062.44 E 19,871.58
Inclination Vert
Logged by ETG - CWH
Date: Start 7/17/63 Finish 8/6/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	11.0	11.0																																				
NC 2.400 11.0	19.7	8.7		.04				88	2.47	.04								SP			Tr							Tr	SP	Tr			Tr	Dp	11.0	-	Dp, leached, tr liv. lim Sp clay alt Patches Dp bx
19.7	26.6	6.9		.06				90	2.56	.06																												Dp, leached, sp clay alt. 6" pod Mz
26.6	35.7	9.1		.07				83	2.40	.07																							SP					Dp, leached, sp clay alt Silicif. patches Patches liv. lim
35.7	43.5	7.8		.07				92	2.51	.07																												Dp, leached, sp clay alt Mod liv lim assoc w patches Dp sm. veins alunite
43.5	48.6	5.1		.05				86	2.51	.05								Tr															S					Dp, as above
48.6	56.0	7.4		.07				94	2.55	.07																							Tr					Dp, as above Tr Mz pods
56.0	64.2	8.2		.06				98	2.54	.05					.01				Tr																			Dp, leached w tr py. Sp clay - silicif. Tr liv lim
64.2	73.6	9.4		.04				83	2.50	.04																		SP	10				S					Dp, as above
73.6	83.4	9.8		.10				95	2.58	.03					.07				Tr										10									Dp, mod clay alt Sp suls Tr CuCo. Mod bx text. Sp incl
83.4	92.3	8.9		.08				91	2.56	.02					.06														10									Dp, mod clay alt w wkly patches Sp suls Tr Hp incl
92.3	102.5	10.2		.08				81	2.61						.08														5				Tr					Dp, mod clay alt w bx text grad to sp clay alt in dk Dp? Sp suls
NX 1.875 102.5	111.3	8.8		.05				93	2.74						.05						Tr							Tr	SP									Dp, sp clay alt. wk alt. patches Tr suls
111.3	120.3	9.0		.06				92	2.67						.04	.02																						Dp, as above Tr gaio on sh
120.3	128.0	7.7		.06				86	2.64						.06														5									Dp, sp clay alt w sp gaio Gay areas Tr suls
128.0	137.3	9.3		.07				95	2.69						.07														SP			Tr						Dp, wk alt. Tr dk incl Tr suls
137.3	146.8	9.5		.06				94	2.68						.06			Tr																				Dp, as above Tr vugginess
146.8	154.2	7.4		.06				100	2.69						.06																							Dp, as above
154.2	163.3	9.1		.04				100	2.71						.04														Tr									Dp, wk alt Sp incl Tr sul vning
163.3	172.8	9.5		.06				94	2.70						.06																							Dp, as above
172.8	181.0	8.2		.09				95	2.70						.09																							Dp, as above Silicif patches Tr pods feldspath
181.0	190.4	9.4		.08				97	2.67						.08										Tr													Dp, wk alt Tr cal vning Sp incl Tr suls
190.4	198.9	8.5		.06				100	2.69						.06																							Dp, as above
198.9	208.1	9.2		.12				94	2.73						.12																							Dp, as above Silicif patches
208.1	215.9	7.8		.10				98	2.66						.10												Tr											Dp, as above Vuggy patches
215.9	224.9	9.0		.06				98	2.70						.03	.03																						Dp, wk alt. Sp ang incl. Tr suls Tr cal blobs
224.9	233.8	8.9		.06				95	2.85						.03	.03																						Dp, wk alt Sp incl Tr suls. Tr cal vning
233.8	241.0	7.2		.06				84	2.74							.06																						Dp, as above
241.0	245.8	4.8		.05				94	2.73							.05																						Dp, as above
245.8	254.6	8.8		.07				100	2.72							.07			Sp																			Dp, as above
254.6	264.0	9.4		.07				94	2.69							.07																						Dp, as above
264.0	273.5	9.5		.06				93	2.70							.06																						Dp, as above Tr barite? w cal
273.5	281.3	7.8		.07				96	2.68							.07																Tr						Dp, as above
281.3	290.1	8.8		.07				95	2.70							.07											Tr											Dp, wk alt. Tr vugginess. Mod ang incl
290.1	298.2	8.1		.04				96	2.70							.04			Tr																			Dp, as above w sp cal vning
298.2	307.5	9.3		.03				100	2.70							.03																						Dp, as above
307.5	313.4	5.9		.04				88	2.67							.04																						Dp, as above
313.4	323.0	9.6		.03				99	2.65							.03									SP													Dp, wk silicif w tr sul vning. Tr cal vning. ang incl.
323.0	331.9	8.9		.04				98	2.65							.04			SP						S													Dp, wk silicif w tr suls. Sp vugginess w tr cal
331.9	341.4	9.5		.14				97	2.72							.14			Tr						Tr													Dp, spotty alt, showing feldspatization. Sc. dk. incl.
341.4	351.2	9.8		.08				93	2.70							.08													SP									Dp, spotty alt gives salt & pepper look. St gte incl's?
351.2	360.4	9.2		.05				97	2.69							.05									SP													Dp, as above, plus tr cp dots
360.4	371.7	11.3		.07				90	2.69							.07									Tr													Dp, as preceeding plus numerous inclusions
371.7	380.6	8.9		.05				96	2.68							.05													Tr									Dp, as above
380.6	388.8	8.2		.10				80	2.72							.10											SP											Dp, alt fades in and out. Sc incl's. Sp py
388.8	394.5	5.7		.06				100	2.81							.06											Tr											Dp, as above

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-161
Page 2 of 2 Pages
Collar Elev 3079.54 Final Depth 650.0
Coords. N 38,062.44 E 19,871.58
Inclination Vert
Logged by FTG - CWH
Date: Start 7/17/63 Finish 8/6/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg.	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
394.5	403.2	8.7		.04				100	2.52							.04			Tr							Tr				Tr			Tr		Mz	395.6	brkn	Dp; wk alt to 395.6, then Mz; wk alt; mod 2nd fspar. Tr py
403.2	412.0	8.8		.01				94	2.61							.01																						Mz, as above
412.0	417.9	5.9		.02				100	2.65							.02												Tr	SP									Mz; as above w ggy areas
417.9	427.4	9.5		.05				100	2.63							.05													Tr									Mz; as above
427.4	430.6	3.2		.08				92	2.60							.08																						Mz; tr alt. Tr suls
430.6	439.4	8.8		.04				98	2.64							.04																						Mz, as above
439.4	449.0	9.6		.04				87	2.65							.04													SP									Mz, as above grad to sp clay an sh. Tr suls
449.0	459.8	10.8		.07				80	2.63							.07									SP						S			Dp	453.0	15°	Mz; as above w matrix grad to buff to 453.0, then Dp; sp alt Tr suls
459.8	467.1	7.3		.03				92	2.65							.03															SP							Dp, sp alt. Sg on sh. Tr suls
467.1	477.1	10.0		.01				94	2.64							.01									Tr				Tr					Mz	489.0	50°	Dp, as above to 489.0 then Mz, tr alt Tr suls Tr 2ndary fspar
Bx 1.432 → 477.1	484.2	7.1		.02				100	2.63							.02																						Mz; tr alt - suls - 2nd kspar
484.2	493.5	9.3		.04				99	2.56							.04																						Mz; as above
493.5	503.0	9.5		.01				100	2.64							.01																						Mz, bla on sh. Tr suls
503.0	507.6	4.6		.01				94	2.64							.01															SP			Dp	506.0	brkn	Mz; as above to 506.0, then Dp, mod state incl Tr py
507.6	516.6	9.0		.02				97	2.70							.02															Tr							Dp, wk alt. Areas mod incl. Tr suls
516.6	526.2	9.6		.03				94	2.68							.03							Tr															Dp; as above w feldspath patches. Sp py assoc w. cby-cal blebs
526.2	535.5	9.3		nil				98	2.68							nil																						Dp, tr alt. Patches mod incl. Tr suls
535.5	544.5	9.0		.04				98	2.68							.04																						Dp; as above
544.5	554.6	10.1		.01				88	2.70							.01																						Dp; tr alt. Tr suls
554.6	563.6	9.0		.03				98	2.69							.03								Tr														Dp, as above 0.3 ft patch cal w cpy-sl.
563.6	572.4	8.8		.03				98	2.71							.03																						Dp; tr alt Patches w. mod incl Tr suls
572.4	582.3	9.9		.06				93	2.68							.06																						Dp, tr alt. Patches whitish bx w. sp sl-gn Tr suls
582.3	591.4	9.1		.05				98	2.72							.05																						Dp tr alt w patches mod incl Tr alt
591.4	601.4	10.0		.02				90	2.67							.02							Tr	Tr														Dp; tr alt Patches bx w. tr sl-gn cal
601.4	611.2	9.8		.04				94	2.69							.04															SP							Dp: mod siliceous incl Mod dk-ang incl Sp sul vning
611.2	620.8	9.6		.04				89	2.68							.04															Tr							Dp; patches mod siliceous incl (nearly intr bx) w. areas Dp w. tr alt
620.8	630.0	9.2		.03				84	2.82							.03																						Dp, tr alt w. tr dk-ang. Silicif patches. Tr suls.
630.0	639.2	9.2		.03				88	2.71							.03																						Dp, wk alt. Patches Dp bx (incl?) w tr cal
639.2	650.0	10.8		.05				87	2.70							.05							Tr															Dp; silicif patches. Patches Dp bx? (incl?) w. tr cpy-sl.

Av. Rec. = 94%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
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Note (4)
V - Vein
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C - Contact
Ig - Undif igneous

Hole No. D-161
Page 1 of 2 Pages
Collar Elev. 3079.54 Final Depth 650.0
Coords N 38,062.44 E 19,871.58
Inclination Vert
Logged by FTG - CWH
Date: Start 7/17/63 Finish 8/6/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chys	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	11.0	11.0																																					
NS 2.408	11.0	19.7	8.7		.04				88	2.47	.04								SP			Tr							Tr	SP	Tr			Tr		Dp	11.0	-	Dp, leached, tr liv lim Sp clay alt Patches Dp bx
	19.7	26.6	6.9		.06				90	2.56	.06																													Dp, leached, sp clay alt. 6" pod Mz
	26.6	35.7	9.1		.07				83	2.40	.07																							SP						Dp; leached, sp clay alt Silicif patches Patches liv lim
	35.7	43.5	7.8		.07				92	2.51	.07																													Dp, leached, sp clay alt Mod liv lim assoc w patches Dp bx Veins alunite
	43.5	48.6	5.1		.05				86	2.51	.05								Tr															S						Dp, as above
	48.6	56.0	7.4		.07				94	2.55	.07																							Tr						Dp, as above Tr Mz pods
	56.0	64.2	8.2		.06				98	2.54	.05					.01				Tr																				Dp, leached w tr py Sp clay - subsilic. Tr liv lim
	64.2	73.6	9.4		.04				83	2.50	.04																		SP	10				S						Dp, as above
	73.6	83.4	9.8		.10				95	2.58	.03					.07				Tr										10										Dp, mod clay alt Sp suls Tr Cu Cr. Assoc bx text. Sp incl
	83.4	92.3	8.9		.08				91	2.56	.02					.06														10										Dp, mod clay alt w broken patches Sp suls Tr Hp incl
	92.3	102.5	10.2		.08				81	2.61						.08														5				Tr						Dp, mod clay alt w bx text grad to sp clay alt in dk Dp? Sp suls
NS 1.875	102.5	111.3	8.8		.05				93	2.74						.05						Tr							Tr	SP										Dp, sp clay alt. wk alt. patches Tr suls
	111.3	120.3	9.0		.06				92	2.67						.04	.02																							Dp, as above Tr gaio on sh
	120.3	128.0	7.7		.06				56	2.64						.06														S										Dp, sp clay alt w sp gaio. Gray areas Tr suls
	128.0	137.3	9.3		.07				95	2.69						.07														SP			Tr							Dp, wk alt. Tr dk incl Tr suls
	137.3	146.8	9.5		.06				94	2.68						.06			Tr																					Dp, as above Tr vuggyness
	146.8	154.2	7.4		.06				100	2.69						.06																								Dp, as above
	154.2	163.3	9.1		.04				100	2.71						.04														Tr										Dp, wk alt Sp incl Tr sul vning
	163.3	172.8	9.5		.06				94	2.70						.06																								Dp, as above
	172.8	181.0	8.2		.09				95	2.70						.09																								Dp, as above Silicif patches Tr pods feldspath
	181.0	190.4	9.4		.08				99	2.67						.08										Tr														Dp, wk alt Tr cal vning Sp incl Tr suls
	190.4	198.9	8.5		.06				100	2.69						.06																								Dp; as above
	198.9	208.1	9.2		.12				94	2.73						.12																								Dp, as above Silicif patches
	208.1	215.9	7.8		.10				98	2.66						.10												Tr												Dp, as above Vuggy patches
	215.9	224.9	9.0		.06				98	2.70						.03	.03																							Dp, wk alt. Sp ang incl. Tr suls Tr cal blebs.
	224.9	233.8	8.9		.06				95	2.85						.03	.03																							Dp, wk alt Sp incl Tr suls. Tr cal vning
	233.8	241.0	7.2		.06				84	2.74							.06																							Dp; as above
	241.0	245.8	4.8		.05				94	2.75							.05																							Dp; as above
	245.8	254.6	8.8		.07				100	2.72							.07			Sp																				Dp, as above
	254.6	264.0	9.4		.07				94	2.69							.07																							Dp, as above
	264.0	273.5	9.5		.06				93	2.70							.06																							Dp, as above Tr barite? w cal
	273.5	281.3	7.8		.07				96	2.68							.07																	Tr						Dp; as above
	281.3	290.1	8.8		.07				95	2.70							.07											Tr											Dp, wk alt. Tr vuggyness. Mod ang incl
	290.1	298.2	8.1		.04				96	2.70							.04			Tr																				Dp, as above w sp cal vning
	298.2	307.5	9.3		.03				100	2.70							.03																							Dp; as above
	307.5	313.4	5.9		.04				88	2.67							.04																							Dp; as above.
	313.4	323.0	9.6		.03				99	2.65							.03											SP												Dp, wk silicif w tr sul vning. Tr cal vning. ang incl.
	323.0	331.9	8.9		.04				98	2.65							.04			SP								S												Dp, wk silicif w tr suls Sp vuggyness w tr cal
	331.9	341.4	9.5		.14				97	2.72							.14			Tr								Tr												Dp, spotty alt, showing feldspathization. Sp dk incl
	341.4	351.2	9.8		.08				93	2.70							.08													SP										Dp, spotty alt gives salt & pepper look. St ptz incl?
	351.2	360.4	9.2		.05				97	2.69							.05											SP												Dp, as above, plus tr sp dark
	360.4	371.7	11.3		.07				90	2.69							.07											Tr												Dp, as preceding plus numerous inclusions
	371.7	380.6	8.9		.05				96	2.68							.05														Tr									Dp, as above
	380.6	388.8	8.2		.10				80	2.72							.10												SP											Dp, alt fades to end out. Sc inclis, Sp py
	388.8	394.5	5.7		.06				100	2.81							.06												Tr											Dp, as above

Notes:

(1) Est. % Cu represented by each mineral

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PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Note (3)
Tt - Toctite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Do - Dacite
Mz - Monzonite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-161
Page 2 of 2 Pages
Collar Elev. 3079.54 Final Depth 650.0
Coords. N 38,062.44 E 19,871.58
Inclination Vert
Logged by FTG - CWH
Date: Start 7/17/63 Finish 8/6/63

Depth From	Depth To	Int'vl	Elev	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
394.5	403.2	8.7		.04				100	2.52							.04			Tr						Tr				Tr			Tr			Mz	395.6	brkn	Dp; wk alt to 395.6, then Mz; wk alt; mod 2nd fspar. Tr py
403.2	412.0	8.8		.09				94	2.61							.09																						Mz; as above
412.0	417.9	5.9		.02				100	2.65							.02												Tr	SP									Mz; as above w ggy areas.
417.9	427.4	9.5		.05				100	2.63							.05													Tr									Mz; as above
427.4	430.6	3.2		.08				92	2.60							.08																						Mz; tr alt. Tr suls
430.6	439.4	8.8		.04				98	2.64							.04																						Mz, as above
439.4	449.0	9.6		.04				87	2.65							.04													SP									Mz; as above grad to sp clay on sh. Tr suls
449.0	459.8	10.8		.07				80	2.63							.07									SP						S			Dp	453.0	15°	Mz; as above w matrix grad to buff to 453.0, then Dp; sp alt Tr suls
459.8	467.1	7.3		.03				92	2.65							.03															SP							Dp, sp alt. Gg on sh. Tr suls
467.1	477.1	10.0		.01				94	2.64							.01									Tr				Tr					Mz	469.0	50°	Dp, as above to 469.0 then Mz, tr alt Tr suls Tr 2ndary fspar
Bx 1432 477.1	484.2	7.1		.02				100	2.63							.02																						Mz; tr alt - suls - 2nd kspar
484.2	493.5	9.3		.04				99	2.56							.04																						Mz; as above.
493.5	503.0	9.5		.01				100	2.64							.01																						Mz, bla on sh. Tr suls
503.0	507.6	4.6		.01				94	2.64							.01															SP			Dp	506.0	brkn	Mz; as above to 506.0, then Dp, mod alte incl Tr py.
507.6	516.6	9.0		.02				97	2.70							.02															Tr							Dp, wk alt. Areas mod incl Tr suls
516.6	526.2	9.6		.03				94	2.68							.03							Tr															Dp, as above w feldspath patches. Sp py assoc w cby-cal blebs
526.2	535.5	9.3		nil				98	2.68							nil																						Dp, tr alt. Patches mod incl Tr suls
535.5	544.5	9.0		.04				98	2.68							.04																						Dp; as above
544.5	554.6	10.1		.01				88	2.70							.01																						Dp; tr alt. Tr suls
554.6	563.6	9.0		.03				98	2.69							.03								Tr														Dp, as above 0.3 ft patch cal w cpy-sl.
563.6	572.4	8.8		.03				98	2.71							.03																						Dp; tr alt Patches w. mod incl Tr suls
572.4	582.3	9.9		.06				93	2.68							.06																						Dp, tr alt. Patches whitish bx w. sp sl-gn Tr suls
582.3	591.4	9.1		.05				98	2.72							.05																						Dp, tr alt w patches mod incl Tr alt
591.4	601.4	10.0		.02				90	2.67							.02							Tr	Tr														Dp; tr alt Patches bx w tr sl-gn-col
601.4	611.2	9.8		.04				94	2.69							.04															SP							Dp: mod siliceous incl Mod dk-ang incl Sp sul vnng
611.2	620.8	9.6		.04				89	2.68							.04															Tr							Dp; patches mod siliceous incl (nearly intr bx) w areas Dp w. tr alt
620.8	630.0	9.2		.03				84	2.82							.03																						Dp; tr alt w tr dk-ang. Silicif patches. Tr suls.
630.0	639.2	9.2		.03				88	2.71							.03																						Dp; wk alt. Patches Dp bx (incl?) w tr cal
639.2	650.0	10.8		.05				87	2.70							.05							Tr															Dp; silicif patches. Patches Dp bx? (incl?) w. tr cpy-sl.

Av. Rec = 94%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-162
Page 1 of 1 Pages
Collar Elev 3042.72 Final Depth 2582
Coords N 35,895.57 E 19,382.57
Inclination Vert
Logged by FTG - CWH
Date: Start 8/1/63 Finish 8/14/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 54 2730	0.0	6.7	6.7		.12				78	2.69	.06	.01	.01	.04					SP			Tr				90	SP	SP		Tr			Tr		Mb	0.0	-	Mb, leached, tr hem assoc w patches bx Tr chlor pods
NC 2400	6.7	17.2	10.5		.02				88	2.69				.02												95	Tr	1		1	SP		1					Mb, leached; patches st qtz vning (pods?) Tr chlor
	17.2	25.8	8.6		.16				92	2.67		.01	.01	.14					1							95	1	1					1	Tr				Mb; leached; tr clay patches
	25.8	35.2	9.4		.01				95	2.69				.01					Tr	Tr						95	1	1		1				1				Mb; leached w tr suls; tr lim vning
	35.2	44.2	9.0		.04				96	2.68				.04					1	1						99	1	Tr		1			Tr	1				Mb; as above w sp clay on fractures.
	44.2	52.7	8.5		.03				98	2.67				.03					1	1						95	1	1		1			SP					Mb, as above grad to Mb bx w sp suls. Tr CuOx
	52.7	62.0	9.3		.09				93	2.68				.04			.05		1	1		Tr				90	SP			1			5					Mb bx; ang frags in chlor - sul matrix, leached patches Pods chlor - hem
	62.0	70.3	8.3		.05				98	2.72				.02			.03		1	1		1				95				1			SP					Mb; tr chlor vning Tr chlor - hem pods
	70.3	79.5	9.2		.09				89	2.67				.02			.07		SP	1						90		Tr		1			SP					Mb; leached patches Tr suls
	79.5	85.7	6.2		.24				86	2.66				.01			.23		Tr	1						85		1		1		10	1					Mb, leached patches Mb bx possib pebble dike - qtz + Dp frags.
NX 1875	85.7	94.4	8.7		.47	276' @ .65	nil	276' @ .01	98	2.79							.47		1	SP		Tr			Tr	70		15		1			10		Hf	93.0	grad	Mb, mc chlor vning to 93.0, then Hf, mod chlor - spchlor vning Sp suls
	94.4	103.7	9.3		.76		.02		100	2.78							.76		1	1		1				40	5	40		SP			10					Hf patches mod chlor - suls. Mod Mb
	103.7	113.3	9.6		.72		.02		89	2.68							.72			1						25		50	10	5			5					Hf, sp - mod chlor - cal vning grad to mod clay - sericite. Mod suls
	113.3	121.8	8.5		.14		.01		88	3.41							.14			1		Tr				15	60	10	10	5			SP		Tt	115.7	brkn	Hf, mod - st clay - sericite alt to 115.7, then Tt; dense, sp hem - suls.
	121.8	131.1	9.3		.35		.03		81	3.27				.03			.32		5	1		1				15	15	50		5			5	Tr	Hf	129.0	grad	Tt, sp chlor - hem - cal vning to 129.0, then Hf, sp chlor alt. Mod suls
	131.1	139.8	8.7		.53		.04		99	2.71				.04		.02	.45	.02	Tr	1						15	10	60		5			5					Hf, mod chlor - cal vning - suls grad to mod chlor - st suls 1 ft feldspath Mz
	139.8	148.8	9.0		.57		.02		96	2.73							.57			1		Tr				15	5	65		SP			10					Hf, st clay grad to sp chlor - mod clay alt, mod suls Sp vnlts st clay - chlor
	148.8	158.7	9.9		.44		.01		69	2.55							.44			1		1				20	SP	65		5			5					Hf, mod clay - chlor cal vning. 1.2 ft bx w st clay - chlor. St mass + diss suls
	158.7	164.5	5.8		.39		.01		89	2.87							.39			1						15	1	70		10			5		Tt	158.7	grad	Tt, sp feldspath - qtz vn grad to dense, sp chlor vning Sp suls
	164.5	173.1	8.6		.83	1379' @ .48%	.02	.02	84	3.05							.83			1		5			Tr	15	30	30		5			15					Tt, mod hem vning. Sp chlor grad to mod chlor. St suls
	173.1	181.0	7.9		.39		.01		81	3.18							.39			1						10	55	25		SP			5					Tt, dense; patches mod clay. Sp chlor vning Sp suls
	181.0	189.7	8.7		.59		.02		88	3.11							.59			1						SP	15	50	25		5	SP		5					Tt, patches mod clay. Patches sp qtz + sul vning Spchlor vning Sp suls
	189.7	199.6	9.9		.26		.01		82	3.18							.26			1					Tr	Tr	15	50	25		5	Tr		SP					Tt, mod chlor - clay alt grad to dense; sp sul vning. Sp qtz-moly vning
	199.6	205.3	5.7		.27		.01		100	2.95							.27			1							10	60	20		SP			SP					Tt, dense; sp chlor - sul vning
	205.3	214.6	9.3		.45	183' @ .96	.03	183' @ .03	89	3.20							.45			1							10	60	20		1			5					Tt, dense, sp sul - tr chlor vning. Tr epid along sul walls
	214.6	223.6	9.0		.47		.02		75	3.06							.47			1							10	65	15		1		SP	Tr		Mz	220.0	brkn	Tt, dense, mod chlor vning to 220.0, then Mz mod silicif Sp suls.
	223.6	230.6	7.0		.27		.02		98	2.61							.27			1							5		SP	5		25						Mz, mod silicif Tr suls. Tr Dp text
	230.6	239.0	8.4		.20				100	2.56	Tr						.20			1		Tr					SP			5		20	Tr					Mz; mod silicif Sp sul vning
	239.0	249.0	10.0		.29				82	2.82							.29			1		1					1			SP		5	1					Mz; sp silicif w patches mod clay Tr suls.
	249.0	258.2	9.2		.21				93	2.72							.21			1							1	SP	10		10	SP	1						Mz; sp clay - silicif Tr Hf - Tt - Qtz incl. Tr suls
							Av.	Rec = 90%																															

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 % Moderate (Md) 5 - 50 % Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-162
Page 1 of 1 Pages
Collar Elev 3042.12 Final Depth 2582
Coords N 35,895.57 E 19,382.57
Inclination Vert
Logged by FTG - CWH
Date: Start 8/1/63 Finish 8/14/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JARGSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 34 3338	0.0	6.7	6.7		.12				78	2.69	.06	.01	.01	.04					SP			Tr				90	SP	SP		Tr	Tr			Tr		Mb	0.0	-	Mb, leached, tr hem assoc w patches bx Tr chlor pods
NC 2400	6.7	17.2	10.5		.02				88	2.69				.02												95	Tr				SP								Mb, leached; patches st qtz vning (pods?) Tr chlor
	17.2	25.8	8.6		.16				92	2.67		.01	.01	.14												95								Tr				Mb; leached; tr clay patches
	25.8	35.2	9.4		.01				95	2.69				.01					Tr	Tr						95												Mb, leached w tr suls; tr lim vning
	35.2	44.2	9.0		.04				96	2.68				.04												99		Tr					Tr					Mb; as above w sp clay on fractures.
	44.2	52.7	8.5		.03				98	2.67				.03												95							SP					Mb, as above grad to Mb bx w sp suls. Tr CuOx
	52.7	62.0	9.3		.09				93	2.68				.04			.05					Tr				90	SP						S					Mb bx; vng frags in chlor - sul matrix, leached patches. Pods chlor - hem
	62.0	70.3	8.3		.05				98	2.72				.02			.03									95							SP					Mb; tr chlor vning Tr chlor - hem pods
	70.3	79.5	9.2		.09				89	2.67				.02			.07		SP							90		Tr					SP					Mb, leached patches Tr suls
	79.5	85.7	6.2		.24				86	2.66				.01			.23		Tr							85						10						Mb, leached patches. Mb bx possib pebble dike - qtz + Dp frags.
NX 1875	85.7	94.4	8.7		.47	2.76' @ .65	nil.	.02	98	2.79							.47			SP		Tr			Tr	70		15					10		Hf	93.0	grad	Mb, incr chlor vning to 93.0, then Hf; mod chlor - sp chlor vning Sp suls
	94.4	103.7	9.3		.76			.02	100	2.78							.76									40	5	40		SP			10					Hf, patches mod chlor - suls. Mod Mb
	103.7	113.3	9.6		.72			.02	89	2.68							.72									25		50	10	5			5					Hf; sp - mod chlor - cal vning grad to mod clay - sericite. Mod suls
	113.3	121.8	8.5		.14			.01	88	3.41							.14					Tr				15	60	10	10	5			SP		Tt	115.7	brkn	Hf, mod - st clay - sericite alt to 115.7 then Tt, dense; sp hem - suls
	121.8	131.1	9.3		.35			.03	81	3.27				.03			.32		S							15	15	50		5			5	Tr	Hf	129.0	grad	Tt, sp chlor - hem - cal vning to 129.0, then Hf, sp chlor alt. Mod suls
	131.1	139.8	8.7		.53			.04	99	2.71				.04		.02	.45	.02	Tr							15	10	60		5			5					Hf, mod chlor - cal vning - suls grad to mod chlor - st suls 1 ft feldspath Mz
	139.8	148.8	9.0		.57			.02	96	2.73							.57					Tr				15	5	65		SP			10					Hf, st clay grad to sp chlor - mod clay alt, mod suls Sp vnlts st clay - chlor
	148.8	158.7	9.9		.44	58.6 @ .34	.01	.01	69	2.55							.44									20	SP	65		5			5					Hf, mod clay - chlor cal vning. 1.2 ft bx w st clay - chlor. St mass + diss suls
	158.7	164.5	5.8		.39				89	2.87							.39									15		70		10			5		Tt	158.7	grad	Tt, sp feldspath - qtz vn grad to dense, sp chlor vning Sp suls
	164.5	173.1	8.6		.83	137.9 @ .48	.02	.02	84	3.05							.83				5			Tr		15	30	30		5			15					Tt, mod hem vning Sp chlor grad to mod chlor. St suls
	173.1	181.0	7.9		.39			.01	81	3.18							.39									10	55	25		SP			5					Tt, dense; patches mod clay Sp chlor vning Sp suls
	181.0	189.7	8.7		.59			.02	88	3.11							.59								SP	15	50	25		5	SP		5					Tt, patches mod clay. Patches sp qtz + sul vning Sp chlor vning Sp suls
	189.7	199.6	9.9		.26			.01	82	3.18							.26							Tr	Tr	15	50	25		5	Tr		SP					Tt, mod chlor - clay alt grad to dense, sp sul vning. Sp qtz - mol vning
	199.6	205.3	5.7		.27			.01	100	2.95							.27									10	60	20		SP			SP					Tt, dense; sp chlor - sul vning
	205.3	214.6	9.3		.45	183' @ .46		.03	89	3.20							.45									10	60	20					5					Tt, dense, sp sul - tr chlor vning. Tr epid. along sul walls
	214.6	223.6	9.0		.47			.02	75	3.06							.47									10	65	15				SP	Tr		Mz	220.0	brkn	Tt, dense, mod chlor vning to 220.0, then Mz mod silicif Sp suls.
	223.6	230.6	7.0		.27			.02	98	2.61							.27									5			SP	5		25						Mz, mod silicif Tr suls. Tr Dp text
	230.6	239.0	8.4		.20				100	2.56	Tr						.20					Tr				SP				5		20	Tr					Mz; mod silicif Sp sul vning
	239.0	249.0	10.0		.29				82	2.82							.29									1				SP		5	1					Mz; sp silicif w patches mod clay Tr suls.
	249.0	258.2	9.2		.21				93	2.72							.21									1	SP	10		10		SP	1					Mz, sp clay - silicif Tr Hf - Tt - Qtz incl. Tr suls

Av. Rec = 90%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-163
Page 1 of 1 Pages
Collar Elev. 3141.02 Final Depth 201.8
Coords N 37,312.31 E 18,905.84
Inclination Vertical
Logged by ETG - CWH
Date: Start 8/7/63 Finish 8/21/65

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC,stl 2.750	0.0	8.0	8.0		.38		.33		95	2.76			.01	.32			.05		SP			Tr					15	60	15	SP	Tr		SP	Tr	Tt	0.0	-	Tt; leached, sp clay - qtz vning. Sp diss hem. Mod CuOx
NC 2.400	8.0	17.0	9.0		.63		.55		90	2.89			.01	.54			.08		1			SP					15	50	25	1			5					Tt; leached, wk chlor - hem alt grad to mod hem - cal vn. Sp CuOx
	17.0	26.1	9.1		.59		.57		77	2.79			.01	.56			.02		1			5					5	35	10	5	Tr	10	5			Bx	21.9	brkn	Tt, leached w mod hem - CuOx to 21.9, then Bx; partly round frags, qtzite + silicif Hf? in dense silicif matrix. Ped Mz w st feldspath
	26.1	35.2	9.1		.34		.65		76	2.55		.01	.01	.63			.19		SP			10					10	55	15	10		SP	SP		Tt	28.0	brkn	Bx, siltst frags in silicif matrix to 28.0, then Tt, leached, sp silicif, st hem
	35.2	43.2	8.0		1.06	7.8	.85	7.8	82	3.01		.01	.01	.83			.21		1			5					15	40	30	5			1					Tt, leached, st clay - qtz vning. Sp hem - chlor - CuOx
	43.2	51.3	8.1		.53	1.80	.43	1.61	83	2.99		.01	.01	.41			.10		1	Tr		SP					10	60	25	5			1					Tt, leached, dense, mod diverse qtz vning.
	51.3	55.1	3.8		4.04		3.44		100	2.76		.02	.01	3.41			.60		1	1		10					10	65	5	5								Tt, leached, mod hem. St CuOx
	55.1	60.2	5.1		5.00		4.48		65	2.69		.01	.01	4.46			.52		1	1		15					10	60	5	5								Tt, leached, as above and to mod clay - st hem alt. St CuOx
NX 1.875	60.2	70.8	10.6		2.79		2.63		82	2.65		.01	.01	2.61			.16		1	1		10					15	50	5	5	10		Tr					Tt, leached, st hem - mod qtz vning. St CuOx
	70.8	79.9	9.1		3.05		2.78		46	2.79			.01	2.77			.27		1	1		5					10	40	20	20	SP		1		Hf	77.0	brkn	Tt, as above w gay patches (bx) to 77.0, then Hf, leached, st clay alt
	79.9	87.7	7.8		.26		.22		78	2.56			.01	.21		.04			1	1							5		SP	5	1		1		Mz	82.2	brkn	Hf, leached, st clay alt to 82.2, then Mz; sp - mod qtz vn - clay. Sp CuOx
	87.7	96.0	8.3		.16		.14		62	2.57			.01	.13		.02			1	1										SP	1		1					Mz; leached, sp clay - qtz vning. Sp ads Cu on fspar. Sp CuOx
	96.0	106.0	10.0		.08				45	2.59			.01	.06		.01			1	1										1	1		1					Mz; leached, mod - st clay alt. Sp CuOx
	106.0	115.2	9.2		.07				68	2.55			.01	.05		.01			1	1										1	1		1					Mz; leached, mod clay alt. Tr CuOx
	115.2	124.6	9.4		.08				98	2.49			.01	.06		.01			1	1										5	1		1					Mz; leached, mod clay alt - mod qtz vning. Tr CuOx
	124.6	134.7	10.1		.08				62	2.57			.01	.06		.01			1	1										5	5		1					Mz; leached, mod clay - silicif. Tr CuOx
	134.7	141.6	6.9		.26				92	2.57			.01	.25					1	1										10	5		1					Mz; leached w tr suls in vnlts. Patches st qtz. Mod CuOx
	141.6	150.8	9.2		1.60		1.36		97	2.56			.01	1.35			.24		1	1		15					15	55	SP	5	5				Tt	142.3	brkn	Mz; leached, mod clay - CuOx to 142.3, then Tt, leached; st hem - qtz vn - CuOx
	150.8	159.5	8.7		2.56	14.6'	1.05	14.4'	81	3.19		.02	.01	1.02		.10	1.15	.25	1	1		10				Tr	15	50	5	5	5				Mz	158.8	brkn	Tt, leached, st hem - mod silicif - CuOx, mod suls to 158.8, then Mz; mod clay alt
	159.5	169.1	9.6		1.28	0	1.02	0	99	2.49		.01	.01	1.00			.26		1	1		15					15	35	5	10	5		Tr		Tt	162.5	brkn	Mz, leached, mod clay alt, mod CuOx to 162.5, then Tt, leached, st hem - CuOx
	169.1	177.4	8.3		.25	1.44	.18	0.99	94	2.57		.01	.01	.16		.04	.03		1	1		Tr					5		5	10	SP		SP		Mz	169.6	brkn	Tt, leached, mod hem - qtz vn - chlor to 169.6, then Mz, leached; mod clay alt
	177.4	186.0	8.6		1.44		1.30		95	2.41		.01	.01	1.28		.14			1	1							SP			10	5	5	Tr					Mz, leached, mod silicif w st silicif (aplitic text) pods. Sp CuOx
	186.0	196.0	10.0		.06		.06		67	2.57			.01	.05					1	1							Tr			5	SP		1					Mz; leached; sp clay - silicif. Tr CuOx
	196.0	201.8	5.8		.13		.12		70	2.60			.01	.11		.01			1	1							1			5	1		1					Mz, leached, sp clay alt. Tr CuOx
							Av. Rec. =		90%																													
						END	OF	HOLE																														

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-163
Page 1 of 1 Pages
Collar Elev. 3141.02 Final Depth 201.8
Coords N 37,312.31 E 18,905.84
Inclination Vertical
Logged by FTG - CWH
Date: Start 8/7/63 Finish 8/21/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	LABRADITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC.all 2.750	0.0	8.0	8.0		.38		.33		95	2.76			.01	32			.05		SP			Tr					15	60	15	SP	Tr		SP	Tr	Tt	0.0	-	Tt; leached; sp clay - qtz vning. Sp diss hem. Mod CuOx
NC 2.400	8.0	17.0	9.0		.63		.55		90	2.89			.01	.54			.08		1			SP					15	50	25	1			5					Tt; leached, wk chlor - hem alt grad to mod hem - cal vn. Sp CuOx
	17.0	26.1	9.1		.59		.57		77	2.79			.01	.56			.02		1			5					5	35	10	5	Tr	10	5		Bx	21.9	brkn	Tt leached w mod hem - CuOx to 21.9, then Bx; partly rounded frags, qtzite + silicif Hf? in dense silicif matrix. Pod Mz w st feldspath
	26.1	35.2	9.1		.84		.65		76	2.55		.01	.01	.63			.19		SP			10					10	55	15	10		SP	SP		Tt	28.0	brkn	Bx, siltst frags in silicif matrix to 28.0, then Tt, leached; sp silicif, st hem
	35.2	43.2	8.0		1.06	7.18	.85	7.8	82	3.01		.01	.01	.83			.21		1			5					15	40	30	5			1					Tt, leached, st clay - qtz vning. Sp hem - chlor - CuOx
	43.2	51.3	8.1		.53	7.80	.43	1.61	83	2.99		.01	.01	.41			.10		1	Tr		SP					10	60	25	5			1					Tt, leached, dense; mod diverse qtz vning.
	51.3	55.1	3.8		4.04		3.44		100	2.76		.02	.01	3.41			.60		1	1		10					10	65	5	5								Tt; leached; mod hem. St CuOx
	55.1	60.2	5.1		5.00		4.48		65	2.69		.01	.01	4.46			.52		1	1		15					10	60	5	5								Tt, leached, as above grad to mod clay - st hem alt. St CuOx
NX 1.875	60.2	70.8	10.6		2.79		2.63		82	2.65		.01	.01	2.61			.16		1	1		10					15	50	5	5	10		Tr					Tt, leached, st hem - mod qtz vning. St CuOx
	70.8	79.9	9.1		3.05		2.78		46	2.79			.01	2.77			.27		1	1		5					10	40	20	20	SP		1		Hf	77.0	brkn	Tt, as above w gray patches (bx) to 77.0, then Hf, leached, st clay alt
	79.9	87.7	7.8		.26		.22		78	2.56			.01	.21		.04			1	1							5		SP	5	1		1		Mz	82.2	brkn	Hf, leached, st clay alt to 82.2, then Mz; sp - mod qtz vn - clay. Sp CuOx
	87.7	96.0	8.3		.16		.14		62	2.57			.01	.13		.02			1	1										SP	1		1					Mz; leached; sp clay - qtz vning. Sp ads Cu on fspar. Sp CuOx.
	96.0	106.0	10.0		.08				45	2.59			.01	.06		.01			1	1										1	1		1					Mz; leached, mod - st clay alt. Sp CuOx.
	106.0	115.2	9.2		.07				68	2.55			.01	.05		.01			1	1										1	1		1					Mz; leached, mod clay alt. Tr CuOx
	115.2	124.6	9.4		.08				98	2.49			.01	.06		.01			1	1										5	1		1					Mz; leached; mod clay alt - mod qtz vning. Tr CuOx
	124.6	134.7	10.1		.08				62	2.57			.01	.06		.01			1	1										5	5		1					Mz; leached, mod clay - silicif. Tr CuOx
	134.7	141.6	6.9		.26				92	2.57			.01	.25					1	1										10	5		1					Mz; leached w tr sulf in vnlts. Patches st qtz. Mod CuOx
	141.6	150.8	9.2		1.60		1.36		97	2.56			.01	1.35			.24		1	1		15					15	55	SP	5	5				Tt	142.3	brkn	Mz; leached, mod clay - CuOx to 142.3, then Tt, leached; st hem - qtz vn - CuOx
	150.8	159.5	8.7		2.56	14.6	1.05	14.4	81	3.19		.02	.01	1.02		.10	1.16	.25	1	1		10			Tr		15	50	5	5	5				Mz	158.8	brkn	Tt, leached; st hem - mod silicif - CuOx; mod sulf to 158.8, then Mz; mod clay alt
	159.5	169.1	9.6		1.28	0	1.02	0	99	2.49		.01	.01	1.00			.26		1	1		15					15	35	5	10	5		Tr		Tt	162.5	brkn	Mz, leached, mod clay alt, mod CuOx to 162.5, then Tt, leached, st hem - CuOx
	169.1	177.4	8.3		.25	1.44	.18	0.99	94	2.57		.01	.01	.16		.04	.03		1	1		Tr					5		5	10	SP		SP		Mz	169.6	brkn	Tt, leached, mod hem - qtz vn - chlor to 169.6, then Mz, leached; mod clay alt
	177.4	186.0	8.6		1.44		1.30		95	2.41		.01	.01	1.28		.14			1	1							SP			10	5	5	Tr					Mz, leached, mod silicif w st silicif (aplitic text) pods. Sp CuOx
	186.0	196.0	10.0		.06		.06		67	2.57			.01	.05					1	1							Tr			5	SP		1					Mz; leached; sp clay - silicif. Tr CuOx
	196.0	201.8	5.8		.13		.12		70	2.60			.01	.11		.01			1	1							1			5	1		1					Mz, leached; sp clay alt. Tr CuOx
							Av. Rec. = 90%																															
						END	OF	HOLE																														

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5 - 50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-164
Page 1 of 1 Pages
Collar Elev 3106.95 Final Depth 355.6
Coords N 35,748.06 E 19,594.31
Inclination Vert
Logged by ETG - CWH
Date: Start 8/15/63 Finish 9/6/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	UNKNOWN	Flor. %	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	15.2	15.2																																					ROCKBIT
NC 2400	15.2	24.5	9.3		28		18		69	2.99	.16	.01	.01			10			Tr	Tr						10	30	50		SP		5				Hf	15.2	-	Hf, leached, mod clay alt Tr CuOx Mod Mb
	24.5	35.4	10.9		04		02		71	2.62	.01		.01			.02			1	1						10	5	75		1		SP							Hf, leached, mod clay alt grad to dk brn Hf w sp cal vning
	35.4	44.1	8.7		01				86	2.79			.01						1							20	5	65		1	5	1				Tt	39.1	grad	Hf leached, pods dk brn w sp cal vning to 39.1, then Tt, leached, mod cal pods.
	44.1	52.0	7.9		01				90	2.73			.01						1							5		5	15			60				Slst	45.1	grad	Tt, as above to 45.1, then Slst, leached, brks, pale buff w - dk patches
	52.0	60.4	8.4		01				90	2.85			.01						1							25	30	40		5			Tr			Hf	53.5	grad	Slst, as above to 53.5, then Hf, leached, pods dk brn w calcin incr Tt
	60.4	68.9	8.5		.03				95	3.13			.03													10	15	70		SP									Hf, wk cal, mod pods Tt. Sp Slst
	68.9	76.1	7.2		.03				96	2.97			.03													5	15	50		Tr		25							Hf, pods st qtz. Patches wk clay
NK 1875	76.1	81.8	5.7		.04				98	3.15			.04													10	25	50		1		10							Hf, pods qtz (chert) irreg distrib in core. Poss gar.
	81.8	91.0	9.2		.03				100	2.84			.03													60	20	10		1		5				Mb	83.3	grad	Hf, as above w stgar to 83.3, then Mb; tr clay w pods qtz (chert)
	91.0	100.0	9.0		.02				94	2.78			.02													80	5	10		SP									Mb, tr clay alt
	100.0	108.4	8.4		.01				98	2.79			.01													85	Tr	10		1									Mb, tr Hf.
	108.4	117.6	9.2		.02				95	2.74			.02							Tr						70	1	15		1		5		SP					Mb, tr Hf Sp qtz pods
	117.6	125.9	8.3		.03				91	2.71			.03						Tr	1				Tr		100		Tr		Tr									Mb, tr hem w st frost
	125.9	135.0	9.1		.01				100	2.69			.01						1	1				1	Tr	100		1					Tr		Tr				Mb, tr chlor on Tr fluor
	135.0	144.1	9.1		.05				96	2.69			.03				.02		1	1				1	1	100		1		1		1							Mb, tr leached vnlts
	144.1	153.0	8.9		.01				97	2.68			.01						1	1				1		100		1		1		1							Mb, as above
	153.0	161.5	8.5		.04				98	2.74			.03				.01		1	1						90	10			Sp		1		Tr		Hf	160.0	grad	Mb, tr yaro on vnlts to 160.0 then Hf, sp diss + vnlt chlor
	161.5	170.3	8.8		.05				95	2.72	.01		.03				.01		1	1						80	20			1									Hf, sp chlor vning grad to dense Hf w sp clay - chlor.
	170.3	179.6	9.3		.06				66	2.69			.01	.05					1	1						40	5	40		5			SP			Mb	177.0	grad	Hf, mod clay alt to 177.0, then Mb; sp clay alt
	179.6	188.5	8.9		.17				92	2.73							.17		1	1		Tr				80	5			5		5							Mb, tr clay alt. Tr hm on sh
	188.5	198.8	10.3		.28				90	2.70							.28		1	1				Tr		95		SP		SP									Mb, tr clay, sp lim on sheers, & tr of thin sul vnlts, tr py, sulfs
	198.8	207.6	8.8		.13				86	2.78							.13		1	1						90	Tr	SP		SP			Tr						Mb, frost, tr hm, one 1" py vnlt. Gn gar.
	207.6	216.8	9.2		.06				96	2.70							.06		1	1						95	1	Tr		Tr									Mb, tr clay, tr lim, tr sul & py
	216.8	226.2	9.4		.12				97	2.62						Tr	.12	Tr	1	1						95		1					Tr						Mb, as above and vuggy in spots.
	226.2	234.2	8.0		.14				94	2.72							.14		1	1						80	5	10		SP			S						Mb, tr clay, tr chlor, sp lim, and vuggy scay, tr sulfs (?)
	234.2	242.7	8.5		.29				97	2.67							.29		1	1						60	5	30		SP			SP			Hf	239.0	grad	Mb, w tr incr chlor & sulfates to ct Hf w/ chlor on vnlts, tr sulfs
	242.7	246.0	3.3		.14				102	2.73							.14		1	1						20	5	70											Hf w/ mod. cal & chlor vnlts. Tr sulfs. Limy.
	246.0	253.4	7.4		.31				91	2.82						.02	.21		Tr							15	5	70		5									Hf, incr. chlor & py. Spotty mod clay alt. limy.
	253.4	262.6	9.2		.53		.02		96	2.80							.53		1	SP						20		65		5			5		SP				Hf, sp clay - chlor alt. Patches st clay wk bx text. Tr sulfs.
	262.6	272.3	9.7		.86	36.6' @ .06	.02	36.6' @ .04	94	2.84							.86		1	5		Tr		Tr	Tr	15	5	60		5			10	SP					Hf, mod chlor vning w wk bx - cal cement grad to mod chlor - sulfs.
	272.3	274.7	2.4		.91		.02		69	2.79							.91		1	5						15		40					40						Hf, mod chlor - cal vning - sulfs.
	274.7	282.0	7.3																																					OLD DRIFT
	282.0	290.0	8.0		.48		.11		98	2.67			.02	.06			.40		Tr	SP						5	30	45		SP			5						Hf, mod chlor - clay grad to mixed Hf - Tt w sp clay alt
	290.0	299.7	9.7		.28		.02		88	2.80						.14	.14		1	Tr						15	10	65		1			5						Hf, mod chlor - sp clay alt w lim on frost. Sp cal vning. Mod mass sulfs.
	299.7	309.3	9.6		.31		.01		87	2.86							.31			SP						10	45	30		1			5			Tt	299.7	brkn	Tt, dense w sp sul vning grad to mod chlor vning w Hf pods to
																																				Dp	307.0	brkn	307.0, then Dp, mod - st silicif. Sp sulfs
	309.3	317.9	8.6		.44		.01		94	2.67							.44			SP						5	15	15		SP	Tr		5						Dp, mod silicif. Patches mod chlor Sp sul vning
	317.9	327.0	9.1		.30		.01		87	2.68							.30			1		Tr				5	SP	5		1	1		SP						Dp, mod clay - silicif. Sp sul vning. Sp ghosts sed? incl.
	327.0	335.5	8.5		.18				94	2.60							.18			Tr						SP			Tr	SP	1		1			Mz	332.7	brkn	Dp, as above to 332.7, then Mz; sp clay, ex feldspath
	335.5	345.3	9.8		.26				92	2.60							.26			1						1			SP	S	1		1						Mz, sp clay - feldspath. Sp ads Cu on fsprs. Tr Dp incl
	345.3	355.6	10.3		.13				56	2.66							.13			1						Tr			Tr	SP	1	S	Tr			Dp	345.3	brkn	Dp, mod silicif. Tr sulfs

BARITE

Av. Rec = 90%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-164
Page 1 of 1 Pages
Collar Elev 3106.95 Final Depth 355.6
Coords N 25,248.06 E 19,594.31
Inclination Vert
Logged by FTG - CWH
Date: Start 8/15/63 Finish 9/6/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	UNROASTED	Floor %	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	15.2	15.2																																					ROCKBIT
NC 2400	15.2	24.5	9.3		28		18		69	2.99	.16	.01	.01			.10			Tr	Tr							10	30	50		SP		.5				Hf	15.2	-	Hf, leached, mod clay alt. Tr CuOx Mod Mb
	24.5	35.4	10.9		.04		.02		71	2.62	.01		.01			.02			1	1							10	5	75		1		SP				Hf			Hf, leached, mod clay alt grad to dk brn Hf w sp cal vning
	35.4	44.1	8.7		.01				86	2.79			.01						1								20	5	65		1	5	1				Tt	39.1	grad	Hf leached, pods dk brn w sp cal vning to 39.1, then Tt, leached, mod cal pods.
	44.1	52.0	7.9		.01				90	2.73			.01						1								5			5	15		60				Slfst	45.1	grad	Tt, as above to 45.1, then Slfst, leached, brks, pale buff w dk patches
	52.0	60.4	8.4		.01				90	2.85			.01						1								25	30	40		5			Tr			Hf	53.5	grad	Slfst, as above to 53.5, then Hf, leached, pods dk brn w cal vn. Incr Tt
	60.4	68.9	8.5		.03				95	3.13			.03														10	15	70		SP									Hf, wk cal, mod pods Tt. Sp Slfst
	68.9	76.1	7.2		.03				96	2.97			.03														5	15	50		Tr		25							Hf, pods st qtz. Patches wk clay
NK 1875	76.1	81.8	5.7		.04				98	3.15			.04														10	25	50		1		10							Hf, pods qtz (chert) irreg distrib in core. Pods gar
	81.8	91.0	9.2		.03				100	2.84			.03														60	20	10		1		5				Mb	83.3	grad	Hf, as above w st gar to 83.3, then Mb; tr clay w pods qtz (chert)
	91.0	100.0	9.0		.02				94	2.78			.02														80	5	10		SP									Mb; tr clay alt
	100.0	108.4	8.4		.01				98	2.79			.01														85	Tr	10		1									Mb, tr Hf.
	108.4	117.6	9.2		.02				95	2.74			.02							Tr							70	1	15		1		5		SP					Mb, tr Hf Sp qtz pods
	117.6	125.9	8.3		.03				91	2.71			.03						Tr	1				Tr			100		Tr		Tr									Mb, tr hem w st frost
	125.9	135.0	9.1		.01				100	2.69			.01						1	1				1	Tr		100		1					Tr		Tr				Mb, tr chlor vn Tr fluor
	135.0	144.1	9.1		.05				96	2.69			.03				.02		1	1				1	1		100		1		1			1						Mb, tr leached vnlts
	144.1	153.0	8.9		.01				97	2.68			.01						1	1				1			100		1		1			1						Mb, as above
	153.0	161.5	8.5		.04				98	2.74			.03				.01		1	1							90		10		Sp			1	Tr		Hf	160.0	grad	Mb, tr yaro on vnlts to 160.0 then Hf, sp diss + vnlt chlor
	161.5	170.3	8.8		.05				95	2.72	.01		.03				.01		1	1							80		20		1			1						Hf, sp chlor vning grad to dense Hf w sp clay - chlor.
	170.3	179.6	9.3		.06				66	2.69			.01	.05					1	1							40	5	40		5			SP			Mb	177.0	grad	Hf, mod clay alt to 177.0, then Mb; sp clay alt
	179.6	188.5	8.9		.17				92	2.73							.17		1	1		Tr					80		5		5		5							Mb; tr clay alt. Tr lim on sh
	188.5	198.8	10.3		.28				90	2.70							.28		1	1				Tr			95		SP		SP									Mb, tr clay, sp lim on sheers; & tr-c thin sul vnlts, tr py, sulfs
	198.8	207.6	8.8		.13				86	2.78							.12		1	1							90	Tr	SP		SP			Tr						Mb, fresh Tr lim. one 1" py vnlt. Gn gar
	207.6	216.8	9.2		.06				96	2.70							.06		1	1							95	1	Tr		Tr									Mb, tr clay, tr lim, tr cal & py
	216.8	226.2	9.4		.12				97	2.62						Tr	.12	Tr	1	1							95		1		1			Tr						Mb, as above and vuggy in spots.
	226.2	234.2	8.0		.14				94	2.72							.14		1	1							80	5	10		SP			5						Mb, tr clay, tr chlor, sp lim, and vuggy areas, tr sulfs (Cu)
	234.2	242.7	8.5		.29				97	2.67	•						.29		1	1							60	5	30		SP			SP	BARITE		Hf	239.0	grad	Mb, with incr chlor & silicates to at Hf w/ chlor in vnlts, tr sulfs
	242.7	246.0	3.3		.14				100	2.73							.14		1	1							20	5	70					1						Hf w/ incr cal & chlor vnlts. Tr sulfs. Lim.
	246.0	253.4	7.4		.31				91	2.82						.02	.21		Tr	1							15	5	70		5			1						Hf, incr chlor & py. Spotty mod clay alt. Lim.
	253.4	262.6	9.2		.53		.02		96	2.80							.53		1	SP							20		65		5			5		SP				Hf, spotty - chlor alt. Patches st clay wk bx text. Tr sulfs.
	262.6	272.3	9.7		.86	36.6' @ .66	.02	36.6' @ .04	94	2.84							.86		1	5		Tr		Tr	Tr		15	5	60		5			10	SP					Hf, mod chlor vning w wk bx - cal cement grad to mod chlor - sulfs.
	272.3	274.7	2.4		.91				69	2.79							.91		1	5							15		40					40						Hf, mod chlor - cal vning - sulfs.
	274.7	282.0	7.3																																					OLD DRIFT
	282.0	290.0	8.0		.48		.11		98	2.67			.02	.06			.40		Tr	SP							15	30	45		SP			5						Hf, mod chlor - clay grad to mixed Hf-Tt w sp clay alt
	290.0	299.7	9.7		.28		.02		88	2.80						.14	.14		1	Tr							15	10	65		1			5						Hf, mod chlor - sp clay alt w lim on frost. Sp cal vning. Mod mass. sulfs
	299.7	307.3	9.6		.31		.01		87	2.86							.31			SP							10	45	30		1			5			Tt	304.7	broken	Tt dense w sp sul vning grad to mod chlor vning w Hf pods to
																																					Dp	307.0	broken	307.0, then Dp, mod - st silicif Sp sulfs
	309.3	317.9	8.6		.44		.01		94	2.67							.44			SP							15	15	15		SP	Tr		5						Dp; mod silicif. Patches mod chlor Sp sul vning
	317.9	327.0	9.1		.30		.01		87	2.68							.30			1		Tr					5	SP	5		1		1	SP						Dp, mod clay - silicif Sp sul vning. Sp ghosts sed? incl
	327.0	335.5	8.5		.18				94	2.60							.18			Tr							SP			Tr	SP	1		1			Mz	332.7	broken	Dp, as above to 332.7, then Mz; sp clay, wk feldspath
	335.5	345.3	9.8		.26				92	2.60							.26			1							1			SP	5	1		1						Mz; sp clay - feldspath Sp sds Cu on fsprs. Tr Dp incl
	345.3	355.6	10.3		.13				56	2.66							.13			1							Tr			Tr	SP	1	5	Tr			Dp	345.3	broken	Dp, mod silicif. Tr sulfs
							Av.	Rec. -	90%																															
						END	OF	HOLE																																

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %, Moderate (Md) 5-50 %, Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. 0-165
Page 1 of 2 Pages
Collar Elev 3175.43 Final Depth 520.0
Coords N 35,609.98 E 19,805.58
Inclination Vertical
Logged by FTG - GWH
Date: Start 8/22/63 Finish 9/9/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC 2.730	0.0	6.6	6.6		.02				56	2.67	.02								Tr								95	Tr		Tr						Mb	0.0		Mb, massive, tr Mn Ox
NC 2.400	6.6	16.5	9.9		.03				91	2.61	.03																95			1									Mb, as above w. tr. dk brn pods. Tr chrx.
	16.5	22.0	5.5		.04				94	2.86	.03			.01													30	45	10	1		10				Tt	16.5	brkn	Tt, leached, sp clay alt. Mod dk brn pods w sp cal vning. Incl Mb.
	22.0	30.9	8.9		.02				99	2.73	.02																80	5	SP	1		5				Mb	22.0	grad	Mb; pods Hf-qtz grad to pure Mb.
	30.9	39.7	8.8		.04				82	3.01			.01	.03													75	5	5	1		10				Sltst	37.7	brkn	Mb; pods Hf-qtz to 37.7, then Sltst, brkn; sp clay alt.
	39.7	46.1	6.4		.02				88	2.61				.02						Tr							20	25	30	1		15				Hf	42.7	brkn	Sltst, dk gy to 42.7, then Hf, massive; mod Tt, sp Sltst
NC 1.875	46.1	55.0	8.9		.03				100	2.69				.03						1							55	5	15	1		15				Mb	47.5	brkn	Hf, dense, sp Sltst to 47.5, then Mb; dense
	55.0	59.6	4.6		.05				99	2.71				.05						1							55	25	10	1		SP				Sltst	58.8	brkn	Mb, dense to 58.8, then Sltst, dense, sp Tt
	59.6	67.3	7.7		.03				43	2.63				.03					Tr	1							50	SP	SP	SP		40							Sltst; brkn; tr lim on fract. Lft patch Sltst bx w cal cement
	67.3	77.2	9.9		.01				89	2.70	.01									1							40	1	20	1		40				Hf	72.8	brkn	Sltst; as above to 72.8, then Hf, sp clay - mod chlor alt.
	77.2	85.7	8.5		.01				100	2.71	.01									1							100		Tr	Tr				Tr		Mb	77.2	brkn	Mb, tr clay alt
	85.7	94.4	8.7		N.I				99	2.68										1							99			1									Mb, tr clay alt
	94.4	103.4	9.0		.01				96	2.70				.01						1							99			1									Mb; as above
	103.4	112.3	8.9		N.I				96	2.68										1							99			1									Mb, tr clay on sh.
	112.3	121.0	8.7		.02				97	2.69				.02						1							99			1				Tr					Mb; as above
	121.0	130.3	9.3		.01				97	2.74				.01						1							99			1									Mb, as above
	130.3	140.0	9.7		.02				95	2.73				.02						Tr					Tr		99			1									Mb; as above
	140.0	148.8	8.8		.04				93	2.72				.04					Tr	1					1		90	SP		1		5							Mb, tr sul vning grad to brkn w patches silicif Mb bx Pods qtz
	148.8	159.4	10.6		.04				95	2.72				.04						1							90	SP	SP			Tr							Mb, no vis. Hf sulfs, tr lim, a few patches qtz.
	159.4	169.0	9.6		.03				99	2.71				.03						1							90	5	Tr										Mb, w lim & Jasp on sh. Patches silicif. spotty $CaSO_4$
	169.0	178.6	9.6		.12				98	2.69							.12			1							80	5	10	SP			Tr						Mb, w scattered areas of Hf. Pods of lim.
	178.6	188.4	9.8		.12				90	2.67							.12		SP	1							85		10	1									Mb, gn. Ts vuggy. Vugs w Cal. xls coated w lim.
	188.4	198.0	9.6		.03				95	2.63							.03			1		Tr					85		10	1									Mb, as above
	198.0	204.5	6.5		.06				88	2.68							.06			1							75	Tr		1	Tr		SP			Mz	202.6	Irreg	Mb as above, changing to Hf. 2' before C.T. Mz dark, brkn, wk alt.
	204.5	213.6	9.1		.01				94	2.60							.01		Tr								SP			1	1		1						Mz, sp alt grad to st feldspath
	213.6	223.3	9.7		.02				88	2.59							.02			1	Tr						15	5	60	5	1		1			Hf	220.0	brkn	Mz; sp feldspath - clay w gray patches to 220.0, then Hf, sp clay - calcite
	223.3	232.4	9.1		.02				98	2.69				.01			.01			1							90	5		SP						Mb	224.3	grad	Hf, as above to 224.3, then Mb; sp vugs w wulfenite. Tr gn-fl
	232.4	241.8	9.4		.08				94	2.68							.08			1		Tr					80	SP	10	1			SP						Mb, tr lim on walls. Sp pods Hf w mod clay alt
	241.8	247.4	5.6		.01				97	2.62							.01			1							95	Tr		Tr									Mb; sp clay alt w sp bx. Sa. Hf w mod clay - chlor
	247.4	257.0	9.6		.06				98	2.68							.06			1					Tr		80		10	5			SP		Tr				Mb, sp clay alt w mod pods grad to Hf w mod chlor - clay alt
	257.0	266.6	9.6		.03				90	2.73							.03				Tr						90		SP	Tr		5							Mb, tr clay on sh. Sp qtz pods
	266.6	276.3	9.7		.02				98	2.71						.01	.01				1						95		Tr	1									Mb, tr sul - chlor - clay walls.
	276.3	283.8	7.5		.05				98	2.70							.05				1						90		5	1									Mb, pods + walls sulf - chlor. Sp Hf pods
	283.8	292.7	8.9		.01				99	2.70							.01				1						95		SP	SP									Mb, tr gra gar. walls Tr sulfs.
	292.7	302.2	9.5		.01				99	2.74							.01				1						95		1	Tr									Mb, sp pods $CaSO_4$
	302.2	311.0	8.8		.02				100	2.70							.02		Tr	1							95	Tr	1	1									Mb; sp pods $CaSO_4$, gen gar. Tr sulfs
	311.0	320.3	9.3		.02				92	2.73							.02			1	1						95	1	1	1									Mb, tr $CaSO_4$ walls.
	320.3	330.1	9.8		.04				100	2.71							.04			1	1	Tr					90	1	5	SP			Tr						Mb, patches sp clay; sp Hf
	330.1	338.7	8.6		.04				100	2.71							.04			1	1						80	10	5	1			1						Mb; tr sul vning
	338.7	348.0	9.3		.10				92	2.69						.05	.05			1	1	Tr					85	5	5	1			1						Mb; tr sul. vning
	348.0	358.0	10.0		.11				87	2.69							.11			1	1	1					85	SP	5	1			5						Mb, tr chlor - sul vning
	358.0	367.1	9.1		.14				95	2.71							.14		SP	1							85	1	5	1			SP						Mb, pods st lim. Sp chlor - sul vning
	367.1	374.9	7.8		.37			.01	86	2.70							.37		Tr	1							90		5	1			Tr						Mb; sp chlor - sul vning. Lim on sh.
Bx 1.432	374.9	383.4	8.5		.58	23.1' @ .42	.02 @ .01	27.1' @ .02	94	3.05						.15	.30	.07			1					Tr		10	30	50		Tr				Hf	375.5		Mb; as above to 375.5, then Hf, mod clay alt. Pods st Tt w sp. cpy - bnzr
	383.4	392.8	9.4		.29				96	2.84							.29			1							10	20	65	1									Hf, dense; sp chlor - clay. Tr sul vning. Pods Tt
	392.8	402.0	9.2		.45				100	2.82							.45								Tr	Tr	10	25	60	1		SP							Hf; dense w gray patches. Sp chlor blebs + vning. Tr sulfs

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Manzonite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-165
Page 2 of 2 Pages
Collar Elev. 3175.43 Final Depth 520.0
Coords. N 35,609.98 E 19,805.58
Inclination Vertical
Logged by ETG - CWH
Date: Start 8/22/63 Finish 9/9/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
402.0	411.4	9.4		.16		.01		88	3.28							.16			Tr					Tr		5	30	40		Tr		15	Tr					Hf dense; silicif patches Tr sulf
411.4	420.6	9.2		.38		.01		92	3.29						.04	.34			1						Tr	5	80	10		1		Tr			Tt	411.4	grad	Tt; sp qtz - chlor - sul vning to 419.0, then Mz, st silicif,
																																			Mz	419.0	brkn	almost pseudo-Dp; sp sul vning
420.6	429.7	9.1		.12				99	2.68							.12		Tr	SP						Tr	Tr				SP		5	Tr					Mz, sp silicif w tr chlor - clay vnlts grad to sp jaro on fspars
429.7	438.4	8.7		.10				96	2.71							.10		1	Tr							1				Tr	Tr	Tr	1					Mz; sp clay - silicif Tr feldspath Tr sul vning
438.4	447.9	9.5		.17		.02		90	3.17							.17			SP							5	60	15		1	1	1	5		Tt	441.7	5°	Mz, mod silicif to 441.7 then Tt; sp chlor - cal vning Sp sulf
447.9	457.0	9.1		.49	27.8' @ .36	.03	27.8' @ .04	99	2.91							.19			1		Tr					5	25	60		SP	1		SP		Hf	451.5	grad	Tt, sp chlor, cal-sul vning to 451.5, then Hf, sp chlor - sul - qtz vning
457.0	466.6	9.6		.62		.05		95	2.81							.62			1							5	10	70		1	1		1					Hf; buff to white; sp chlor - mod sul vning
466.6	475.7	9.1		.56		.04		94	3.09							.56			5		Tr			Tr		5	30	50		1	1		5		Tt	472.0	grad	Hf, as above to 472.0, then Tt; mod chlor - st sulf
475.7	483.3	7.6		.18		.01		89	3.18							.18			SP						Tr	5	45	25		1		10	SP		Dp	480.5	grad	Tt, sp chlor - sul vning w incr silicif to 480.5, then Dp, st silicif - sulf
483.3	487.9	4.6		.27				70	3.17							.27			1							Tr				1	Tr	SP	5					Dp, mod silicif, tr sulf
487.9	496.3	8.4		.20		.01		88	2.69						.03	.17			1							1				1	1	1	SP					Dp, sp silicif - sul vning
496.3	505.0	8.7		.18		.01		89	2.70							.18			1							1				1	1		1					Dp; as above
505.0	513.0	8.0		.11		.01		85	2.65							.11			1							1				1	1		1					Dp, as above
513.0	520.0	7.0		.17		.01		76	2.64							.17			1							1				1	1		1					Dp, wk silicif Tr sulf
						Av.	Rec. =	93 %																														
					END	OF	HOLE																															

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

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Note (4)
V - Vein
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Hole No. 0-165
Page 1 of 2 Pages
Collar Elev 3175.43 Final Depth 520.0
Coords N 35,409.98 E 19,805.58
Inclination Vertical
Logged by FTG - CWH
Date: Start 8/22/63 Finish 9/9/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC-56 2.730 NC 2.400	0.0	6.6	6.6		.02				56	2.67	.02								Tr							95	Tr			Tr						Mb	0.0		Mb, massive, tr Mn Ox
	6.6	16.5	9.9		.03				91	2.61	.03															95	1			1									Mb, as above w. tr dk brn pods. Tr chrx.
	16.5	22.0	5.5		.04				94	2.86	.03			.01												30	45	10		1		10				Tt	16.5	brkn	Tt, leached, sp clay alt. Mod dk brn pods w sp cal vning. Incr Mb.
	22.0	30.9	8.9		.02				99	2.73	.02															80	5	SP		1		5				Mb	22.0	grad	Mb; pods Hf-qtz grad to pure Mb.
	30.9	39.7	8.8		.04				82	3.01			.01	.03												75	5	5		1		10				Sltst	37.2	brkn	Mb; pods Hf-qtz to 37.7, then Sltst, brkn; sp clay alt.
	39.7	46.1	6.4		.02				88	2.61				.02						Tr						20	25	30		1		15				Hf	42.7	brkn	Sltst, dk gy to 42.7 then Hf, massive; mod Tt, sp Sltst
NX 1.875	46.1	55.0	8.9		.03				100	2.69				.03						1						55	5	15		1		15				Mb	47.5	brkn	Hf, dense, sp Sltst to 47.5, then Mb; dense
	55.0	59.6	4.6		.05				99	2.71				.05						1						55	25	10		1		SP				Sltst	58.8	brkn	Mb, dense to 58.8, then Sltst, dense, sp Tt
	59.6	67.3	7.7		.03				43	2.63				.03					Tr	1						50	SP	SP		SP		40							Sltst; brkn; tr lim on fract. 1 ft patch Sltst bx w cal cement
	67.3	77.2	9.9		.01				89	2.70	.01								1							40	1	20		1		40				Hf	72.8	brkn	Sltst; as above to 72.8, then Hf, sp clay - mod chlor alt.
	77.2	85.7	8.5		.01				100	2.71	.01								1							100		Tr		Tr				Tr		Mb	77.2	brkn	Mb, tr clay alt
	85.7	94.4	8.7		N:1				99	2.68									1							99		1		1									Mb, tr clay alt
	94.4	103.4	9.0		.01				96	2.70				.01					1							99		1		1									Mb; as above
	103.4	112.3	8.9		N:1				96	2.68									1							99				1									Mb, tr clay on sh.
	112.3	121.0	8.7		.02				97	2.69				.02					1							99				1				Tr					Mb, as above
	121.0	130.3	9.3		.01				97	2.74				.01					1							99				1									Mb, as above
	130.3	140.0	9.7		.02				95	2.73				.02						Tr					Tr	99				1									Mb; as above
	140.0	148.8	8.8		.04				93	2.72				.04					Tr	1					1	90		SP		1		5							Mb, tr sul vning grad to brkn w patches silicif Mb bx. Pods qtz
	148.8	159.4	10.6		.04				95	2.72				.04					1	1						90		SP		SP				Tr					Mb, no visible sulfs, tr lim, a few patches qtz.
	159.4	169.0	9.6		.03				99	2.71				.03					1	1						90		5		Tr									Mb, w lim & Dac on sh. Patches silicif, spotty $CaSiO_3$
	169.0	178.6	9.6		.12				98	2.69							.12		1	1						80	5	10		SP				Tr					Mb, w scattered areas of Hf. Pods of lim.
	178.6	188.4	9.8		.12				90	2.67							12		SP	1						85		10		1									Mb, gn Tc vuggy. Vugs w Cal. x's coated w lim.
	188.4	198.0	9.6		.03				95	2.63							.03		1	1		Tr				85		10		1									Mb, as above
	198.0	204.5	6.5		.06				88	2.68							.06		1	1						75		Tr		1	Tr		SP			Mz	202.6	Freq	Mb as above, changing to Hf 2' before cont. Hf dark, brkn, wh alt.
	204.5	213.6	9.1		.01				94	2.60							.01		Tr							SP				1	1		1						Mz, sp alt grad to st feldspath
	213.6	223.3	9.7		.02				88	2.59							.02		1	Tr						15	5	60		5	1		1			Hf	220.0	brk.	Mz, sp feldspath - clay w gay patches to 220.0, then Hf, sp clay - calcm
	223.3	232.4	9.1		.02				98	2.69				.01			.01		1	1						90		5		SP						Mb	224.3	grad	Hf, as above to 224.3, then Mb; sp vugs w wulfenite. Tr gn-fl
	232.4	241.8	9.4		.08				94	2.68							.08		1	1		Tr				80	SP	10		1			SP						Mb, tr lim on walls. Sp pods Hf w mod clay alt
	241.8	247.4	5.6		.01				97	2.62							.01		1							95		Tr		Tr									Mb; sp clay alt w sp bx. Sp Hf w mod clay-chlor
	247.4	257.0	9.6		.06				98	2.68							.06		1					Tr		80		10		5			SP		Tr				Mb, sp clay alt w mod pods grad to Hf w med chlor-clay alt
	257.0	266.6	9.6		.03				90	2.73							.03			Tr						90		SP		Tr		5							Mb; tr clay on sh. Sp qtz pods
	266.6	276.3	9.7		.02				98	2.71						.01	.01			1						95		Tr		1									Mb; tr sul-chlor-clay vnlts.
	276.3	283.8	7.5		.05				98	2.70							.05			1						90		5		1									Mb, pods + vnlts sulf-chlor. Sp Hf pods
	283.8	292.7	8.9		.01				99	2.70							.01			1						95		SP		SP									Mb; tr gn gar. vnlts Tr sulfs.
	292.7	302.2	9.5		.01				99	2.74							.01			1						95		1		Tr									Mb, sp pods $CaSiO_3$
	302.2	311.0	8.8		.02				100	2.70							.02		Tr	1						95	Tr	1		1									Mb; sp pods $CaSiO_3$, gra gar. Tr sulfs
	311.0	320.3	9.3		.02				92	2.73							.02		1	1						95	1	1		1									Mb, tr $CaSiO_3$ vnlts.
	320.3	330.1	9.8		.04				100	2.71							.04		1	1		Tr				90	1	5		SP				Tr					Mb, patches sp clay; sp Hf
	330.1	338.7	8.6		.04				100	2.71							.04		1	1						80	10	5		1				1					Mb; tr sul vning
	338.7	348.0	9.3		.10				92	2.69						.05	.05		1	1		Tr				85	5	5		1				1					Mb; tr sul. vning
	348.0	358.0	10.0		.11				87	2.69							.11		1	1		1				85	SP	5		1				5					Mb; tr chlor - sul vning
	358.0	367.1	9.1		.14				95	2.71							.14		SP	1						85	1	5		1				SP					Mb, pods st lime. Sp chlor - sul vning
	367.1	374.9	7.8		.37			.01	86	2.70							.37		Tr	1						90		5		1				Tr					Mb; sp chlor - sul vning. Lim on sh.
BX 1.435	374.9	383.4	8.5		.52	.27.1' @ .42	.02	.27.1' @ .02	94	3.05						.15	.30	.07		1					Tr	10	30	50		1		Tr				Hf	375.5		Mb; as above to 375.5, then Hf, med clay alt. Pods st Tt w sp cpy - bnr
	383.4	392.8	9.4		.29				96	2.84							.29			1						10	20	65		1									Hf, dense; sp chlor - clay. Tr sul vning. Pods Tt
	392.8	402.0	9.2		.45				100	2.82							.45							Tr	Tr	10	25	60		1		SP							Hf, dense w. gay patches. Sp chlor blebs + vning. Tr sulfs

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Toctite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-165
Page 2 of 2 Pages

Collar Elev. 3175.43
Final Depth 520.0
Coords. N 35,609.98 E 19,805.58
Inclination Vertical
Logged by FTG - GWH
Date: Start 8/22/63 Finish 9/9/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
402.0	411.4	9.4		.16		.01		88	3.28							.16			Tr				Tr		5	30	40		Tr		15	Tr						Hf, dense, silicif patches Tr suls
411.4	420.6	9.2		.38		.01		92	3.29						.04	.34			1					Tr	5	80	10		1		Tr			Tt	411.4	grad	Tt, sp qtz - chlor - sul vning to 419.0, then Mz, st silicif,
																																		Mz	419.0	brkn	almost pseudo - Dp, sp sul vning
420.6	429.7	9.1		.12				99	2.68							.12		Tr	SP					Tr	Tr				SP		5	Tr						Mz, sp silicif w tr chlor - clay vnlts grad to sp jaro on fspars.
429.7	438.4	8.7		.10				96	2.71							.10		1	Tr						1				Tr	Tr	Tr	1						Mz, sp clay - silicif. Tr feldspath Tr sul vning
438.4	447.9	9.5		.17		.02		90	3.17							.17			SP						5	60	15		1	1	1	5		Tt	441.7	5°	Mz, mod silicif to 441.7 then Tt, sp chlor - sul vning Sp suls
447.9	457.0	9.1		.49	27.8 @ .56	.03	27.8 @ .04	99	2.91							.49			1		Tr				5	25	60		SP	1		SP		Hf	451.5	grad	Tt, sp chlor, sul-sul vning to 451.5, then Hf, sp chlor - sul - qtz vning
457.0	466.6	9.6		.62		.05		95	2.81							.62			1						5	10	70		1	1		1						Hf, buff to white; sp chlor - mod sul vning
466.6	475.7	9.1		.56		.04		94	3.09							.56			5		Tr			Tr	5	30	50		1	1		5		Tt	472.0	grad	Hf, as above to 472.0, then Tt, mod chlor - st suls
475.7	483.3	7.6		.18		.01		89	3.18							.18			SP					Tr	5	45	25		1		10	SP		Dp	480.5	grad	Tt, sp chlor - sul vning w incr silicif to 480.5, then Dp, st silicif - suls
483.3	487.9	4.6		.27				70	3.17							.27			1						Tr				1	Tr	SP	5						Dp, mod silicif, tr suls
487.9	496.3	8.4		.20		.01		88	2.69						.03	.17			1						1				1	1	1	SP						Dp, sp silicif - sul vning
496.3	505.0	8.7		.18		.01		89	2.70							.18			1						1				1	1		1						Dp, as above
505.0	513.0	8.0		.11		.01		85	2.65							.11			1						1				1	1		1						Dp, as above
513.0	520.0	7.0		.17		.01		76	2.64							.17			1						1				1	1		1						Dp, wk silicif Tr suls
						Av.	Rec. =	93%																														
					END	OF	HOLE																														

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5-50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-166
Page 1 of 1 Pages
Collar Elev. 2957.23 Final Depth 355.6
Coords. N 35,773.67 E 19,052.45
Inclination Vert
Logged by FTG - CWH
Date: Start 9/6/63 Finish 9/19/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	GYPSUM	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
NC std 2.750	0.0	7.0	7.0		.17		.14		30	2.60	.14					.03			SP											SP	5	Tr		Tr	Tr		Dp	0.0	-	Dp, leached, brkn, sp clay alt
NC 2.400	7.0	13.6	6.6		.16		.08		76	2.55	.08					.08			1											1	5	1		1	1					Dp, as above w gay areas
	13.6	21.9	8.3		.11		.08		90	2.57	.08					.03			1											1	5	1		1	1					Dp, leached, mod clay alt w pod st jaro - lim
	21.9	31.2	9.3		.12		.06		83	2.59	.04	.01	.01			.06			1											1	5	1		1	1					Dp, leached, mod clay alt w gay patches
	31.2	39.5	8.3		.06				32	2.55	.03		.01			.02			1											1	SP	1		1	1					Dp, leached, mod clay alt
	39.5	49.1	9.6		.06				63	2.38	.03		.01			.02			1											15	40	1			1					Dp, leached, int clay alt w patches Dp bx Flt zone
	49.1	58.4	9.3		.06				86	2.53			.01	.03		.02			1											15	30	1			1					Dp, int clay alt w bx patches to 54.7 then sp clay alt
	58.4	64.3	5.9		.13		.12		69	2.56			.02	.10		.01			1											10	30	1	5		1					Dp, mod clay - silicif w gay areas, Pods Mz, grad to st clay alt
	64.3	69.5	5.2		.15		.10		89	2.53			.01	.09		.05			1											10	20	1			1		Mz	64.3	brkn	Mz, mod clay - feldspath Tr CuOx..
	69.5	78.2	8.7		.36				74	2.58			.02	.30		.04			1											5	5	1			1					Mz, leached, sp clay - feldspath Sp CuOx Tr Dp incl
	78.2	86.3	8.1		.34				94	2.56			.02	.30		.02			1											5	15	1			1					Mz, leached, mod clay alt Sp CuOx - ads Cu
	86.3	94.2	7.9		.37				98	2.54			.03	.20		.14			1	Tr										10	35				1		Dp	89.3	brkn	Mz, leached, mod clay alt to 89.3, then Dp, st clay alt, Areas blk gg (Sheared?)
	94.2	102.6	8.4		.32				95	2.56		.01	.02	.27		.02			1	1		Tr								15	45				1					Dp, leached, st clay alt w dk grn-gy incl (Hf. SHst) Sp CuOx.
	102.6	112.0	9.4		.17				95	2.59		.01	.01	.11		.04			1	1										5	10				1					Dp, leached, sp alt w pods st clay alt Areas wk bx Tr sulf - CuOx
	112.0	122.0	10.0		.11				84	2.63		.01	.01	.06		.03			1	1										SP	5			Tr	1	Tr				Dp, sp clay alt Tr sulf Tr dk incl
	122.0	130.5	8.5		.08				97	2.61			.01	.04		.03			1	1										10	25			1	1		Mz	125.5	brkn	Dp, as above to 125.5, then Mz, leached, st clay alt. Rubbly text
	130.5	139.6	9.1		.05				84	2.49			.01	.03		.01			1	1		Tr								10	30			1	1		Dp	135.0	brkn	Mz, st to int clay-jaro alt to 135.0, then Dp, mod clay - hem - chlor alt
	139.6	146.6	7.0						-	-																													Drift
	146.6	151.6	5.0		.03				90	2.68			.01	.02					Tr	Tr										SP	5			Tr	Tr	Tr				Dp, leached w sp sulf, mod silicif w aplite text
NX 1.875	151.6	160.2	8.6		.06				94	2.66				.02		.02	.02		1	1		Tr			SP	SP	25	Tr	5	SP	35	5				Hf	151.7	brkn	Dp, as above to 151.7, then Hf, dense, mod silicif Sp pods Tt w sp hem
	160.2	169.5	9.3		.20				86	2.62				.02		.03			1	1					5	1	35	P	10	1	30	20							Hf, mod silicif w chlor blebs + mod sul vning grad to mod clay Sp Siltst
	169.5	176.7	7.2		.04				60	2.61				.03		.01			1	1					5		10	1	5	1	25	5							Hf - Siltst, mod silicif - blea Sp clay alt
	176.7	186.8	10.1		.03				50	2.63				.02		.01			1	1					SP		5	1	53	1	10	SP				Dp	181.9	brkn	Hf - Siltst, as above to 181.9, then Dp, sp alt, sp clay on sh
	186.8	195.6	8.8		.03				94	2.55		Tr		.02		.01			1	1					SP			1	5	1		Tr							Dp, sp alt. Patches mod clay - feldspath (Mz? - Hf?)
	195.6	204.0	8.4		.06				86	2.64				.01		.05			1	1					Tr				SP	Tr									Dp, dense, sp silicif Tr sulf
	204.0	214.8	10.8		.07				91	2.62						.07				1					1				1	1			1						Dp, as above 6' patch Ap
	214.8	225.1	10.3		.05				95	2.59						.05				1					1				1	1			1						Dp, brkn, sp clay - silicif Tr sulf
	225.1	233.5	8.4		.08				86	2.64						.08				1					1				Tr	1	Tr		1						Dp, sp silicif Tr bio flakes Tr sulf
	233.5	242.7	9.2		.15				92	2.64						.15				1					1				1	1			1						Dp, as above w sp dk incl
	242.7	252.3	9.6		.37				88	2.73						.37				1					1				1	1			SP						Dp, dk shase (Ap) w sp sul vning grad to sp silicif Tr sulf
	252.3	260.8	8.5		.10				94	2.63						.10				1					1				SP	1			Tr						Dp, sp silicif - clay on shears Tr sulf
	260.8	269.5	8.7		.07				90	2.65						.07				1					Tr				Tr	1			1						Dp, tr silicif Tr incp feldspath on sh Tr sulf, dk incl
	269.5	276.4	6.9		.04				94	2.63						.04				1					1	Tr				1			1						Dp patches sp clay alt Tr dk incl Tr sulf
	276.4	285.3	8.9		.05				44	2.63						.05				1					1					1	1		1						Dp, tr silicif Tr feldspath, sulf
	285.3	293.4	8.1		.04				94	2.67						.04				1					1				10	1			1						Dp, as above w gay - brkn area
	293.4	303.3	9.9		.11				72	2.66						.11				1					1				SP	1			1						Dp, as above w incl Ap? Sp sulf
	303.3	309.0	5.7		.06				90	2.61						.06				1					1				Tr	1			1						Dp, mod shearing, sp silicif - spotty sp feldspath. Tr sulf
	309.0	317.8	8.8		.04				95	2.61						.04				1				Tr	1				SP	1			1						Dp, wk alt Tr sulf
	317.8	326.2	8.4		.05				98	2.62						.05				1					1				1	1			1						Dp, as above
	326.2	335.0	8.8		.04				83	2.63						.04				1					1				1	1			1						Dp, mod shearing, sp alt Tr sulf
	335.0	344.6	9.6		.05				77	2.64						.05				1					1				1	1			1						Dp, brkn patches w sp clay alt Tr sulf
	344.6	352.4	7.8		.03				91	2.62						.03				1					1				1	1			1						Dp, brkn w sp alt Tr sulf
	352.4	355.6	3.2		.02				100	2.65						.02				1					1				1	1			1						Dp, wk alt
							Av	Rec =	83%																														
						END	OF	HOLE																															

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-167
Page 1 of 2 Pages
Collar Elev. 3017.82 Final Depth 626.2
Coords N. 35,294.59 E. 19,652.21
Inclination Vert
Logged by FTG - CWH
Date: Start 9/10/63 Finish 9/30/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Native Copper	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	80	80						—	—																													ROCKBIT
NG 2400	80	17.5	9.5		.10				89	2.60	.07	.01	.02						SP										SP	10	Tr.		Tr	Tr	Mz	8.0	-	Mz; leached; mod clay alt, areas fg text. Mod ten-melacon. vning
	17.5	25.1	7.6		.05				66	2.65	.03	.01	.01						|										10	20	1	10	|	|				Mz, leached, mod-st clay alt. Mod blk CuOx vning. Silicif areas
	25.1	36.1	11.0		.10				66	2.47	.08	.01	.01						|										10	20	1		|	|				Mz; leached; mod clay alt w ggy areas
	36.1	46.0	9.9		.11				75	2.46	.04	.02	.05						|										10	20	1		|	|				Mz; as above grad to mod clay - chlor - lim alt. Tr suls
	48.0	54.5	8.5		.17				89	2.67	.02	.02	.05			.08			5	Tr										5	25	1		5	|				Mz; leached w sp suls. St clay - chlor - lim alt. Mod Dp text
	54.5	59.6	5.1		.15				96	2.63		.01	.02		.01	.11			5	|									SP	20	1		25	|				Mz; leached, st clay alt w destroyed Mz text to 58.6, then sp clay - suls
	59.6	67.2	7.6		.03				87	2.84		.01	.01			.01			SP	|									5	25	1		SP	|				Mz; sp mod clay alt w lim - sul veins grad to st clay - chlor - lim alt
	67.2	76.5	9.3		.10				96	2.63		.01	.01			.08			|	|									SP	10	1		10	|				Mz, leached on sh, mod diss py. Sp f.g, mod chlor areas (dioritic facies?)
	76.5	85.3	8.8		.13				95	2.78		.01	.02			.10			|	|									|	5	1		15	|				Mz; as above
	85.3	94.4	9.1		.07				88	2.58		.01	.03			.03			|	|									5	25	1		10	|				Mz, leached w sp py. Sp clay alt w silica cement bx grad to ggy patches
	94.4	103.5	9.1		.04				80	2.61		.01	.01			.02			|	|									SP	15	1		SP	|				Mz; mod clay - insp feldspath. Mod div. lim - sul vning
NX 1875	103.5	113.4	9.9		.07				87	2.63			.01	.01		.05			Tr	|									P	10	1		|	|				Mz, mod clay - sp feldspath. Sp patches dior facies
	113.4	122.1	8.7		.16				92	2.73			.01	.03		.12			|	|		Tr							|	5	1		5	|				Mz; as above w sp hem in dioritic rk
	122.1	131.5	9.4		.55	.18.8 @ .57	.02	.18.8 @ .02	95	2.74						.55			|	SP		|			SP		25	|	10			35	|	Hf	122.1	broken	Hf, st sul - chlor alt. Tr cal vning. Ggy patches w st clay 2 ft Mz
	131.5	140.9	9.4		.59				87	2.74						.59				|		|				30	|	15			15		Dp	137.0	broken	Hf; st clay - chlor alt. Sp diss hem, mod suls to 137.0, then Dp, mod silicif
	140.9	150.5	9.6		.35				88	2.62						.35			Tr	Tr						|			Tr	5	Tr		SP	Tr				Dp, mod silicif - clay alt. Areas sp chlor. Tr suls, oxidic gn - fluor vult
	150.5	159.8	9.3		.30		.05		82	2.85						.30			|	|		Tr				|		.10	|	SP	|	.5	10	|				Dp, mod silicif grad to mod chlor - feldspath w sp cal ming
	159.8	168.5	8.7		.37		.05		56	2.56					.05	.20	.12		|	|		|				Tr			|	5	|		SP	|				Dp, brkn, mod silicif w patches dk gn rock (st chlor?) Tr CuOx
	168.5	176.3	7.8		.42		.02		58	2.74						.30	.12		|	|		|						5	|	5	|		20	|				Dp, dk gn phase (st chlor?) Sp cal vning (Hf ind?)
	176.5	184.3	8.0		.22		.12		72	2.70					.12	.10			|	|		|				|			|	5	|		SP	|				Dp, brkn, mod silicif w patches mod feldspath. Tr CuOx
	184.3	194.0	9.7		.31				69	2.49					.04	.17	.10		|								|			|	5	|		|					Dp, mod feldspath, tr Mz text
	194.0	203.3	9.3		.26				71	2.66					.02	.14	.10		|	|							|		Tr	|	Sp	|		|					Dp, wk alt w feldspath on vults
	203.3	212.2	8.9		.33		.02		25	2.72						.15	.18		|	|							|			|	Tr	|		|					Dp, as above
	212.2	221.5	9.3		.44		.02		86	2.70						.24	.20			|							|			|	Sp	|		|					Dp, sp alt w pods mod feldspath, sp suls - vaults
	221.5	230.1	8.6		.36		.01		97	2.69						.10	.26			|						Tr	|		|	|	|		|					Dp, sp mod feldspath. Sp Mz text
	230.1	239.2	9.1		.66	56.3' @ .57	.01	56.3' @ .01	91	2.74						.20	.46			|						SP		SP	10	|	|	|		|					Dp, as above w 13' qtz - epid - sl vult
	239.2	245.8	6.6		.43		.01		94	2.78						.10	.33			|		Tr	Tr			Tr			5	|	|	|		|					Dp, sp chy - feldspath. Mod fg Mz text. 15' patch Tt w st sl
	245.8	254.3	8.5		.37		.01		89	2.72						.05	.32			|									5	|	|	|		|					Dp, sp silicif. 1.5' patch Tt w w. mod chlor ming. Sp suls
	254.3	262.8	8.5		1.00		.01		58	2.66						.15	.85			|								Tr		|	|	|		(					Dp?, dense wk chlor & epidote. Sp py & cpy. Sp clay alt
	262.8	268.5	5.5		.77		.03		93	2.63						.10	.67			|										|	5	|		|	TT	268.4	broken	Dp? as above poor chlor towards ct.
	268.5	279.6	11.1		.18		.01		95	2.51						.02	.16		Tr	|		Tr				.20		5	55	15		20	|				Tr, wk clay & epidote. Sp. Chlor. Mod py & sp cal.
	279.6	289.5	9.9		.16				74	2.60							.16		|	|								SP			5	|		10	Dp	279.6	broken	Dp? st silicif, brkn. sp. cpy.
	289.5	299.5	10.0		.14				77	2.61							.14		|	|								|			SP	|		35					Dp, st silicif. Tr vugs w qtz xtls. Sp suls
	299.5	307.5	8.0		.10				69	2.96							.10		|	|		Tr						10	10	40	20	10	|		5		Tt	299.5	broken	Tt, brkn; areas st clay alt. Sp hem - cal vning w pods st chlor. 1 ft silicif Dp
	307.5	316.0	8.5		.04				72	2.55							.04		|	|		|	Tr	Tr				10	25	40	15	5			SP				Tt, ft bx w st clay to 309.0, then mod clay - sp chlor alt. Sp suls
	316.0	324.5	8.5		.15				91	2.50							.15		|	|		|						5	5	30	10	35			5		Hf	316.0	broken	Hf, int clay alt. Sp diss chlor - suls. Pods Tt
	324.5	333.8	9.3		.11				86	2.70							.11			|								5	|	10	20	20			SP				Hf, mod clay alt. Ggy patches. Tr suls. Patches gn w dk blebs w incl. cpy
	333.8	342.4	8.6		.73	333' @ .67	.06	333' @ .05	98	2.67							.73			|								5	SP	5	5	10			|				Hf, dense; mod clay alt. Patches gn text. Chlor? blebs assoc w mod diss suls
	342.4	352.3	9.9		.17				89	2.56							.17			|		Tr						45	SP	15	SP	5			10		Mb	344.4	broken	Hf, mod chlor - clay to 344.4, then Mb; sp clay alt.
	352.3	361.0	8.7		1.18		.05		96	2.71							1.18			|		|						75	5	5		SP			5				Mb; pods Tt w sp hem - st suls
	361.0	370.8	9.8		.23		.03		93	2.68							.23			|		|						90	5	SP		|			Tr				Mb; pods + vults hem - Tt w sp suls
	370.8	379.2	8.4		.11				96	2.81							.11			|								45		40		Tr		10	|				Mb, tr chlor vning grad to mod qtz pods w 1 ft qtz bx
	379.2	388.6	9.4		.24				96	2.71							.24			|								SP	SP	5		|		40	|	Hf	379.2	broken	Hf, 2 ft patch int silicif (Hf?) grad to pods CaSiO3 - Tt to 383.3,
					—		—		—	—																											Mz	383.3	broken	then Mz? vague sg per text masked by st silicif. Sp suls in dk blebs.
	388.6	398.1	9.5		.14				99	2.66							.14		Tr							Tr	Tr					Tr	SP	40	Tr					Mz, mod silicif w f.g blebs, gn? Mod dk blebs (remnant bio?) w included cpy.

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5.% Moderate (Md) 5-50 % Strong (St) +50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-167
Page 2 of 2 Pages

Collar Elev. 3017.82 Final Depth 626.2
Coords. N 35,294.59 E 19,652.21
Inclination Vert
Logged by FTG - CWH
Date: Start 9/10/63 Finish 9/20/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	BARITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
Bx 1432	398.1	407.2	9.1		.56		.03		100	2.72							.56			Tr				Tr	SP	40	40	10		Tr			SP		Hf	402.4	beta	Mz, mod Tt incl to 402.4, then Hf; poda cpy-sl; tr chlor vn. Mod Mb
	407.2	416.6	9.4		.04				94	2.68							.04									99							Tr		Mb	402.2	beta	Mb sp chlor-cal vning
	416.6	423.8	7.2		.05				93	2.71							.05									99												Mb as above
	423.8	433.0	9.2		.05				98	2.72							.05									99												Mb sp-mod cal-chlor vning
	433.0	442.4	9.4		.01				89	2.69							.01									97	Tr											Mb; as above
	442.4	452.7	10.3		.02				92	2.70							.02		Tr							95	Tr			Tr								Mb; sp clay alt 1" sul-hem-gar valt
	452.7	461.0	8.3		nil				98	2.70																98												Mb; sp clay alt
	461.0	470.4	9.4		.01				96	2.70							.01									99												Mb, bl gy grad to white. Tr clay alt.
	470.4	480.1	9.7		nil				93	2.70																99												Mb; white, tr alt
	480.1	489.7	9.6		.08				94	2.68							.08									99												Mb; sp diss clay-chlor alt. Almost Ls
	489.7	496.4	6.7		nil				94	2.72																99												Mb; as above
	496.4	505.5	9.1		.02				100	2.72							.02									99												Mb; as above
	505.5	514.8	9.3		.01				100	2.71							.01									99												Mb, as above
	514.8	524.3	9.5		.01				99	2.70							.01									99												Mb, as above
	524.3	533.9	9.6		nil				98	2.70																99												Mb; as above
	533.9	543.6	9.7		nil				95	2.70																99												Mb, vk alt; almost Ls
	543.6	553.0	9.4		.01				97	2.72							.01									99												Mb; as above
	553.0	561.0	8.0		nil				99	2.69																98	Tr											Mb; as above
	561.0	571.0	10.0		nil				92	2.71																99												Mb; as above.
	571.0	581.6	10.6		.02				88	2.70							.02									99	Tr											Mb; as above Tr vugs
	581.6	591.0	9.4		.01				95	2.72							.01									95	SP						Tr					Mb; as above.
	591.0	600.7	9.7		.01				93	2.71							.01									99												Mb; as above grad to white
	600.7	610.3	9.6		nil				96	2.71																95	SP											Mb; as above
	610.3	616.2	5.9		.01				97	2.69							.01									95	Tr				Tr			Tr				Mb; as above w 3" gry area w bar
	616.2	626.2	10.0		.01				97	2.73							.01									95	SP											Mb, white w gtz pods.

Av Rec. = 88%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

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Tt - Tactite
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Hole No. D-167
Page 1 of 2 Pages
Collar Elev. 3017.82 Final Depth 626.2
Coords N 35,294.59 E 19,652.21
Inclination Vert
Logged by FTG - CWH
Date: Start 9/10/63 Finish 9/30/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Native Copper	Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	8.0	8.0						—	—																													ROCKBIT
NS 2400	8.0	17.5	9.5		.10				89	2.60	.07	.01	.02						SP										SP	10	Tr.		Tr	Tr	Mz	8.0	-	Mz; leached; mod clay alt, areas fg text. Mod tan - nelson vning
	17.5	25.1	7.6		.05				66	2.65	.03	.01	.01						1										10	20	1	10	1	1				Mz, leached, mod-st clay alt. Mod blk CuOx vning. Silicif areas
	25.1	36.1	11.0		.10				66	2.47	.08	.01	.01						1										10	20	1		1	1				Mz; leached; mod clay alt w ggy areas
	36.1	46.0	9.9		.11				75	2.46	.04	.02	.05						1										10	20	1		1	1				Mz; as above grad to mod clay - chlor - lim alt. Tr suls
	46.0	54.5	8.5		.17				89	2.67	.02	.02	.05			.08			5	Tr									5	25	1		5	1				Mz; leached w sp suls. St clay - chlor - lim alt. Mod Dp text
	54.5	59.6	5.1		.15				96	2.63		.01	.02		.01	.11			5	1									SP	20	1		25	1				Mz; leached, st clay alt w destroyed Mz text to 58.6 then sp clay - suls
	59.6	67.2	7.6		.03				87	2.84		.01	.01			.01			SP	1									5	25	1		SP	1				Mz; sp mod clay alt w lim - sul vnlts grad to st clay - chlor - lim alt
	67.2	76.5	9.3		.10				96	2.63		.01	.01			.08			1	1									SP	10	1		10	1				Mz, leached on sh, mod diss py. Sp fg, mod chlor areas (dioritic facies?)
	76.5	85.3	8.8		.13				95	2.70		.01	.02			.10			1	1									1	5	1		15	1				Mz; as above
	85.3	94.4	9.1		.07				88	2.58		.01	.03			.03			1	1									5	25	1		10	1				Mz, leached w sp py. Sp clay alt w silica cement by grad to ggy patches
	94.4	103.5	9.1		.04				80	2.61		.01	.01			.02			1	1									SP	15	1		SP	1				Mz; mod clay - incip feldspath. Mod dis. lim - sul vning
NX 1875	103.5	113.4	9.9		.07				87	2.63			.01	.01		.05			Tr	1									P	10	1		1	1				Mz; mod clay - sp feldspath. Sp patches dior facies
	113.4	122.1	8.7		.16				92	2.73			.01	.03		.12			1	1		Tr							1	5	1		5	1				Mz; as above w sp hem in dioritic ck
	122.1	131.5	9.4		.55	.18.8	.02	.18.8	95	2.74						.55			1	SP		1				SP		25		10			35	1	Hf	122.1	broken	Hf, st sul - chlor alt. Tr cal vning. Ggy patches w nt clay 2 ft. Mz
	131.5	140.9	9.4		.59	.57	.01	.02	87	2.74						.59				1		1				1		30	1	15			15		Dp	137.0	broken	Hf; st clay - chlor alt. Sp diss hem, mod suls to 137.0, then Dp, mod silicif
	140.9	150.5	9.6		.35				88	2.62						.35			Tr	Tr						1			Tr	5	Tr		SP	Tr				Dp, mod silicif - clay alt. Areas sp chlor. Tr suls, oxide gn - fluor vnlt
	150.5	159.8	9.3		.30		.05		82	2.85						.30			1	1		Tr				1		10	1	SP	1	5	10	1				Dp, mod silicif grad to mod chlor - feldspath w sp cal vning
	159.8	168.5	8.7		.37		.05		56	2.56					.05	.20	.12		1	1		1				Tr			1	5	1		SP	1				Dp; brkn, mod silicif w patches dk grnish (st chlor?) Tr CuOx
	168.5	176.3	7.8		.42		.02		58	2.74						.30	.12		1	1		1				1		5	1	5	1		20	1				Dp; dk grn phase (st chlor?) Sp cal vning (Hf mod?)
	176.3	184.3	8.0		.22		.12		72	2.70					.12	.10			1	1		1				1			1	5	1		SP	1				Dp; brkn; mod silicif w patches mod feldspath. Tr CuOx
	184.3	194.0	9.7		.31				69	2.49					.04	.17	.10		1	1						1			1	5	1		1					Dp; mod feldspath, tr Mz text
	194.0	203.3	9.3		.26				71	2.66					.02	.14	.10		1	1						1		Tr	1	Sp	1		1					Dp; wk alt w feldspath on vnlts
	203.3	212.2	8.9		.33		.02		25	2.72						.15	.18		1	1						1		1	1	Tr	1		1					Dp; as above
	212.2	221.5	9.3		.44		.02		86	2.70						.24	.20			1						1		1	1	Sp	1		1					Dp, sp alt w pods mod feldspath, sp suls. on vnlts
	221.5	230.1	8.6		.36		.01		97	2.69						.10	.26			1				Tr		1		1	1	1			1					Dp sp mod feldspath. Sp Mz text
	230.1	239.2	9.1		.66	56.3	.01	56.3	91	2.74						20	.46			1				SP	SP	10		1	1	1	1		1					Dp; as above w 1" qtz - epid - st vnlt
	239.2	245.8	6.6		.43	.57	.01	.01	94	2.78						10	.33			1		Tr	Tr	Tr		1	5	1	1	1	1		1					Dp; sp chy - feldspath. Mod fg Mz text 15' patch Tt w st sl
	245.8	254.3	8.5		.37		.01		89	2.12						.05	.32			1		1				1	5	1	1	1	1		1					Dp; sp silicif. 1.5' patch Tt w w mod chlor ming. Sp suls
	254.3	262.8	8.5		1.00		.01		58	2.66						.15	.85			1						Tr			1	1	1		(					Dp?, dense w/ chlor & epidote. sp py & cpy. Sp clay alt.
	262.8	268.5	5.5		.77		.03		93	2.63						.10	.67			1									1	5	1		1		Tt	268.4	brkn	Dp? as above, over chlor. Tr seeds etc.
	268.5	279.6	11.1		.18		.01		95	2.51						.02	.16		Tr	1		Tr			.20	5	55	15		20	1		1					Tt, w clay & epidote. Sp Chlor. Mod py & spcal.
	279.6	289.5	9.9		.16				74	2.60							.16		1	1						SP				5	(		30		Dp	279.6	brkn	Dp? st silicif, broken. Sp. cpy.
	289.5	299.5	10.0		.14				77	2.61							.14		1	1						1				SP	1		35					Dp, st silicif. Tr vugs w qtz xtls. Sp suls
	299.5	307.5	8.0		.10				69	2.96							.10		1	1		Tr				10	10	40	20	10	1		5		Tt	299.5	brkn	Tt, brkn; areas st clay alt. Sp hem - cal vning w pods st chlor. Lft silicif Dp
	307.5	316.0	8.5		.04				72	2.55							.04		1	1		1		Tr	Tr	10	25	40	15	5			SP					Tt, Ft bx w st clay to 309.0, then mod clay - sp chlor alt. Sp suls.
	316.0	324.5	8.5		.15				91	2.50							.15		1	1		1				5	5	30	10	35			5		Hf	316.0	brkn	Hf; int clay alt. Sp diss chlor - suls. Pods Tt
	324.5	333.8	9.3		.11				86	2.70							.11			1						5		10	20	20			SP					Hf; mod clay alt. Ggy patches. Tr suls. Patches ign w. dk blebs w incl. cpy
	333.8	342.4	8.6		.73	.22 .67	.06	.22 .05	98	2.67							.73			1						5	SP	5	5	10			1					Hf, dense; mod clay alt. Patches gn text. Chlor? blebs assoc w mod diss suls
	342.4	352.3	9.9		.17				89	2.56							.17			1		Tr				45	SP	15	SP	5			10		Mb	344.4	brkn	Hf, mod chlor - clay to 344.4, then Mb; sp clay alt.
	352.3	361.0	8.7		1.18		.05		96	2.71							1.18			1		1				75	5	5		SP			5					Mb; pods Tt w. sp hem - st suls
	361.0	370.8	9.8		.23		.03		93	2.68							.23			1		1				90	5	SP		1			Tr					Mb; pods + vnlts hem - Tt w sp suls
	370.8	379.2	8.4		.11				96	2.81							.11			1						45		40		Tr		10	1					Mb, tr chlor vning grad to mod qtz pods w 1 ft qtz bx
	379.2	388.6	9.4		.24				96	2.71							.24			1						SP	SP	5		1		40	1		Hf	379.2	brkn	Hf, 2 ft patch int silicif (Hf?) grad to pods $CaSiO_3$ - Tt to 383.3,
					—		—		--	—																										Mz	388.3	brkn	then Mz? vague sg par text masked by st silicif. Sp suls in dk blebs
	388.6	398.1	9.5		.14				99	2.66							.14			Tr					Tr	Tr				Tr	SP	40	Tr					Mz; mod silicif w fg blebs, gnt? Mod dk blebs (cement bio?) w included cpy.

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Tt - Toctite
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Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg	% Cu NS	% Cu Avg	% Core Recov	Sp Gr	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	BARITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
Bx 398.1	407.2	9.1		.56		.03		100	2.72							.56			Tr				Tr	SP	40	40	10		Tr			SP			Hf	402.4	b-k	Mz; mod Tt incl to 402.4, then Hf; pods cpy-sl; tr chlor vn Mod Mb
407.2	416.6	9.4		.04				94	2.68							.04			1							99						Tr			Mb	407.2	b-k	Mb sp chlor-cal vning
416.6	423.8	7.2		.05				93	2.71							.05			1							99						1						Mb as above
423.8	433.0	9.2		.05				98	2.72							.05			1							99						1						Mb sp-mod cal-chlor vning
433.0	442.4	9.4		.01				89	2.69							.01			1							97	Tr					1						Mb; as above
442.4	452.7	10.3		.02				92	2.70							.02		Tr	1							95	Tr		Tr			1						Mb; sp clay alt 1" sul-hem-gar vnlt
452.7	461.0	8.3		nil				98	2.70										1							98			1			1						Mb; sp clay alt
461.0	470.4	9.4		.01				96	2.70							.01			1							99						1						Mb; bl gy grad to white. Tr clay alt
470.4	480.1	9.7		nil				93	2.70										1							99						1						Mb; white, tr alt
480.1	489.7	9.6		.08				94	2.68							.08			1							99						1						Mb; sp diss clay-chlor alt. Almost Ls
489.7	496.4	6.7		nil				94	2.72										1							99						1						Mb; as above
496.4	505.5	9.1		.02				100	2.72							.02			1							99						1						Mb; as above
505.5	514.8	9.3		.01				100	2.71							.01			1							99						1						Mb, as above
514.8	524.3	9.5		.01				99	2.70							.01			1							99						1						Mb, as above
524.3	533.9	9.6		nil				98	2.70										1							99						1						Mb; as above
533.9	543.6	9.7		nil				95	2.70										1							99						1						Mb, wk alt; almost Ls
543.6	553.0	9.4		.01				97	2.72							.01			1							99						1						Mb; as above
553.0	561.0	8.0		nil				99	2.69										1							98	Tr					1						Mb; as above
561.0	571.0	10.0		nil				92	2.71										1							99						1						Mb; as above.
571.0	581.6	10.6		.02				88	2.70							.02			1							99	Tr					1						Mb; as above Tr vugs
581.6	591.0	9.4		.01				95	2.72							.01			1							95	SP					1	Tr					Mb; as above.
591.0	600.7	9.7		.01				93	2.71							.01			1							99						1						Mb; as above grad to white
600.7	610.3	9.6		nil				96	2.71										1							95	SP					1						Mb; as above
610.3	616.2	5.9		.01				97	2.69							.01			1							95	Tr			Tr		1	Tr					Mb; as above w 3" gry area w bar
616.2	626.2	10.0		.01				97	2.73							.01			1							95	SP			1		1						Mb, white w gtz pods.
						Av		Rec = 88%																														
				END OF HOLE																																		

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5-50 %; Stong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-168
Page 1 of 2 Pages

Collar Elev 2971.85 Final Depth 467.7
Coords N 35,568.14 E 19,168.62
Inclination Vert
Logged by FTG - CWH
Date: Start 9/20/63 Finish 10/14/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ?	CHLORITE	LIMONITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	00	7.0	7.0		—			—	—	—																														ROCKBIT
NC 2,400	7.0	15.6	8.6		.52	15.4' @	.39	15.4' @	84	2.58	.30	.01	.05	.03		.13			SP										SP	S	Tr	SP		S		Dp	7.0	-	Dp; leached, sp silicif. Sp st alt sed incl (Hf?)
	15.6	22.4	6.8		.49	.51	.40	.39	99	2.57	.32	.01	.03	.04		.09			1										1	S	1	1		SP						Dp; leached, sp-mod silicif. Possib sp eds Cu. Sp CuOx
	22.4	30.7	8.3		.24		.21		90	2.55	.15	.01	.03	.02		.03			1										1	SP	1	1		Tr						Dp, leached, sp silicif, broken patches. Tr CuOx
	30.7	38.2	7.5		.19				100	2.54	.10	.01	.01	.06		.01			1										Tr	1	1	Tr		1						Dp; leached, sp alt
	38.2	47.1	8.9		.20				89	2.58	.07	.01	.02	.07		.03			1										1	1	1	1		1						Dp; as above
	47.1	54.4	7.3		.20				99	2.56	.07	.01	.02	.07		.03			1										1	1	1	1		1						Dp; as above
	54.4	62.9	8.5		.11				99	2.56	.03	.01	.01	.04		.02			1	Tr									1	1	1	1		1						Dp; as above
	62.9	70.8	7.9		.25				97	2.56	.05	.01	.01	.08		.10			1	1									1	S	1	1		1						Dp, leached w sp sulf. Sp clay alt. Tr CuOx
	70.8	78.6	7.8		.14				93	2.54	.04	.01	.01	.04		.04			1	1									SP	S	1			1						Dp; as above
	78.6	87.6	9.0		.18				86	2.29	.07	.03	.03	.03		.02			45	1									5	15	1			5						Dp; leached, st clay alt to 82.3 then mass sul. gossan. 100 % lim-hem
	87.6	96.6	9.0		.30		.07		84	2.53	.02	.01	.02	.02		.23			15	1									SP	10	1			SP						Dp; mass lim-hem (sed incl?) to 89.6 then Dp; mod clay alt, tr sulf
	96.6	104.7	8.1		1.50		.07		92	2.64	.03		.01	.03		1.20	.23		5	1									5	15	1			Tr						Dp, mod-st clay alt. Mod sulf
	104.7	112.7	8.0		.10		.01		95	2.61						.10			Tr	1									Tr	SP	1									Dp; sp clay alt grad to mod clay-shearing. Sp sulf
	112.7	121.0	8.3		.14				96	2.59						.10	.04		1	1									1	1	1			Tr						Dp; sp clay-silicif. Tr sulf. lim on shears
	121.0	127.3	6.3		.15				75	2.59						.11	.04		1	1					Tr				1	1	1			1						Dp, as above
	127.3	132.0	4.7		—		—		—	—																														STOPE
	132.0	138.6	6.6		.13				35	2.53						.13			Tr	Tr									S	30	1			Tr						Dp, brkn w 2 ft int clay-bx, then sp clay, sulf.
	138.6	147.3	8.7		.07				44	2.56						.07			1	1									Tr	SP	1			1						Dp, brkn, sp alt. Tr sulf
	147.3	156.3	9.0		.18				36	2.52		.01	.03	.08		.06			1	1									S	20	1			1						Dp; brkn w ggy patches to 150.8, then int Dp bx grad to mass sul lim.
	156.3	165.6	9.3		.23				78	2.24		.01	.04	.09		.09			S	1		Tr							10	SS	1			SP						Dp; lim after mass sulf (leached sed?) to 158.0 then st clay-pro alt SlBlk CuOx
NX 1875	165.6	175.1	9.5		7.55		4.19		25	3.07	1.00	.02	.04	3.13		1.86	1.50		15	1		S				10	S	S	10	40		15	Tr		Tt	165.6	brkn	Tt, ggy grnd, brkn, mod hem-blk chlor-cpy pods grad to st lim-clay. CuOx
	175.1	185.9	10.8		1.65		1.28		29	2.60	.20	.01	.02	1.05		.25	.12		10	1	10								S	30		Tr	1		Mz	175.1	brkn	Mz, ggy grnd, brkn, mod clay alt grad to mass lim gossan (of leached sed?)
	185.9	194.8	8.9		1.82	62.4' @	.26	62.4' @	93	3.48			.01	.25		1.00	.56		5	5	15		10				50				5				Tt	185.9	brkn	Tt, dense, st gar, pods massive mag, px. Tr CuOx
	194.8	204.8	10.0		.35	2.50	.03	98	94	3.87							.35		SP	25	15		15				40				Tr								Tt, as above w st mass mag-px, w incr spec hem-py
	204.8	211.0	6.2		1.01		.27		94	3.55			.02	.25			.74		1	10	10		5				60	SP		10		Tr							Tt, massive mag-spec hem-px grad to sp clay alt, mod CuOx
	211.0	219.3	8.3		2.65		.37		100	2.81				.37		2.00	.28		1	Sp		Sp					5	60		5	Sp	5	15						Tt, dense, mod silicif. Sp sulf
	219.3	228.0	8.7		2.10		.05		95	3.16				.05		.20	1.85				5					2m 110		25	50		Sp	1	5	5						Tt, dense, st silicif; st sl-cpy. 1.5 ft patch Mz
	228.0	237.6	9.6		nil				87	2.66							N.I		Tr	Tr							100	Tr	Tr	Tr						Mb	228.0	brkn	Mb, sp clay alt
	237.6	245.1	7.5		.11				100	2.69							.11			1							100	1	1	1									Mb, sp clay alt
	245.1	254.0	8.9		.10				75	2.55							10		Tr	1							30	1	1	SP			Tr		Mz	248.7	brkn	Mb, to 248.7, then Mz, resp. feldspathic?, tr sulf
	254.0	262.5	8.5		.03				94	2.70							.03		1	1							70	S	10	1				1	Mb	255.4	brkn	Mz, fresh, tr FeOx & py. Mb, wh to m blue patches. Tr sul.
	262.5	270.1	7.6		.08				90	2.70							.08		1	1		Tr		Tr	Tr	Tr	45	30	10	5			SP						Mb, wh to-blue. Fe (red) stained at cont. Some chlor. m FeOx?
	270.1	279.3	9.2		.11				90	3.44							.11			5		1				22	15	30	10	SP		30		Tr	274.8	Grad.	Mb m incr FeOx, sp cpy blebs. Tr m mod-st py & spha. Mod cpy
	279.3	284.1	4.8		.10				97	3.45							.10			15		1				25	5	70	5	Tr								Tr m st py, wk mod sphal, wk cpy.
	284.1	288.3	4.2		.15				90	2.93							.15			SP		1				32	35	45	5	S				Mb	284.1	Grad.	Mb m deem patches of FeOx staining. wk-mod sphal & py & cpy
	288.3	297.5	9.2		.03				89	2.69							.03			Tr							90	5		Tr									Mb, wh to, barren, m patches of chlor.
	297.5	307.9	10.4		.30				100	2.77							.30			SP						Tr	Tr	40	35	15	S		SP						Mb, wh to, m patches of chlor & tactite. Tr sphal.
	307.9	316.7	8.8		.14				85	3.38							.14			Tr							1	SP	85	10			SP		Tt	307.9	brkn	Tt, dense, tr cal-chlor veining
	316.7	326.3	9.6		.20				94	2.88							.20			1							1	5	25	10			5						Tt, as above Tr fg Mz?
	326.3	335.3	9.0		.35				100	2.98							.35			1							1	5	80	10			SP						Tt, as above grad to dense buff Tt?
	335.3	344.9	9.6		.06				83	3.17							.06			1							1	30	10	55	SP		Tr		Mb	335.8	grad	Tt, as above to 335.8, then Mb; mod clay alt
	344.9	352.5	7.6		.02				100	2.75							.02			1								95			Tr		1						Mb, dk gy w wht blebs
BX 1932	352.5	363.0	10.5		7.73	199' @	.05	199' @	92	2.80						2.00	5.70	.03		15								35	30	5	S				Tt	356.0	grad	Mb, as above to 356.0, then Tt, grad to mass sulf to 362.0, then mod clay alt
	363.0	372.4	9.4		1.02	4.56	.01	.03	95	2.89						.10	.92			SP								5	10	75	S?		Tr		Hf	364.5	grad	Tt, st sulf to 364.5, then Hf, dense, sp clay on fract
	372.4	381.6	9.2		.02				100	2.57							.02			Tr								5	5	80	S		1						Hf, dense w patches mod clay alt. Pods Mb

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-168
Page 2 of 2 Pages

Collar Elev 2971.85 Final Depth 467.7
Coords N 35,568.14 E 19,168.62
Inclination Vert
Logged by FTG - CWH
Date: Start 9/20/63 Finish 10/14/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
381.6	392.0	10.4		.10				90	2.81							.10			Tr							5	5	80					5					Hf, wood clay alt grad to sp clay - chlor vning
392.0	400.3	8.3		.21				100	2.79							.21										35		50					5		Mb	396.5	grad	Hf, sp chlor vning to 396.5, then Mb; tr clay - $CaSO_4$.
400.3	409.5	9.2		.06				100	2.62							.06										50		40					5					Mb; partly silicated; areas sp clay - chlor vning.
409.5	415.3	5.8		.12				94	2.70							.12										15		70					5		Hf	411.5	grad	Mb, sp clay to 411.5, then Hf, sp chlor vning
415.3	421.0	5.7		.43		.02		100	2.70							.43										5		85				SP	SP					Hf, gray w tr chlor vning
421.0	429.0	8.0		–	2.80 @	–	2.80 @	–	–							—																						STOPE
429.0	433.9	4.9		.41	.77	.02	.03	98	2.73	.10						.31			Tr							5	10	80					SP					Hf, gray w tr chlor vning
433.9	443.3	9.4		1.17		.05		94	2.98							1.17			SP							5	15	70		5			1					Hf; sp clay, sp suls
443.3	453.1	9.8		.07				88	2.88							.07			Tr							SP				5	Tr		Tr		Dp	443.3	brkn	Dp; mod clay alt w fresh pods. Patches mod feldspath
453.1	460.3	7.2		.08				96	2.68							.08										Tr				Tr	1		1					Dp, patches w sp clay - silicif raised w wk alt Dp. Tr suls
460.3	467.7	7.4		.07				92	2.67							.07														1	1		1					Dp; wk alt w pods mod feldspath Tr suls

Av Rec = 87%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %
Moderate (Md) 5-50 %
Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-169
Page 1 of 2 Pages
Collar Elev 2922.95 Final Depth 468.0
Coords N 35,303.01 E 19,206.74
Inclination Vert
Logged by ETG - CWH
Date: Start 10/1/63 Finish 10/14/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Schol.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JASPERITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	4.0	4.0		—		—		—	—																													ROCKBIT
NC 2.400	4.0	14.3	10.3		.12				41	2.42	.07		.02	.03					SP								5		5	20					And	4.0	-	And, brkn, dk grn rk grad to buff w concentric lim rings (weath And?)
	14.3	22.0	7.7		.09				85	2.41	.02		.01	.06					1								Tr		5	50				Tr	Mz	20.2	-	And, post min dike; dense, buff w lim rings to 20.2, then Mz; st clay alt
	22.0	28.6	6.6		.05				72	2.50		.01	.01	.03					1								1		5	50				1				Mz, st clay alt Possib ads Cu on fspars. Leached.
	28.6	36.2	7.6		.04				68	2.41			.01	.03					1								1		5	40				1				Mz, mod alt, st clay, leached.
	36.2	47.8	11.6		.03				67	2.54			.01	.02					1								1		5	30			Tr	1				Mz; as above. A few grn-stained folds.
	47.8	58.4	10.6		.05				57	2.43			.01	.04					1			Tr						15	5	20			1	1	Tt	57.7	?	Mz, as above, wk less alt towards cr. Tt; brn st of, st gar.
	58.4	61.6	3.2		.03				82	2.51			.01	.02					1			SP						90		5								Tt; dense massive gar, slst Fe Ox masking everything.
	61.6	67.5	5.9		-				0	—																												No core recovery
	67.5	78.7	11.2		.07				64	—			.01	.06					SP										10	60				5	Mz	67.5?	?	Mz, st leached, wkt Jar & clay, badly brkn.
	78.7	85.6	6.9		.15				73	2.41		.01	.01	.13					1										5	20			Tr	SP	And	83.7	brkn	Mz, leached, wk Jar, mod clay, core more solid. And leached.
	85.6	90.8	5.2		.16				98	2.44		.01	.03	.12					1										5	40			5	5				And, leached, alt. on clay & Jar. Lost 1.8' comp brkn, st. FeOx
	90.8	100.2	9.4		.21				85	2.52		.01	.05	.15					5								35		SP	5			SP	Tr				And, brn w mod clay alt. 4 ft pod bx Mb, grad from st clay-blk ox
	100.2	110.3	10.1		.07				82	2.46		.01	.02	.04					5								Tr		1	10				1				And; brn w sp clay alt Patches lim rings
	110.3	120.6	10.3		.94	{	.83	}	85	2.90	.15	.01	.03	.64			.11		SP	Tr							15	30		5		10	Tr		Mb bx	114.5	10°	And, grad to grn at 114.5, then Mb bx w silicif frags + vcr gg grad to Mb
NX 1.875	120.6	129.0	8.4		.04				94	2.71				.04													95			SP			1		Mb	120.6	brkn	Mb; dk gy w sal. wing
	129.0	138.3	9.3		.03				95	2.66				.03					5								55			5			SP		And	135.3	brkn	Mb; as above w patches mod clay to 138.3, then And; brkn. dk grn, spced.
	138.3	147.6	9.3		.06				99	2.70				.06					Tr								90	5		SP			Tr		Mb	138.5	brkn	And, mod clay alt to 138.5, then Mb; dk gy w wht patches. Sp Hf
	147.6	156.0	8.4		.06				100	2.72				.06					1								90	5		SP			1					Mb; sp clay alt w. pods Hf. 1 ft patch And w vert ct. in Mb.
	156.0	165.9	9.9		.02				93	2.67				.02					SP								50			5			1		And	159.4	40°	Mb; as above. to 159.4, then And; lim stain on fract.
	165.9	174.8	8.9		.02				94	2.64				.02					1								Tr			SP			1					And; lim stain out from fract Tr diss + vn col. Incr clay alt at 174.0
	174.8	185.4	10.6		.03				78	2.68				.03					5								70			5			1		Mb	175.5	brkn	And, post min dike to 175.5, then Mb; sp clay alt. Tr diller pods
	185.4	194.0	8.6		.02				99	2.71				.02					Tr								90			5			1					Mb; white grad to dk gy w white blebs + veins
	194.0	202.7	8.7		.05				93	2.62				.02		.03			1								10			SP			1		And	195.3	bx	Mb; as above to 195.3, then And; post min dike, lim in from fract
	202.7	211.5	8.8		.02				98	2.56				Tr		.02			1								Tr			1			1					And; post min dike, lim on fract. Diss col in dk grn matrix
	211.5	220.4	8.9		.03				96	2.56				.01		.02			1								1			1			1					And; as above w gay seams
	220.4	228.6	8.2		.02				100	2.62						.02			1	Tr							1			1			1					And, as above
	228.6	238.3	9.7		.02				95	2.61						.02			1	1							10			1			1		Mb	236.1	45°	And; as above to 236.1, then Mb, lt. gy.
	238.3	247.5	9.2		.07				97	2.53						.07			1	1							20			1			1		And	240.8	80°	Mb, as above to 240.8, then And; thin lim-clay seams. Col blebs
	247.5	256.8	9.3		.04				96	2.61						.04			1	1							Tr			1			1					And, post min dike; as above
	256.8	265.0	8.2		.14				99	2.61						.14			1	1							20	Tr		1			1		Mb	262.8	80°	And; as above to 262.8, then Mb; areas sp clay.
	265.0	274.1	9.1		.02				96	2.66						.02			1	1							80	SP		1			1		And	270.7	60°	Mb, tr clay to 270.7 then And, tr lim-clay on fract. Sp col blebs at ct.
	274.1	282.7	8.6		.01				100	2.60						.01			1	1							Tr			1			1					And; post min dike, dk grn-gy.
	282.7	291.9	9.2		.05				97	2.69						.05			1	1							85	Tr		1			1		Mb	283.1	75°	And, as above to 283.1, then Mb; sp clay alt
	291.9	301.0	9.1		.10				99	2.54						.10				1							65			Tr			1		And	297.5	75°	Mb, tr alt to 297.5, then And; dk grn, soft
	301.0	309.2	8.2		.04				95	2.50						.04				1							Tr			1			1					And, post min dike; sp clay alt, tr diss col
	309.2	318.7	9.5		.01				88	2.46						.01				1							1			SP			1					And; as above w lim-clay gg seams.
	318.7	327.9	9.2		.04				91	2.51						.04			Tr	1							1			1			1					And; as above w pods qtz
	327.9	337.0	9.1		.05				71	2.55						.05			1	1							1			5			1					And; as above
	337.0	346.5	9.5		.08				90	2.48						.08			1	1							1			Tr			1					And; post min dike, med gy color
	346.5	354.3	7.8		.04				100	2.52						.04			1	1							1			1			1					And, post min dike w qtz pods grad to mod lim staining
	354.3	364.0	9.7		.01				88	2.49						.01			1	1							1			1			1	Tr				And; mod lim stain grad to dk grn
	364.0	371.0	7.0		.01				88	2.49						.01			1	1							1			1			1					And; post min dike; sp lim on fract.
	371.0	381.0	10.0		.01				75	2.56						.01			1	1							1	10		1	Tr	10	1		Hf	378.8	brkn	And, post min dike to 378.8, then Hf; dense; st. silicates
	381.0	385.6	4.6		.08				97	2.69							.08		1	1							5	15				50						Hf, dense, st $CaSiO_3$-silicif
	385.6	394.3	8.7		.06				98	2.72							.06		1	1							5	15				50	Tr					Hf, dense, mod silicif Tr suls

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-169
Page 2 of 2 Pages

Collar Elev. 2922.95 Final Depth 468.0
Coords. N 235,303.01 E 19,206.74
Inclination Vert
Logged by FTG - CWH
Date: Start 10/1/63 Finish 10/14/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
394.3	403.5	9.2		.07				95	2.68							.07		Tr	Tr							S		20		Tr		SP	Tr					Hf, dense; mod silicif. Tr suls.
403.5	413.5	10.0		.05				79	2.55							.05		1	1							SP		SP		S		SP	1		Mz	404.5	brkn	Hf, as above to 404.5, then Mz; sp silicif, pods st clay 2 ft And dike
413.5	422.9	9.4		.05				96	2.62							.05		1	1							Tr				SP	Tr		1					Mz; mod silicif, incip feldspath. Tr diss cal
422.9	430.9	8.0		.04				98	2.61							.04		1	1							1				1	1		1					Mz; dense w silicif feldsp phenos? Tr suls.
430.9	438.2	7.3		.27				93	2.79							.27			1							SP		15		Tr	1		1		Hf	434.8	brkn	Mz; as above to 434.8, then Hf, dense, mod silicif; tr suls.
438.2	447.2	9.0		.14				37	2.70						.02	.12			1							S		20		1	1		1		And	443.3	?	Hf, dense w tr suls to 443.3, then And, post min dike
447.2	457.5	10.3		.02				98	2.55						.02			Tr								Tr				1			1					And, post min dike; dk green
457.5	468.0	10.5		.01				56	2.51						.01			1	1							Tr				1			1					And, as above
						Av	Rec.	= 85%																														
					END	OF	HOLE																															

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral.

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %.

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-170
Page 1 of 2 Pages
Collar Elev. 2937.98 Final Depth 550.9
Coords. N 135,599.55 E 18,801.96
Inclination Vert
Logged by FTG - CWH
Date: Start 10/15/63 Finish 11/6/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pinch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Sh. Qz.	QUARTZ	CHLORITE	LIMONITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	12.4	12.4		—		—		—	—																														ROCKBIT
NC 2.400	12.4	18.9	6.5		.39				88	2.73	.30	.01	.01	.07					Tr								5	50	10		SP		25	Tr			Tt	12.4	-	Tt, leached, mod silicif
	18.9	27.2	8.3		.11				92	2.80	.07		.01	.03					1								10	40	25		1		20	1	Tr					Tt; leached, sp clay - mod silicif grad to Tt? w st silicif
	27.2	34.9	7.7		.10				92	2.66	.08		.01	.01					1								5	40	5		1		40		1					Tt(?) st silicif w qtz pods
	34.9	43.3	8.4		.09				96	2.60	.08		.01						1								SP	5	SP		Tr		80		1		Qtzite	34.9	grad	Qtzite, grad from Tt w indef st. Mod yellow (jare) blebs
	43.3	52.1	8.8		.13				99	2.62	.12		.01						1								Tr	5	5		1		80		1					Qtzite, qtz grains w FeOx coming. Patches w sp gar - CuOx
	52.1	60.6	8.5		.28				98	2.60	.25		.01	.02					1								10	15	15		20		25		1		Tt	55.5	grad	Qtzite; as above to 55.5, then Tt, leached, mod clay alt w silicif pods
	60.6	69.5	8.9		.18				94	2.78	.17		.01						1								15	45	15		15		10		1					Tt, leached, mod clay grad to mod silicif (Qtzite?)
	69.5	78.0	8.5		.20		.09		100	3.09	.03			.06		.04	.07		1	Tr							10	40	30		5	5	5	Tr						Tt, dense, mod qtz vning
	78.0	84.5	6.5		.56		.45		80	3.19	.05		.01	.39		.04	.07		1	1							10	50	20		5	Tr	10	1	Tr					Tt, leached, sp clay grad to st clay - lim w sp CuOx
	84.5	90.2	5.7		.26		.22		93	3.01	.18	.01	.01	.02		.01	.03		1	1							5	30	50		5	1		SP			Hf	84.5	grad	Hf, dense, sp clay alt w sp CuOx vning
	90.2	99.3	9.1		.38				97	2.81	.08	.01	.01	.02		.06	.20		1	1							15	10	60		5			5	Tr					Hf, leached, patches mod pro - clay alt w sp chry. Pods st chlor w Cu
	99.3	108.6	9.3		.21				90	3.00	.06			.01		.02	.12		1	1							15	10	60		5		5	SP	1					Hf, leached, sp chlor vning grad to dense, st $CaSiO_3$
	108.6	117.0	8.4		.22		.16		92	3.07	.14		.01	.01			.06		1	1							10	15	60		15			Tr						Hf, leached, sp clay alt w. jjx patches
	117.0	125.9	8.9		.50	.164	.44	.164	91	2.63	.40		.01	.03			.06		1	1							10	50	20		15			1	Tr		Mz	119.0	brkn	Hf, leached, med clay chlor to 119.0, then Mz; st clay grad to sp St clay alt
	125.9	133.4	7.5		.63	.56	.24	.35	98	2.47	.22		.01	.01		.30	.09		1	1							10	50	20		5			1	5					Mz; brkn, leached, st clay alt grad to st gar - clay alt of Mz. Sp chry - cpy
	133.4	142.4	9.0		.24		.06		90	3.35	.02		.01	.03		.14	.04		1	1							5	40	40		5			SP	SP		Hf	139.0	brkn	Mz (?) st gar - clay alt w sp chry to 139.0 then Hf, sp clay alt w sp CuOx sulfs
	142.4	150.6	8.2		.62	2.26	.01	2.26	100	2.70	.03	.01	Tr			.45	.13		1	1							10	20	55		SP			S						Hf, mod clay alt w chry - sulfs grad to sp-mod chlor vning w sp sulfs in chlor
	150.6	160.0	9.4		2.05	1.24	.06	.14	100	2.58						.80	1.25			1						Tr	15	10	60		10			SP						Hf, sp chlor vning to 152.0, then mod - st clay alt w st diss cc, cpy
	160.0	170.0	10.0		1.00		.29		100	2.53	.26		.01	.02		.15	.56		Tr	1							10	5	65		10			S	Tr					Hf, st clay - sulfs to 162.5, then sp clay - chlor vning. Patches leaching
NX 1.875	170.0	174.1	4.1		.28		.14		99	3.24	.12		.01	.01		.05	.09		1	1							5	30	50		5			SP	S					Hf, sp diss chlor in Hf - Mb? bx w incr Tt. Tr sulfs
	174.1	175.8	1.7		.36		.02		52	2.05						.04	.32			1							10	5	75		SP			S						Hf, mod chlor vning
	175.8	178.9	3.1		—		—		—	—																														Cavity
NC 2.488	178.9	184.0	5.1		.17				93	2.56							.17			Tr							10	15	60		SP			S						Hf, mod chlor - cal vning
DX 1.873	184.0	188.0	4.0		.18				92	2.56							.18			1							10	10	70		1			SP						Hf, sp - mod chlor vning - clay alt
	188.0	197.5	9.5		.24		.08		96	2.81	.07		.01				.16		Tr	1							10	10	65		1			5	SP					Hf, mod chlor vning w white patches w tr CuOx. Tr sulfs in chlor vn
	197.5	206.9	9.4		.60		.01		93	2.97	.01						.60		1	1							10	15	65		1			5	1					Hf, mod chlor vning. Pods Tt w tr chry. Tr sulfs in chlor
	206.9	215.5	8.6		.34		.01		97	2.56							.34			1							10	10	70		1			5	Tr					Hf, mod chlor vning. Mod diss sulfs
	215.5	224.5	9.0		.09				100	3.03	.05	Tr					.04		Tr	1							5	80	10		1				1		Tt	216.1	63°	Hf, sp clay - mod diss sulfs to 216.1, then Tt, patches mod clay. Tr CuOx
	224.5	233.2	8.7		.18				98	3.09	.13	.01	.01				.03		1	1							5	70	20		1				1		Hf	230.7	brkn	Tt, dense, sp clay w yellow gar to 230.7, then Hf, sp clay - CuOx - sulfs
	233.2	241.3	8.1		.67		.02		97	2.75							.67			1							25	65	Tr				10							Hf, mod chlor w mod diss sulfs grad to sp chlor vning
	241.3	245.3	4.0		.10				81	2.91	.05		.05						Tr								20	25	50		1			5	Tr		Tt	243.5	brkn	Hf, sp-mod clay alt w sp. CuOx to 243.5, then Tt, vuggy, sp clay.
	245.3	254.9	9.6		1.00		.92		82	2.91	.82		.10			.08			1								5	60	20		15				1	Tr				Tt, mod clay alt w chry (ads Cu) in clay patches. Mod blk ox specks.
	254.9	264.2	9.3		.27		.25		84	3.25	.20		.05			.02			1								25	50	20		5				1					Tt, mod clay alt w sp cal vning. Tr CuOx
	264.2	272.9	8.7		.08				99	3.06	.05		.03			Tr	Tr		1	Tr							25	50	25		Sp						Hf	264.6	brkn	Tt, as above to 264.6, then Hf, sp gar vning
	272.9	282.3	9.4		.30				85	3.03	.20		.03			.01	.06		1	1							25	15	40		20				Tr					Hf, as above to 279.3, then incr gard alt w chry staining
	282.3	290.7	8.4		.77		.73		59	3.01	.70		.03			.04			1								25	Sp	55		20				1					Hf, dense, buff, sp garo - chry on fract
	290.7	299.1	8.4		.21		.19		99	2.98	.18		.01			.02			1								30	Tr	50		20									Hf, as above
	299.1	306.4	7.3		.19				85	2.92	.04		.02			.04	Tr			Tr							30	5	50		15									Hf, patches mod clay alt. Mixed Mb
	306.4	313.8	7.4		.12				80	2.74	.10					.01	.01		1	1							50	Sp	35		15				Tr					Hf, sp chlor - clay vning w mixed Mb
BX 1.952	313.8	323.2	9.4		.15				95	2.58	.07						.08		1	1							25		55		SP			10						Hf, as above
	323.2	332.3	9.1		.17				93	2.87							.17			1							20		60		5			10						Hf, sp - mod chlor vning
	332.3	341.0	8.7		.27				100	2.51							.27			1							10		75		SP			10						Hf, dense, patches mod chlor vning
	341.0	350.3	9.3		.17				100	2.57							.17			1							10	SP	85		1			SP						Hf, dense wit patches mixed w sp chlor vning
	350.3	359.2	8.9		.33				95	2.66	.10						.23			1							10	1	85		1			1						Hf, sp chlor vning
	359.2	369.3	10.1		.28				98	2.72							.28			1							15		75		1			5						Hf, sp chlor vning w white pods

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:
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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-170
Page 2 of 2 Pages
Collar Elev. 4332.96 Final Depth 550.9
Coords N 35,599.55 E 18,391.96
Inclination Vert
Logged by FTG - CWH
Date: Start 10/18/68 Finish 11/6/68

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
369.3	378.0	9.7		.10				88	2.69	.01						.09		Tr	Tr							10	SP	65		10			5					Hf, st Cal, st chlor + cal valls. Leached zone 1½' long
379.0	388.7	9.7		.08				87	2.98							.08			1							10	5	75		SP			5					Hf as above. Almost a blue L.S. Leached zone 5' long
388.7	398.9	10.2		.33		.03		93	2.63							.33			1							10	SP	75		SP			5					Hf as above, no leaching
398.9	409.1	10.2		.80		.03		90	2.91							.80			SP							10	20	60		5			SP	Tr				Hf, as above, to Bx.
409.1	419.0	9.9		.32		.02		100	2.70							.32			1							10	5	70		5			5					Hf, " "
419.0	425.8	6.8		.24				98	2.60							.24			Tr							10	10	70		SP			5					Hf, " "
425.8	434.6	8.8		.15				100	2.53							.15			1							10	5	70		1			5					Hf, grad almost to Mb w. blk chlor vning
434.6	443.7	9.1		.30				98	2.74							.30			SP							10	5	70		1			5	Tr				Hf, sp chlor vning in gy-wht rk w. sp sulf assoc w. chlor
443.7	453.2	9.5		.03				99	2.67							.03			1							10	SP	80		1			SP					Hf, sp chlor vning.
453.2	461.7	8.5		.34				93	2.76							.34			1							10	1	80		1			1					Hf, sp chlor vning w. wht patches of $CaSiO_3$
461.7	471.2	9.5		.24				92	2.57						.04	.20			1							10	1	80		1			1					Hf, sp chlor - alunite(?) vning.
471.2	479.3	8.1		.23				100	2.51							.23			1							10	1	80		1			1					Hf, sp chlor vn - pods in mixed Hf - Mb
479.3	488.7	9.4		.10				100	2.51							.10			1							10	1	80		1			1					Hf, sp chlor vn.
488.7	499.5	10.8		.27				93	2.63							.27			1							10	1	80		1			1					Hf, sp chlor vn w. brka areas
499.5	504.7	5.2		.37				98	2.53							.37		Tr	Tr							15	1	75		5			1	Tr				Hf, mod blk chlor vning
504.7	513.0	8.3		.27				95	2.56							.27			1							10	1	80		SP			5	1				Hf, mod chlor vning w. brka patches
513.0	522.2	9.2		.32				96	2.67	.05						.27		Tr	1							10	1	80		SP			SP	1				Hf, sp-mod chlor vning w. tr chrys devl in vert clay (alun) valls.
522.2	531.1	8.9		.34				90	3.00							.34			1							15	10	70		1			1					Hf, sp chlor vning Mod Mb
531.1	540.1	9.0		.16				98	2.56							.16			1							25	5	60		5			Tr	Tr				Hf, mod - st clay alt grad to mod Mb
540.1	550.9	10.8		.13				93	2.60							.13			1							20	SP	60		SP			SP	SP				Hf, pods mod clay - jaro. Pods Mb.

Av. Rec. = 93%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

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Note (3)
Tt - Toctite
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Mb - Marble
Qt - Quartzite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-171
Page 1 of 3 Pages
Collar Elev. 2939.96± Final Depth 490.0
Coords. N 35,446.86 E 18,998.76
Inclination Vert
Logged by FTG - CWH
Date: Start 10/15/63 Finish 10/31/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green	Covellite	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	BARITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	30.7	30.7		—		—		—	—																														ROCKBIT
NC 2.400	30.7	37.4	6.7		.03				100	2.70				.03					Tr								95			SP						Mb	30.7	-	Mb, dk banding, tr lim on fract
	37.4	44.9	7.5		.12				91	2.68				.12													90		SP	SP									Mb, as above
	44.9	53.1	8.2		.08				96	2.70	.07			.01													85	SP	.5										Mb, as above w tr HF pods
	53.1	62.4	9.3		.24		.13		93	2.70	.02	.01	.01	.09	Tr	.06	.04	.01		Tr				Tr	Tr		70	15	10							Tt	62.2	bx	Mb, 2 ft pod Tt w mod CuOx - suls, dk banding to 62.2, then Tt, leached bx
	62.4	70.4	8.0		.82	13.1 @ 66	.59	13.1 @ .49	94	3.55	.30	.02	.01	.26		.13	.20							SP	SP		30	50	SP							Mb	69.4	brkn	Tt, dense, mod gn - gy - CuOx w incr CuOx to 69.4, then Mb, mod gy
	70.4	75.5	5.1		.40		.33		90	2.78	.03	.01	.01	.28			.07		5								55	10	10		10			SP					Mb, dk pods w 2 ft pod Tt - st leaching
	75.5	84.9	9.4		.07				100	2.69				.07					SP								90	5	SP		SP								Mb, altered dk gy + wht. Tr alunite? veins
	84.9	94.2	9.3		.06				97	2.71				.06													85	SP	5		5								Mb, dk gy to wht. 6" pod Tt w st CuOx
	94.2	103.1	8.9		.12				99	2.70	.08			.04													80	SP	10		SP								Mb, dk gy to wht. Pods Tt w st lim - CuOx Tr clay veins w ads Cu
	103.1	111.0	7.9		.29				93	2.71	.18			.02			.09		Tr	Tr							85	5	5		1			Tr					Mb, dk gy to wht w tr clay veins w ads Cu
	111.0	115.0	4.0		.07				100	2.72				.07													95			Tr									Mb, gy grad to wht on fract
NX 1.875	115.0	124.2	9.2		.84	18.4 @ .62	.15	18.4 @ .22	99	2.70	.13			.02			.69										90	5	Tr		1								Mb, gy w patches sp gar
	124.2	133.4	9.2		.40		.29		95	3.34	.04			.25			.11			Tr							25	55	15		1					Tt	126.4	40°	Mb, gy w pods Tt to 126.4, then Tt, massive w sp CuOx
	133.4	142.8	9.4		.20		.10		94	2.65				.10			.10										20	40	5		1		20						Tt, mod clay w silicif patches to 140.8, then Tt, (?) st silicif Tr ign?
	142.8	152.9	10.1		.35		.04		88	2.64	.04					.10	.21										5	50	5		1		30	Tr					Tt(?), st silicif w patches gar. Tr suls. Possib ign?
	152.9	161.6	8.7		.45		.06		100	2.79	.02		.01	.03		.07	.32					Tr			Tr		15	20	50		SP	SP	Tr						Tt, (?), st silicif grad to sp silicif w mod qtz vning
	161.6	171.1	9.5		1.99		.02		94	2.66						.70	1.14	.15	SP	SP							10	30	40		5	Tr.		5					Tt, mod chlor - qtz vning grad to mod diss + sul vning
	171.1	180.2	9.1		3.36		.01		92	3.39						.30	3.06			5							5	30	25		SP	SP	5	15					Tt, dense w diss suls grad to pods blk chlor - px w pods st cpx
	180.2	189.9	9.7		5.24	82.5 @ 2.78	.06	82.5 @ .03	78	3.13						1.00	3.94	.30		5					Zn .23		5	50	15										Tt, dense w mod silicif, pods Hf. Pods mass cpx - px
	189.9	200.1	10.2		9.63		.05		85	3.51						1.00	8.53	.10		10					Pb .121 Zn .20		.53	SP	50	5				5					Tt, dense, mass. gar. Approx 3 ft mass cpy - py w sp st
	200.1	209.5	9.4		1.00		.04		88	3.13						.15	.85			SP							10	15	60		1			5		Hf	200.1	grad	Hf, mass chlor - suls grad to sp chlor vning. Sp diss. suls
	209.5	218.9	9.4		.61		.04		98	2.77							.61			Tr							10	20	60		1			SP					Hf, sp clay - chlor vning. Sp diss suls. Incr. gar
	218.9	226.4	7.5		.40		.01		92	3.22							.40			1							10	15	65	Tr	1			5					Hf, dense w sp clay - chlor vning. Sp. diss suls as minute grains
	226.4	235.4	9.0		.97		.01		100	2.59						.15	.82			1							10	15	60		1			10					Hf, mod blk chlor vning. Mod diss suls
	235.4	244.9	9.5		.38		.02		92	3.03							.38			1							10	10	70		1			5					Hf, dense, sp diss suls w gay patches. Patches mod chlor
	244.9	254.0	9.1		.24		.01		93	2.97							.24			1		Tr					Tr	10	15	65		5			SP					Hf, dense, buff w patches mod clay alt. Sp suls
	254.0	260.3	6.3		.43		.02		98	2.83							.43		Tr	1							1	10	10	50	5	5		10		And	258.3	50°	Hf, sp chlor - diss suls grad to st chlor to 258.3, then And, post min dike
	260.3	267.4	7.1		.16		.05		71	2.82							.16			1							5	10	70		SP		5		Tr	Hf	262.5	brkn	And, post min dike w mod clay to 262.5, then Hf, sp chlor - clay incr. Tt
	267.4	277.2	9.8		.63		.02		90	3.05							.63			1							5	20	65		SP		5		Tr	And	276.2	brkn	Hf, mixed Hf-Tt w mod clay alt to 276.2, then And, post min dike
	277.2	286.6	9.4		.06				99	2.53						.06				1							Tr			Tr				Tr					And, post min dike, tr diss cal
	286.6	296.2	9.6		.04				91	2.58						.04				1							1	5		1				1		Tt	295.8	brkn	And, post min dike to 295.8, then Tt, brkn, mod clay alt
	296.2	305.8	9.6		.02				99	2.85							.02			1						Tr	5	15	70		SP			SP		Hf	300.0	grad	Tt, sp clay alt to 300.0, then Hf, dense, sp clay, chlor. Tr ign test(?).
	305.8	315.5	9.7		.03				92	3.29							.03			1							5	30	55		1			1		Tt	314.0	grad	Hf, tr chlor - clay seams to 314.0, then Tt, sp clay alt
	315.8	320.3	4.8		.09		.01		89	3.19							.09			1						Tr	SP	70	15		Tr	5	Tr						Tt, dense to 320.0, then Da(?), ign test ck, dense w gar alt?
	320.3	329.6	9.3		.08				97	3.08							.08			1							10	10	70		1			SP		Hf	327.7	grad	Tt, Da? test ck grad to Tt w tr chlor vn to 322.7, then Hf, grn, dense
	329.6	338.5	8.9		.59	26.4 @ .59	.07	26.4 @ .09	90	3.47							.59			1							10	5	70		1			15					Hf, dk gy - grn w pods Tt to 332.5, then st diss suls
	338.5	346.4	7.9		.31				96	3.39							.31			1							10	15	60		1			15		Tt	338.5	brkn	Tt, dense, massive, patches mixed Tt - Hf
	346.4	356.0	9.6		.82		.10		82	3.42			.02				.80			1							20	10	65		1			5		Hf	346.4	grad	Hf, dense w diss suls grad to Hf - Mb w chlor - gar vn w incr clay
	356.0	365.3	9.3		.53		.21		90	2.72	.15	.02	.03	.02			.32		Tr	1							50	20	30		SP				Tr				Hf, mod clay alt Tt 356.0 - 358.5 w sp CuOx grad to Hf w gar pods + veins
	365.3	374.8	9.5		.17				99	2.72							.17			1							40	5	50		Tr			5					Hf, sp clay alt w tr chlor vning
	374.8	383.6	8.8		.25				97	2.65						Tr	.25			1							20	15	60		SP	SP		Tr					Hf, mod clay vning dipping about 54° Tr suls
	383.6	393.5	9.9		.08				86	2.60						.07	.01		Tr	1							Tr	5	15		Tr			1	Tr	And	385.0	brkn	Hf, mod clay alt to 385.0, then And, post min dike, mod cal vning at st
	393.5	402.0	8.5		.04				98	2.59						.04				1							1				1				1				And, post min dike, tr limon fract. Tr diss + vn cal
	402.0	410.6	8.6		.11				81	2.56										1							1		5		5			1	1	Hf	410.0	brkn	And, post min dike w pods Hf to 410.0, then Hf, st clay alt
	410.6	419.9	9.3		.14		.03		80	3.27							.44			1							15	10	70		SP			1					Hf, sp clay - chlor vning. Pods Tt

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-171
Page 2 of 2 Pages
Collar Elev 2939.96 Final Depth 490.0
Coords N 35,446.86 E 18,998.76
Inclination Vert
Logged by FTG - CWH
Date: Start 10/15/63 Finish 10/31/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE		(3) Rock Type	Structures (4) Depth	True Dip	Remarks
419.9	428.7	8.8		.22		.03		85	3.40							.22			Tr							10	15	70		SP			SP					Hf, dense, buff-wht w pods Tt grad to mod chlor vning
428.7	438.3	9.6		.18				89	2.59							.18			1							10	5	75		Tr			S					Hf, sp clay - chlor vning Pods Tt
438.3	447.4	9.1		.21				100	2.70							.21			1							60	SP	25		S			SP		Mb	440.2	broken	Hf, as above to 440.2, then Mb, sp clay, pods Hf, inlts Tt
447.4	456.4	9.0		.33				93	3.09							.33			1							25	20	45		S			Tr		Tt	448.4	grad	Mb, incr gar to 448.4, then Tt, mod clay all, wk dev gar sand Sp suls
456.4	464.7	8.3		.04				73	3.23	.03						.01			1							20	55	5		15			S					Tt, mod clay all. Tr poros text
464.7	471.4	6.7		.39				98	2.78						.04	.35			1							15	10	60		S			S		Hf	467.0	grad	Tt, dense, mod $CaSiO_3$ to 467.0, then Hf, mod chlor vning, Sp. diss. suls
471.4	481.0	9.6		.20				100	2.63							.20			1							10	5	65		S			10					Hf, mod chlor vning w. pods Tt
481.0	490.0	9.0		.19				100	2.62							.19			1							15	5	65		S			10					Hf, mod chlor vning w. mod Mb
						Av.	Rec:	93%																														
					END	OF	HOLE																															

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-172
Page 1 of 1 Pages
Collar Elev. 2866.67 Final Depth 346.4
Coords. N 135,455.53 E 18,598.63
Inclination Vert
Logged by FTG - CWH
Date: Start 11/1/63 Finish 11/25/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	9.1	9.1		–			–	–	–																													ROCKBIT
NC 2.408 91	19.3	10.2		28				81	2.47	.20	.01	.01	.06					Tr								25	45	SP	15				10	Hf	9.1	–	Hf, leached, vuggy, patches st clay. Mixed Mb. Vague Mz text
19.3	27.8	8.5		.35		.22		100	2.23	.17	.01	.01	.03		.13			L								40	30	SP	15				5	Mb	19.3	grad	Mb, leached, sp clay - jaro alt. Mixed w inter Hf. Sp CuOx
27.8	36.8	9.0		.88		.55		95	2.34	.48	.01	.01	.05		.33			5								20	45	5	15				5	Hf	28.0	grad	Mb, leached, mixed Hf - Mb to 28.0, then Hf, med - st lim-clay alt
36.8	46.1	9.3		.65	37.6	.65	37.2	99	2.21	.42	.01	.02	.20					5								25	50	5	15				SP				Hf, leached, st clay - lim alt. Sp col veining. Sp CuOx
46.1	56.0	9.9		1.49	1.01	.92	.72	78	2.42	.70	.01	.01	.20		.57			5	Tr		Tr					15	20	15	30				5				Hf, leached; st clay - jaro alt grad to int clay alt. Md CuOx
56.0	65.0	9.0		.99		.75		80	2.56	.53	.01	.01	.20		.24			5								10	40	SP	20		20	Tr	SP	Qtzite	59.7	brkn	Hf, leached, st clay - lim, then st clay - jaro - lim - CuOx to 59.7, then Qtzite
65.0	74.1	9.1		.21		.16		64	2.56	.14		.01	.01		.05			Tr								Tr			SP		95		Tr				Qtzite, leached, pods clay, tr. CuOx on fract
74.1	82.6	8.5		.10				81	2.60	.10								1								1			Tr		95		1				Qtzite, leached, brkn, patches med-clay, tr jaro on fract.
82.6	90.7	8.1		.04				55	2.56	.04								1								1			1		95		1				Qtzite; brkn; tr clay on fract
90.7	100.5	9.8		.05				61	2.62	.05								1								1			1		95		1				Qtzite; brkn
100.5	105.5	5.0		.14				62	2.63	.14								1								1			1		95		1				Qtzite, brkn, tr blk ox on fract
105.5	115.0	9.5		.04				76	2.61	.04								1								1			1		95		1				Qtzite, brkn, tr blk ox on fract
115.0	125.7	10.7		.03				69	2.61	.03								1								1			1		95		1				Qtzite; brkn, tr blk ox - jaro on fract
125.7	134.8	9.1		.04				92	2.62	.04								1								1			1		95		1				Qtzite, as above
134.8	143.9	9.1		.04				25	2.60	.04								1								1			1		95		1				Qtzite; as above
NC 1.875 143.9	152.0	8.1		.05				69	2.62	.05								1								1			1		95		1				Qtzite, as above
152.0	161.2	9.2		.10				56	2.62	.10								1								1			Sp			Tr	1	Mz	152.0	brkn	Mz, brkn, leached, sp clay alt. Tr CuOx
161.2	170.9	9.7		.09				67	2.64	.09								1								1			1				1				Mz; brkn, leached; sp clay - feldspath. Tr CuOx
170.9	175.2	4.3		.10				68	2.64	.10								1								1			1				1				Mz; leached, mod feldspath, Tr CuOx
175.2	182.5	7.3		.05				34	2.64	.05								1								1			1				1				Mz; leached, mod clay alt. Tr CuOx
182.5	192.5	10.0		.02				50	2.59	.		.02														1			Tr		95		1	Qtzite	182.5	brkn	Qtzite, brkn, tr col - Qtzite bx
192.5	200.7	8.2		.03				58	2.58	.03																1			1		95		1				Qtzite, brkn, tr jaro on fract.
200.7	210.1	9.4		.01				34	2.59	.01																1			1		95		1				Qtzite, as above
210.1	217.5	7.4		.01				78	2.60	.01																1			1		95		1				Qtzite; as above
217.5	227.1	9.6		.02				77	2.61	.02																1			1		95		1				Qtzite, brkn, bx CuOx on fracs. Tr Jaro.
227.1	236.2	9.1		.04				74	2.63	.04																1			1		95		1	Mz	236.0	brkn	Qtzite, as above to 236.0, then Mz; leached, sp clay - jaro alt
236.2	245.1	8.9		.03				84	2.64	.03																1			1		95		1	Qtzite	242.0	brkn	Mz, leached, sp clay - jaro alt to 242.0, then Qtzite; brkn tr blk ox
245.1	255.5	10.4		.02				62	2.63	.02																1			1		95		1				Qtzite, brkn, tr jaro - blk ox on fract.
255.5	265.3	9.8		.02				71	2.65	.02									Tr							1			1		95	SP	1	Mz	256.6	brkn	Qtzite, as above to 256.6, then Mz, leached, sp clay - mod
				–				–	–																									Qtzite	264.3	brkn	silic to 264.3, then Qtzite, brkn, tr blk ox on fract
265.3	270.6	5.3		.03				75	2.61	.03																			Tr		95		1				Qtzite, brkn.
270.6	277.1	6.5		.04				69	2.64	.04																			5		90		1				Qtzite, brkn patches w med clay alt
277.1	285.8	8.7		.05				72	2.64	.05									Tr						SP				SP		90		Tr	Mz	279.6	brkn	Qtzite, as above to 279.6, then Mz; mod silic, grad to mod clay - jaro alt
285.8	294.1	8.3		.04				48	2.66	.04															Tr				Tr		95		1	Qtzite	289.0	brkn	Mz, sp clay alt to 289.0, then Qtzite; tr jaro on fract
294.1	299.0	4.9		.05				85	2.65	.05										Tr									1		95		1				Qtzite, tr jaro - blk ox. on fract
299.0	308.9	9.9		.07				69	2.64	.07																			1		95		SP				Qtzite, sp jaro - blk ox on fract
308.9	317.6	8.7		.07				92	2.73	.07																			1		95		1				Qtzite, as above
317.6	326.2	8.6		.11				84	2.62	.11																			1		95		1				Qtzite, as above w fracs w st lim
326.2	335.9	9.7		.03				84	2.63	.03																			1		95		1	Qtzite bx	335.0	grad	Qtzite, as above grad to Qtzite - lim bx at 335.0
335.9	346.4	10.5		.01				85	2.63	.01									SP										SP		95		Tr				Qtzite bx, bx frags set in lim matrix. Bx weak grad to Qtzite

Av. Rec. = 71 %

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO- SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

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Note (3)
Tt - Toctite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
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Da - Dacite
Mz - Monzonite
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Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-173
Page 1 of 1 Pages
Collar Elev. 2939.67 Final Depth 398.4
Coords N 35,598.19 E 18,938.30
Inclination Vert
Logged by FTG - CWH
Date: Start 11/7/63 Finish 11/21/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu N S	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys	Pitch	Black	Blue Green		Cc.	Cov.	Born	Fe (2) Lim.	Py.	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz.	QUARTZ	CHLORITE	JAROSITE	FLUORITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	40.5	40.5		–			–	–	–																														ROCKBIT
NC 2.400	40.5	48.0	7.5		.10				100	2.69				.10					Tr								95				Tr						Mb	40.5	--	Mb, dk gy + wht. Mixed Mb - Ls?
	48.0	57.1	9.1		.08				82	3.19				.08													95	Tr	SP											Mb; as above w vnlts + pods Tt - Ca SiO3 w sp CuOx
	57.1	65.3	8.2		.02				97	2.71				.02													95		Tr		Tr				Tr					Mb, mixed dk gy + wht.
	65.3	74.5	9.2		.02				100	2.70				.02													95		1		1				1					Mb; as above
	74.5	83.8	9.3		.09				98	2.70		.02	.01	.06													90	5	1		SP									Mb; as above w tr gar - CuOx vning
	83.8	93.0	9.2		.37		.36		100	2.81		Dl	.03	.32		.01											45	45	5		SP				Tr		Tt	85.5	brkn	Mb; as above to 85.5, then Tt; mod CuOx w mixed Mb - Hf pods
	93.0	99.9	6.9		2.41	15.2	2.30	15.2	93	3.05	.10	.01	.01	2.18		.11											25	65	5		1									Tt; leached; sp clay w st CuOx. Pods Mb.
	99.9	105.0	5.1		.63	7.44	.58	7.32	92	3.23	.07		.01	.50		.05											15	75	5		1				Tr					Tt, leached, grad to mass gar w mod CuOx
	105.0	108.2	3.2		.64		.38		83	3.38	.05		.01	.32		.26											15	75	SP		5									Tt, leached; mod clay alt of mass gar rk Mod CuOx
NX 1.373	108.2	116.3	8.1		.30		.29		94	3.12	.08		.01	.20		.01											10	80	Tr		5				Tr					Tt, as above
	116.3	123.8	7.5		.41		.27		96	2.57	.22		.05			.14											5	45	Tr		Sp			Tr			Mz	119.3	brkn	Tt; leached w tr sulf, clay alt to 119.3, then Mz; leached; mod silicif
	123.8	132.4	8.6		.08				97	2.59	.05		.02			.01											Sp				1			1						Mz; leached; sp clay - chlor grad to sp clay - silicif
	132.4	143.3	10.9		.05				73	2.56	.01		.03			.01			Sp								1				2a			1						Mz, leached; sp silicif grad to brkn, st clay - lim grad to sp clay alt
	143.3	152.5	9.2		.04				91	2.56	.01		.02			.01			Tr								1				5			1	Tr					Mz; leached; sp clay - chlor grad to sp silicif - gare
	152.5	160.0	7.5		.19				97	2.75	.01		.01			.01	.16		1	Sp							10	30	60		Sp			Sp			Hf	153.2	brkn	Mz; as above to 153.3 then 3 ft Tt grad to Hf, dense, sp chlor vn
	160.0	168.7	8.7		.05				96	2.63			.01				.04		1	Tr							Tr	5	40		1		50	1	Tr					Hf, dense; sp silicif. Tr chlor vn. Possib st alt Silfst?
	168.7	176.8	8.1		.11				100	2.59			.01				.10		1	1							1	Tr	40		1		50	1	1					Hf, dense, mod silicif. Tr chlor vn.
	176.8	186.7	9.9		.03				87	2.53			.01				.08		1	1							SP	1	40		1		50	1	1					Hf, dense, mod silicif w yellowish patches Tr CuOx
	186.7	195.7	9.0		.06				94	2.64			.01				.05		1	1							1	1	40		1		50	Tr	1					Hf, as above w incr silicif
	195.7	204.1	8.4		.18				97	2.67							.18		1	1							1	1	50		1		40	1	1					Hf, mod silicif - sp chlor vn.
	204.1	212.6	8.5		.29				96	2.66						.03	.26		1	1							1	1	50		1		40	1	1		And	207.4	45°	Hf, as above to 207, then And, slightly bleached
	212.6	220.7	8.1		.27				95	2.72							.27		1	1							1	15	50		1		30	1	1		Hf	212.6	50°	Hf, mod silicif. wk chlor on shears.
	220.7	230.1	9.4		.22				94	2.67							.22		1	1							1	10	60		1		25	1	1					Hf, as above, leaching w dark lime
	230.1	236.4	6.3		.22				95	2.82							.22		1	1							1	15	70		1		10	SP						Hf, tr jar. @ start, then sp sulfs. Rest as above
	236.4	245.0	8.6		.17				96	2.98							.17			1							5	15	70		1		SP							Hf, dense, sp silicif Tr gar-sl
	245.0	254.3	9.3		.13		.03		87	3.18					03		.10			1						SP	15	5	70		5			5	Tr					Hf, as above grad to pods mod clay - gare alt
	254.3	263.5	9.2		1.04		.03		85	3.41							1.04			SP							15	5	70		5			5						Hf, sp clay w pods blk chlor w mod sulf grad to mix Tt + Hf
	263.5	272.9	9.4		.58		.01		85	3.32							.58			Tr				SP			10	5	70		5			5		Tr				Hf, sp - mod clay alt w chlor - cal vning. Mod diss sulf
	272.9	282.0	9.1		.42	34.5	.05	34.5	95	3.03						12	.30			1							10	10	65	5	5			SP						Hf, dense, mod clay alt grad to st clay alt w incr gar. Sp diss spy
	282.0	290.4	8.4		.57	.38	.03	.02	98	2.59						.30	.27		SP	SP							15	5	60	10	5			1						Hf, st clay w wk veggy text assoc w mod cc - spy, then incr Tt; 6" And dike
	290.4	299.6	9.2		.41		.01		99	2.90						.10	.31		Tr	Tr							10	5	70		SP			5						Hf, patches st clay - lim w dense, sp clay - diss sulf. Pods Tt
	299.6	308.8	9.2		.44		.01		100	2.76						.10	.34			1							10	10	70		1			SP						Hf, wk veggy text w mod clay alt grad to sp clay - sulf. Pods st gar
	308.8	317.6	8.8		.26		.02		91	3.17							.26			1							10	5	70		1			5						Hf, sp clay alt w pods brkn Tt grad to sp chlor + clay vning Tr sulf
	317.6	326.3	8.7		.49		.03		99	2.58							.49			1							10	Tr	80		1			5						Hf, mod chlor - cal vning w irreg pods chlor Tr sulf
	326.3	333.3	7.0		.11				87	2.62						.05	.06			1							5	1	40		Tr			SP			And.	330.0	78°	Hf, sp chlor vning to 330.0, then And; post min dike. Col - clay vn std
	333.3	342.6	9.3		.10				84	2.53						.10			Tr	1							Tr				1			Tr						And, post min dike; tr cal, tr lim on fract
	342.6	350.8	8.2		.03				100	2.55						.03			1	1							1				1			1						And, post min dike; tr cal vning
	350.8	360.5	9.7		.11				90	3.22							.11			1				Tr			5	5	75		5			5			Hf	351.0	70°	And; post min dike to 351.0, then Hf; mod chlor vn grad to sp clay - gar
	360.5	369.3	8.8		.24		.02		99	2.73							.24			1							10	5	75		5			SP						Hf, gy - wht w sp clay alt grad to mod chlor - alun? vning. Tr sulf w chlor.
	369.3	379.6	10.3		.20				86	2.53							.20			1				Tr			5	5	80		SP			1						Hf, mod clay alt w sp chlor vning. Pods Tt. Sp sulf.
	379.6	388.8	9.2		.26				100	2.47							.26		Tr	1							10	5	70		5			1			Mz	387.6	brkn	Hf, mod clay alt w sp diss sulf to 387.6, then Mz, dense; st clay alt
	388.8	398.4	9.6		.08				95	2.57							.08			1							5	5	60		5		10	1						Mz; st clay alt grad to white w st silicif
							Av.	Rec. =	93%																															
						END	OF	HOLE																																

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-174
Page 1 of 1 Pages
Collar Elev 2935.43 Final Depth 345.3
Coords N 35,449.37 E 18,805.07
Inclination Vert
Logged by FTG - CWH
Date: Start 11/22/63 Finish 12/7/63

Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue-Green	Red Cu Oxides	Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem.	Spec.	Other (2) Galena	Sphal.	Molyb.	Calcite	Garnet	Silicates	Sericite	Clay	Un. Qtz	QUARTZ	CHLORITE	SIROSITE	MALACHITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
0.0	80.8	80.8																																					Rockbit
NC 2.400 80.8	87.9	7.1		.16				94	2.64		.01	03	.06		.06			Tr								5		SP	5	Tr		Tr			Mz	80.8	-	Mz; wk alt to 86.8, then And; post min dike w wk bx, Mod cal vn
				—		—		—	—																										And	86.8	brkn	And; post min dike, clay-gg patches. Sp cal vn
87.9	96.5	8.6		.24		.01		97	2.53						.24			Tr								SP		Tr	SP			SP						And, post min dike; sp clay alt
96.5	100.6	4.1		5.12		4.70		76	2.36	3.45		.25	1.00		.42			1								Tr		1	5			1	SP					And; post min dike as above w st chrys vning
100.6	110.5	9.9		11.55		10.61		80	2.81	8.61	.05	45	1.50		.94			SP			SP					5	25	5	SP	5		1	Tr		Tt	105.8	brkn	And, post min dike as above to 105.8, then Tt, leached, st lim-CuOx-clay
110.5	119.4	8.9		.28		.25		84	3.44	.20		01	.04		.03			Tr								10	55	20	Tr	SP		10	1					Tt; chlor-cal bx grad to dense, st gar w tr CuOx
NX 1.875 119.4	128.2	8.8		6.17		5.88		99	2.83	5.37		.01	.50		2.9			Sp			Tr					5	85	10		5	Sp		1					Tt, leached; st gar w st lim-CuOx
128.2	137.6	9.4		12.60		12.05		99	2.46	7.04		.01	5.00		.61			1			1					Tr	70	Sp		20			1					Tt; leached, mod clay alt w st lim w CuOx
137.6	147.6	10.0		12.59	89.5 @	16.98	89.5 @	80	3.33	8.00	.01	.01	7.00	6.46	.96	.10		5			Sp					Sp	50	1		20		Tr						Tt; leached, st gar-clay-lim. Gossan after mass sulf w mod hem w grad to dense st clay alt w st CuOx
147.6	157.5	9.9		3.19	5.95	2.96	5.56	83	2.69	1.46			.50	1.00	.23			Sp			Tr					Tr	45	Tr		30		25		10		Dp	155.0	brkn	Tt, leached, int clay alt (HF?) to 155.0, then Dp (?); pods int garo-CuOx. Dp? is int silicif w sp cup vnlts (Possib Qtzite?)
157.5	166.7	9.2		.66		.60		94	2.60	.10		.04	.46		.06			SP								Tr		5	SP	10		80		SP				Dp; (?) int silicif w patches sp clay. Mod CuOx
166.7	177.0	10.3		.35		.30		93	2.61			.01	.29		.05			15										15		20	Tr	45		5				Dp; (?) int silicif w pods? sed? indiv st clay-lim alt + sp CuOx
177.0	186.0	9.0		.49		.38		50	2.63	.10	.02	.10	.16		.11			10	Tr		Tr							5		15		60		SP				Dp; (?) int silicif, recemb Qtzite, but pods int clay-lim sugg ind in jgn ch
186.0	196.5	10.5		.10		.10		63	2.61	.09		.01						Tr					Tr?			Tr				Tr		85		Tr	Tr			Dp, similar to above, but no jg. test. Tr. Chrys
196.5	206.6	10.1		.05				79	2.29			.01	.04					1								5		15		1		75		1				Dp (?) int silicif w. pods (inclusions?) Hf. Tr CuOx
206.6	213.2	6.6		.12				92	2.53	.11		.01						1								10		70		1		15	Tr	1		Tt	208.7	brkn	Dp (?) int silicif to 208.7, then Tt; sp clay-CuOx to 211.6, then Hf,
				—		—		—	—																										Hf	211.6	grad	dense, pale chlor-cal vning
213.2	221.0	7.8		.06				100	2.78				.06					Tr								SP		90	Tr		5	Tr	Tr					Hf; tr chlor-cal vning w incr silicif
221.0	231.0	10.0		.05				84	2.91	.02						.03		1	Tr							1		65	1	Tr	SP	SP			Mz	225.6	brkn	Hf, sp-mod silicif to 225.6, then Mz; possib incip feldspath w sp silicif?
231.0	241.0	10.0		.07				98	2.63	.07								1											1	1			1	Tr					Mz; possib incip feldspath w tr pyr-blk ox on fract
241.0	250.5	9.5		.07				90	2.62	.07								1								Tr		30	1	1			1	1		Hf	247.0	brkn	Mz; as above to 247.0, then Hf; dense, brn, mod silicif.
250.5	259.8	9.3		.01				94	2.70	.01								1								SP		80	1		10	Tr						Hf; wk chlor-cal grad to buff-wht, mod silicif
259.8	264.1	4.3		.02				99	2.70	.02					Tr			1	Tr							1		80	1		10	1						Hf; tk white w sp pale chlor vn, mod silicif. Fg. [illegible] text.
264.1	273.1	9.0		.01				95	2.84	.01								1	1							1		80	1		10	SP						Hf; dense; white w sp chlor vn. Patches wk silicif.
273.1	282.6	9.5		.02				95	2.93	.02								1	1							1		85	1		10	Tr						Hf; mod clay alt grad to sp silicif grad to dense white; st $CaSiO_3$
282.6	291.8	9.2		.08				95	3.02	.08								1	1							1		85	SP		5	SP						Hf; dense, white; st $CaSiO_3$, sp chlor vn
291.8	301.0	9.2		.20		.02		93	2.97	.02					.10	.08		1	1							1		85	1			5						Hf; dense, st $CaSiO_3$ w tr chlor-cal vning grad to mod silicif
301.0	309.8	8.8		.61	12.5' @ 64	.37	12.5' @ .47	100	2.61	.15	.01	.01	.20		.15	.09		1	1						Tr	1	5	SP		1		90	Tr		Qtzite	301.2	grad	Hf; mod silicif w chlor vn to 301.2, then Qtzite; possib int silicif Hf to 309.2
																																			Tt	309.2	incrs	then Tt, int tk brn gar w mod CuOx. Tt ind to Qtzite? indicate ign d (Dp??)
309.8	318.5	8.7		.68		.57		95	2.63	.18	.02	.02	.35		.05	.06		Tr	Tr							SP	10	SP		SP	SP	85			Qtzite?	311.2	brkn	Tt, int gar w qtz pods to 311.2, then Qtzite?, patches mod CuOx. Sp tr sign?
318.5	327.8	9.3		.05				85	3.55	.05								1	1							5	85	5		1		Tr		Tr	Tt	318.8	brkn	Qtzite, sp CuOx - garo on fract to 318.8, then Tt, sp clay - st gar - mod
—	—	—		—		—		—	—																										Hf?	326.8	grad	CuOx to 326.8, then Hf? dense; gy, mod silicif. Possib qtz eyes.
327.8	337.6	9.8		.20				90	2.81	.10						.10			Tr							SP	15	60		1		15	Tr	Tr	Mz?	336.4	grad	Hf; pods Tt, dense, mod silicif to 336.4, then Mz, st silicif; blka on fract
337.6	345.3	7.7		.11				96	2.77							.11			1							1		?				30	1	1				Mz?, st silicif w blea on fract. Sp sulf. Possib Dp?

Av Rec = 87%

END OF HOLE

PRELIMINARY GEOLOGIC LOG

(Subject to Revised Logging)

ASARCO - SILVER BELL UNIT

Notes:

(1) Est. % Cu represented by each mineral

(2) Est. mineral %; or, as follows: Trace (Tr); Sparce (Sp) < 5 %; Moderate (Md) 5 - 50 %; Strong (St) + 50 %

Note (3)
Tt - Tactite
Hf - Hornfels
Mb - Marble
Qt - Quartzite
Bx - Breccia
Da - Dacite
Mz - Monzonite
An - Andesite

Note (4)
V - Vein
F - Fault
D - Dike
C - Contact
Ig - Undif igneous

Hole No. D-175
Page 1 of 1 Pages
Collar Elev. 2933.45 Final Depth 352.7
Coords. N. 35,296.76 E. 18,997.89
Inclination Vert
Logged by ETG - CWH
Date: Start 11/26/63 Finish 12/14/63

	Depth From	Depth To	Int'vl	Elev.	% Cu Total	% Cu Avg.	% Cu NS	% Cu Avg	% Core Recov	Sp. Gr.	Cu (1) Chrys.	Pitch	Black	Blue Green		Cc.	Cpy.	Born	Fe (2) Lim.	Py	Mag.	Hem	Spec.	Other (2) Galena	Sphal.	Molyb	Calcite	Garnet	Silicates	Sericite	Clay	Vn. Qtz	QUARTZ	CHLORITE	JAROSITE	(3) Rock Type	Structures (4) Depth	True Dip	Remarks
	0.0	42.0	42.0																																				ROCK BIT
NC 2.40	42.0	52.0	10.0		.07				73	2.60	.05	.01	.01						Tr								Tr			Tr	SP		SP		Mz	42.0	-	Mz, leached, sp clay alt w vesp feldspath
	52.0	61.6	9.6		.06		.01		66	2.67						.06			1	Tr											Tr		Tr		Hf	61.0	20°	Mz, med gy w st par devel of 1st + 2nd Sparce to 61.0, then Hf, st silicif
	61.6	69.5	7.9		.50		.31		93	2.61	.29	.01	.01			.15	.04		1	1							10	5	30	Tr	SP		SU	1	Tr	Hf bx	61.6	grad	Hf bx; Hf frags w. mod para in silica matrix (Dp?) No silicif of Hf.
	69.5	78.5	9.0		.28				88	2.63	.12	.01	.01			.08	.06		1	1							5	SP	35	1	SP		SS	SP	1				Hf bx, med clay-para frags w sp med silicif Mz frags floating in silica matrix
	78.5	86.0	7.5		.17				88	3.11	.10	.01	.01			.02	.03		1	1							5	10	40	1	1		40	1	1				Hf bx, frags ½" - 7" decr in no. to 84.5, then Hf frag 2 ft. thick
	86.0	90.2	4.2		.17				86	2.60	.10	.01	.01			.02	.03		1	1							5	SP	30	1	1		60	1	1				Hf bx; clay - para Hf frags in silica matrix.
NC 1.875	90.2	100.9	10.7		.09				84	2.60	.05	.01	.01				.02		1	1							5	1	30	1	1		60	1	1				Hf bx; clay - para frags w sp ads Cu w tr Mz frags in silica matrix
	100.9	109.7	8.8		.10				89	2.62	.06	.01	.01				.02		1	1							5	1	30	1	1	Tr	60	1	1				Hf bx; as above w. frags to 8" length. Silica matrix is 60% of core
	109.7	120.6	10.9		.28				83	2.62	.14	.01	.01			.03	.09		1	1							5	1	50	1	10	1	30	1	1				Hf bx; prob bx w incr size. frags; 4 ft clay - chlor Hf w sp suls - CuOx
	120.6	130.5	9.9		.06				83	2.60	.05		.01						1	1							SP	SP		SP		90	Tr	1				Hf bx, 10% Hf frags, 1% Qtzite frags. Matrix w vague dk blebs - silicif (Hf)
	130.5	140.2	9.7		.01				73	2.75	.01								1	1							SP	5		1		90	1	1				Hf bx, w 30% Hf frags w sp clay - para. Matrix int silicif Mz??
	140.2	149.3	9.1		.02				50	2.60	.02								1	1							1	5		1		90	1	1				Hf bx, 80% qtz matrix w possib Qtzite frags Tr Hf - Mz frags
	149.3	158.0	8.7		.01				49	2.60	.01								1	1							5	35		1		55	1	1				Hf bx; as above w tr med feldspath ½" Mz frags
	158.0	167.0	9.0		.05				91	2.61	.05								1	1							SP	20		Tr		70	5	1				Hf bx; pods Hf w sp chlor, sp. st feldspath Mz frags
	167.0	174.1	7.1		.02				99	2.60	.02								1	1							1	SP		1		90	SP	1				Hf bx, 80% qtz matrix w wk spid Hf, Tt, + Mz frags. Qtzite pebbles
	174.1	183.4	9.3		.03				91	2.62	.01			.02					1	1							1	1		1		90	1	1				Hf bx; 85-90% qtz matrix w sp ¼" chlor-spid frags. Possib Qtzite frags
	183.4	192.0	8.6		.14				95	2.80	.02			.03			.09		1	1							5	Tr	60	1			30	1	1				Hf bx, 2 ft Hf frags w sp chlor vn - sp suls; tr cc; all in qtz matrix
	192.0	201.0	9.0		.04				93	2.61	.01			.03					1	1							Tr	SP		1		95	1	1				Hf bx; sp dk chlor Hf frags, sp Qtzite frags in qtz matrix
	201.0	210.3	9.3		.12				96	2.60	.02			.02		.04	.04		1	1							SP	20		1		70	1	1				Hf bx; mod Hf frags - to 8" w sp spid - cc in qtz w mod limon fract
	210.3	220.3	10.0		.02				100	2.59				.01			.01		1	1							1	10		1		85	1	1				Hf bx; as above. Small dk Hf frags have vague rim; large frags are well defined
	220.3	227.3	7.0		.04				91	2.63	.01		.01	.02					1	1		Tr					1	20		1		70	1	1				Hf bx; >1" Hf - Qtzite frags in silica matrix
	227.3	236.6	9.3		.04				62	2.62			.04						1	1							1	15		1		80	5	1				Hf bx; >2" Hf frags - Qtzite pebbles in silica matrix Tr calcite Tr CuOx
	236.6	245.7	9.1		.04				64	2.62			.04						1	1							5	20		1		70	5	1				Hf bx; Hf frags in silica matrix. Possib Hnd Fe mod? Tr CuOx
	245.7	254.2	8.5		.03				99	2.60	.01	Tr	.02						1	1							5	Tr	60	15		20	Sp	1				Hf bx; clay - dissemd Hf frags up to 1 ft length w mod ads Cu
	254.2	262.6	8.4		.11				83	2.53			.04			.07?			1	1							Sp	55		20		20	5	1	Mz	262.2	brkn	Hf bx, 40% Hf - 5% feldspath Mz frags to 262.2, then Mz, med silicif
	262.6	270.7	8.1		.01				94	2.64			Tr				.01		1	Tr							Tr	Tr		SP	Tr		Tr					Mz, dark gy, wk alt, tr suls; tr limon fract
	270.7	278.9	8.2		.12				65	2.65			.01			.11			1	1										1		1	1					Mz; sp clay - bleach. Sp leach of suls
	278.9	288.8	9.9		.10				53	2.69			.01			.09			1	1										1		1	1					Mz; as above w st par text
	288.8	298.0	9.2		.08				57	2.66			.01			.07			1	1										1		1	1					Mz, as above.
	298.0	307.8	9.8		.06				40	2.69			.01			.05			1	1							Tr			1		1	1		Hf	307.5	brkn	Mz; sp silicif + as above to 307.5, then Hf, dense sp clay alt. Sp cc - sp
	307.8	316.9	9.1		.25				92	3.08							.25		1	1							5	SP	85	1			5					Hf, blue-gray, Pope Tunnel Type. Sp suls.
	316.9	327.3	10.4		.17				70	2.95							.17		1	1							5		85	5			SP					Hf, as above to 319.6, then dense, gray-gray, argillic.
	327.3	335.4	8.1		.44		.03		74	2.69							.44		1	1		Tr					5		80	5			5					Hf, dense, argillic, to 330.5 then gray to 332.6, mottled gr
	335.4	343.2	7.8		.28		.05		80	2.73							.28		1	1							10		80	SP			5					Hf, blue-gray, chlor, w a few spots of org. Hf. Sp suls.
	343.2	352.7	9.5		.20				100	2.59							.20		1	1							15		75	1			5					Hf, as above.
							Av	Rec. =	79%																													
						END	OF	HOLE																														