CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
520-770-3500
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the

James Doyle Sell Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

Final Depth 1881.0'
Collar Elevation
Coordinates
Inclination — 90°

ASARCO

GEOLOGIC — ASSAY LOG

JAN 7 1969

H. C.

HOLE NO. S-123
Sheet No. 105-7
Date Completed 10/20/68
Logged By R HL

Property SACATON

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
0-858.84	858.84	4 3/8" Ro Bit														Alluvium and Conglomerate.
858.84-863	4.16	2 1/2"	—	—											Gr	BEDROCK PLACED AT 825'. Mod. hem'd. leached. No Cu min. noted. Rec'd ± 1.5'. (Rotary Core)
869.0								START OF D.D. CORE								
872.0	3.0	NXWL			No	Recovery										
874.1	2.1	"			No	Recovery										
876.1	2.0	"	2.48	75	0.03	0.02		–	–	–	–	–	Qtz	Ser	Gr Bx	St. Bx'd, sericitized, hematized.
878.3	2.2	"			No	Recovery										
888.8	10.5	"	2.46	85	0.02	0.01		–	–	–	–	–	do		"	St. hem'd, bx'd, ser'd, granit. Rock is
895.8	7.0	"	2.45	92	0.03	0.02		–	–	–	–	–				highly incompetent. Some dacitic do
906.9	11.1	"	2.49	97	0.04	0.02		–	–	–	–	–				seem to suggest porphyry but overall
914.0	7.1	"	2.47	87	0.03	0.01		–	–	–	–	–				aspect is that of granite.
925.5	11.5	"	2.48	100	0.07	0.02		–	–	–	–	–	do		"	Int. remains strongly leached and oxidized.
936.7	11.2	"	2.51	93	0.08	0.02		–	–	–	–	–	do		Gr, Mp? Bx	As above, but int. becomes porphyritic @ 932.0' to about 933.0' and about 6" porph. before end of int.
945.2	8.5	"	2.46	86	0.06	0.03							do		Gr Bx.	Do. Some sections are almost massive red clay.
954.5	0.3	"	2.49	83	0.22	0.19		tr	–	–	–	–	do		"	Gradual decrease in brecciation and rock becomes more competent by 949.5'. Tr. of CuOx at 951'.
964.7	10.2	"	2.52	99	0.42	0.39		wk-mod.	–	–	–	–	do		Gr	Fractured, but no longer brecciated. CuOx (chrysocolla) as veinlets of coating fract. wk. jarosite.
974.3	9.6	"	2.50	98	0.91	0.85		mod-st	–	–	–	–	Qtz	Ser	"	Does in showing. Where est. FeOx, CuOx persists.

Final Depth 1881.0'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-123
Sheet No. 2 of 7
Date Completed 12/24/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
986.0	11.7	NxwL	2.53	94	1.15	1.09		mod-st	–	–	–	–	Qtz-	ser	Gr	Mod-st. CuOx flooding of granitic matrix. St.
993.8	7.8	"	2.51	90	0.28	0.25		wk-mod	–	–	–	–	↓		↓	hem along shears. Fully brecciated, but rock
																is quite fractured. CuOx becomes scat'd
																towards cont. of int.
1003.3	9.5	"	2.50	95	0.11	0.10		wk	–	–	–	–	do		"	Similar to above, but appears fully min'd.
1014.0	10.7	"	2.51	78	0.20	0.17		tr-wk	–	–	–	–	do		Mixed Gr. Mp Bx	Granite to 1002.6' Hence Mp to 1006.2'
																followed by another short section of Mp
																from 1008.5 to 1009.5'.
1023.3	9.3	"	2.49	88	0.04	0.03		–	–	–	–	–	Qtz-	ser	Gr Bx	St. crushed (gran'd) incompetent int.
																Leached and oxidized.
1034.6	11.3	"	2.47	88	0.29	0.23		tr	–	–	–	–	do		Gr Bx	St. gran'd sections intersecting w/comp't
													clay		Mp?	granite. From 1031.2' Porph (Mp?) w/ex-
															(mylonite)	treme shearing, hence so that core is in
															FAULT?	essence clay-like.
1044.1	9.5	"	2.48	92	0.30	0.18		–	–	–	–	–	Qtz-	ser	Mp?	An extremely broken interval w/st red-
													clay		Gr Bx	yellow clay. Orig. rock character almost
															(mylonite)	completely obliterated. At 1042' gran'd
															FAULT?	charact's resume, st. crushed.
1055.8	11.7	"	2.52	93	0.08	0.04		–	–	–	–	–	do		Gr. Bx.	St. red-yellow clay throughout core varying
1064.0	8.2	"	2.49	71	0.14	0.06							↓		↓	w/st gran'd sections. No Cu min. noted.
																@ 1050', int. again becomes gran'd w/yellow
																jarosite to end of int.
1074.5	10.5	"	2.51	86	0.11	0.08		–	–	–	–	–	do		"	Do.
1084.2	9.7	"	2.53	89	0.29	0.24		wk-mod	–	–	–	–	↓			CuOx reappears @ 1076' as chys(?) along
																fract & veinlets. Gran. mod comp't, but w/st'd
																shearing ass w/FeOx. Wk-mod jarosite.
1094.6	10.4	"	2.48	88	0.56	0.52		mod	–	–	–	wk. indig Cu	do		"	Scat'd CuOx within a strongly brec'd, sh'd
																and ser'd granite.
1104.9	10.3	"	2.50	96	0.82	0.79		mod	–	–	–	wk-mod indicator of Cu?	do		Gr. Bx.	Similar to above. Noted brochantite along
																fract. and scat'd CuOx (chys?) St. hem
																along fract. w/pace flooding of matrix.

Final Depth 1884.0'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SPECTOR

HOLE NO. S-123
Sheet No. 8 of 7
Date Completed [illegible]
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1115.5	10.6	NXWL	2.51	90	1.28	1.22		mod-st	–	–	–	tr-wk indig Lim	Qtz	Ser	Granite, Vico-granite	Similar to above, but @ 1110.2' abrupt decrease in FeOx w/coarsh. rock fm. C. Ox within matrix. Microgranite lowered and st. ind.
1127.7	12.2	"	2.55	97	1.50	1.41		st	–	–	–	tr-wk indig Lim	do		Gr	Combed and granite w/st CuOx flooding of matrix. Tr-wk hem. stain.
1138.0	10.3	"	2.53	94	1.03	0.97		st	–	–	–	–				
1148.3	10.3	"	2.51	92	1.04	0.94		mod-st	–	–	–	st indig Lim & Lim	do		"	Recovered limonite after py w/cc.
1157.8	9.5	"	2.52	95	0.80	0.71		mod	–	–	–	wk-mod indig Lim	↓		"	–
1167.2	9.4	"	2.50	94	1.23	1.13		st	–	–	–	wk indig Lim & Lim	do		"	Similar to above, but read scat'd intrusion.
1177.4	10.2	"	2.48	95	2.13	2.09		mod-st	–	–	–	tr-wk Lim	do		"	Do.
1187.8	10.4	"	2.49	94	1.34	1.28		mod	–	–	–	tr Lim	do		Gr	St. CuOx to 1182.7' thence leached to end of int.
									SULPHIDES							
1198.2	10.4	"	2.51	91	1.30	0.04		–	–	–	wk-mod	wk-mod Lim	Qtz	Ser	"	"Live" limonite to 1188' – cc @ 1188.3'-1192'. Thence again indig Lim, leached to end of int, w/variable FeOx.
1208.4	10.2	"	2.49	90	0.05	0.01		–	–	–	–	wk Lim	do		Gr. Bx.	Granite, brecciated in part only. Stands leached and oxidized. Only wk indig Lim & Lim, but mod-st hem. stain of matrix.
1217.8	9.4	"	2.52	100	0.04	0.01		–	–	–	–	–	↓		↓	
1226.2	8.4	"	2.51	100	0.04	0.01		–	–	–	–	wk Lim & Lim				
1235.5	9.3	"	2.50	98	0.03	0.01		–	–	–	–	wk-mod Lim	do		Gr	Do, but w/incr. st. indig. limonites.
1246.2	10.7	"	2.53	97	0.03	0.01		–	–	–	–	tr Lim	↓		↓	Similar as above; tr. Lim. only.
									SULPHIDES							
1256.7	10.5	"	2.51	96	0.44	0.02		–	tr	–	tr-wk	wk-mod Lim & Lim	do		"	At 1252.5' about 4" of core displaying cc. w/very minor scat'd py. Balance of core displays "live" limonite varying from wk-mod.
1266.6	9.9	"	2.49	99	0.03	Tr		–	–	–	–	wk-mod Lim	do		"	Leached, surficial'd Lim and Lim, displaying gossan-like text after py and cc, in particular the last interval.
1276.9	10.3	"	2.50	96	0.03	Tr		–	–	–	–	do	↓		"	
1286.2	9.3	"	2.52	96	0.03	0.01		–	–	–	–	↓	↓		Gr. Bx	

Final Depth 1384.0
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC — ASSAY LOG

Property SPARTAN

HOLE NO. S-123
Sheet No. 4 of 7
Date Completed 12/20/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
									SULPHIDES							
1296.7	10.5	NQWL	2.51	95	0.38	0.01		—	tr	—	wk-mod	wk-mod Lim & Lm	Qtz-Ser		Gr	Similar to previous int's w/dissem. indig Lim's. At 1296.4' cc encountered as dissem & vein mat w/scat'd py.
1307.2	10.5	"	2.61	98	3.19	0.06		—	wk	—	tr	mod-st Lim	do		"	A 2" cc py vein @ 1296.8' and @ 1297.8'. Thence dissem sulph to 1300.8' followed by segments of oxidized and sulphide zones. (Good examples at Lim → cc.)
1316.8	9.6	"	2.57	96	1.11	0.02		—	tr	—	wk-mod	mod Lim	do		Gr. Bx.	Leached and oxidized for the most part. Last 2' of int. intimately mixed sulphide and Lim after cc.
1327.2	10.4	"	2.46	89	0.02	0.01		—	—	—	wk	wk-mod Lim	do		"	Do - to ± 1318.7', thence leached and oxidized w/scat'd indig. Lim's. Variably hem'd w/scat'd chlor'd portions.
1337.4	10.2	"	2.45	93	0.02	0.01		—	—	—	—	do	Kaolinized			
1347.8	10.4	"	2.44	91	0.03	0.01		—	—	—	—	wk indig Lim	Qtz-Ser			
1358.1	10.3	"	2.47	93	0.06	0.01		—	—	—	—	wk Lim & Lm				
1368.4	10.3	"	2.45	89	0.05	0.01		—	—	—	—	do				
1378.8	10.4	"	2.42	90	0.23	0.17		wk	—	—	—	wk Lim	Kaolinized		Gr. Bx	Essentially as above. Noted CuOx (as a silicate or sulphide?) @ 1377.5'
1389.2	10.4	"	2.46	92	0.04	0.01		—	—	—	—	do	Sericitized			
1398.2	9.0	"	2.45	98	0.04	0.01		—	—	—	—	tr Lim	do		Gr. Bx	
1409.5	10.3	"	2.47	N.A.*	0.04	Tr		—	—	—	—	tr-wk Lim				Int's remain leached and oxidized.
1417.8	9.3	"	2.48	N.A.	0.04	Tr		—	—	—	—	do				
1425.8	8.0	"	2.50	100+	0.06	Tr		—	—	—	—	wk Lim	do		"	As above.
1436.8	11.0	"	2.60	76	0.08	Tr		—	—	—	—	wk-mod indig Lim's				
1445.2	8.4	"	2.52	99	0.06	Tr		—	—	—	—	wk-mod indig Lim's	Qtz-Ser		Micro-Granite	Goo'ly g'zone, d'grd, ser'd rock, variably bxc'd.
1455.4	10.2	"	2.54	93	0.09	0.02		—	—	—	—	do				
1464.0	8.6	"	2.49	93	0.13	0.04		wk	—	—	—	do	do		do + Granite Bx	Similar to previous int, but becoming gradually coarser grained toward end of int. Wk CuOx stain.
1474.2	10.2	"	2.51	94	0.09	0.02		—	—	—	—	do	do		Gr. Bx.	Variably bxc'd and hem'd.

* Not Available.

Final Depth 1881.0
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-123
Sheet No. 5 of 7
Date Completed 12/29/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Mo Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1482.4	8.2	NQOL	2.53	96	0.17	0.01		–	–	–	–	wk Lim	Qtz	Ser	Gr Bx	As above.
								SULPHIDES								
1492.6	10.2	"	2.55	98	1.86	0.15		wk	tr-wk	–	mod-st.	wk Lim	do		Gr. Bx.	Sh'd, brec'd and gran'd in part from 1482.4' - 1484' followed by dissem. cc within gran. to end of int. Gran'd in brec.
1502.5	9.9	"	2.65	94	1.48	0.10		–	tr-wk	–	wk-mod	–	do		"	Similar to above. No FeOx present. Mod by cc throughout.
1512.0	9.5	"	2.57	100	1.41	0.07		–	tr	–	wk-mod	–	↓		↓	
1520.8	10.8	"	2.50	94	1.73	0.12		–	tr	–	wk-mod	–				
1529.5	8.7	"	2.51	66	3.12	0.06		–	tr	–	v. st.	–	do		Mixed Mp? Gr FAULT	St. gran'd, ser'd. At 1526' int. becomes porph'ic, thence highly crushed gran'd brec'd w/mixed porph (Mp?) and granite, stained by mod. FeOx.
1541.6	12.1	"	2.49	93	1.10	0.03		–	wk	–	mod?	–	↓			
1550.7	9.1	"	2.55	97	0.75	0.02		–	wk-mod	–	wk	–	do		Mp? Gr Micro-Granite ?	Highly fract'd, variably brec'd, wkly sheat'd, st. ser'd. Porph in places and appears to alternate w/fine gr'd quartzose rock. St. crushed gran'd from 1550.7 - 1558.7'.
1558.7	8.0	"	2.53	97	0.30	Tr		–	wk-mod	–	tr-wk	–	↓			
1567.2	8.5	"	2.70	99	1.07	Tr	0.019	–	wk-mod	–	wk	–	do		Gr. Bx. Mp. Gr Bx.	Somewhat greater consistency than previous int. but includes st'ly gran'd portions. At 1567.2 ± 2' of porph (Mp). St. gran'd toward end of int.
1577.3	10.1	"	2.65	94	0.37	0.01			wk	–	wk	wk. indig Lim.	↓			
1586.6	9.3	"	2.63	96	0.33	0.01		–	wk-mod	–	wk	wk-mod indig Lim	do		Gr. Bx.	St. brec'd throughout w/st hematite along fracture zones. Gen'ly mixed sulphides and FeOx. Chal. incs. toward 1606.8'.
1596.8	10.2	"	2.61	100	0.28	0.01		–	wk	–	wk-mod	wk. Cov	↓		↓	
1606.8	10.0	"	2.64	97	1.18	0.02		–	wk-mod	–	mod-st	do				
1616.2	9.4	"	2.62	94	2.31	0.04		–	wk-mod	–	mod-st	–	Qtz	Ser	"	St. cc first foot of int. but remainder gen'ly wk. Brecciation stronger intervals, w/sect'd but st. FeOx.
1625.8	9.6	"	2.65	94	0.23	Tr			wk-mod	–	wk		↓		↓	
1634.8	9.0	"	2.57	91	0.28	0.01			wk-mod	–	wk					
1645.3	10.5	"	2.54	98	0.31	0.02			wk	–	tr-wk	–				
1654.6	9.3	"	2.54	100	0.25	0.08			wk	–	tr-wk	–				
1663.1	8.5	"	2.56	100	0.39	0.03			wk	–	wk?	–	do		Gr Bx FAULT	At 1655' rock becomes steeply sheat'd, crushed, gran'd, w/st FeOx. do end of int.
1673.6	10.5	"	2.54	97	0.39	0.03			wk	–	wk	–	do		Gr Bx Diabase ?	St. fract'd FeOx, oxide becomes f. gr'd @ ± 1670. qtz-ser. mainly.

Final Depth 1881.0'
Collar Elevation
Coordinates
Inclination −90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SPERTON

HOLE NO. S-123
Sheet No. 6 of 7
Date Completed 10/20/68
Logged By R.H.

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu: Total	Non-S	Average	Mineralization: Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1681.4	7.8	NXWL	2.55	97	0.85	0.01			tr-wk	wk-mod			Alt. (wkly	Ser chlor'd)	Diabase (?)	Fairly fr'd, fine grd, sch'd w/frax. wkly chlor'd cont'g scat'd py and some cby as infilled vnlts and seams
1691.8	10.4	"	2.53	95	0.58	Tr			tr-wk	wk						
1702.1	10.3	"	2.54	97	0.49	0.01			tr-wk	tr-wk			do		" Qtz Gr.	Similar to above. Tot. under micro. core displays a somewhat varied appr. Rock becomes st. bicc'd @ 1693.5' Ht to 1704.5' (fault breccia) followed by coarse grd granite
1712.3	10.5	"	2.50	100	0.25	Tr			tr	tr			do		Gr	Variably bicc'd, grn'd granite
1722.6	10.3	"	2.51	96	0.27	Tr			tr	tr						
1732.7	10.1	"	2.53	94	0.51	0.01			wk	wk			Sericitized Chloritized		Gr, Db? Bx	Granite to 1738.0', thence a steeply inclined contact (~70°) w/dk gray & grd rock fragments set in bicc'd matrix.
1741.6	8.9	"	2.62	95	0.91	0.01			tr-wk	tr			Chloritized		Db? Bx	St. bicc'd w/variable granulation and sericite.
1753.5	11.9	"	2.51	80	0.68	Tr			tr-wk	tr-wk			Sericitized Chloritized		Db? Bx Gr	Sd. remains st. bicc'd, followed by st. sh'd w/fault breccia to 1758.2' where 60° contact w/granite – Db.
1761.6	8.1	"	2.53	89	0.40	Tr			tr-wk	tr-wk			Sericitized		Gr Bx	Coarse grd granite bicc'd in part; scat'd by traces of cby. St. sh'd granite at bad of int.
1771.7	10.1	"	2.51	65	0.32	0.01			tr-wk	tr-wk		tr-wk	↓		↓	
1783.1	11.4	"	2.52	88	0.27	Tr			tr-wk	tr						
1792.2	9.1	"	2.54	98	0.52	0.02			tr	tr-wk			Chlor'd		Db?	St. grn'd to 1784 followed by chlor'd sh'd, f grd Db(?) w/scat'd py (A high angle fault cut.)
1801.3	9.1	"	2.55	100	0.39	0.02			tr	tr-wk						
1813.0	11.7	"	2.54	75	0.41	0.01			tr-wk	tr?			do		Db? Gr.	At 1816' ct w/gran. to 1811.4' followed
1813.5	0.5	"	2.50	–	No	Recovery									Db?	by sh'd, chlor'd Db(?)
														BASEMENT		FAULT.
1823.4	9.9	"	2.50	100	0.03	0.01			—	—		$CO_3^{=}$	do		And? Porph.	A porph'ic, sh'd, w/FeOx along shears. wk calcite? within groundmass.

Final Depth 1881.0'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-123
Sheet No. 7 of 7
Date Completed 10/20/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1834.0	10.6	NWQL	2.51	97	0.04	0.01			—	—		$CO_3^=$	Chlor'd		Db. and/ or Ap.	St. hem'd mass, sh'd, clayey followed by a chlor'd, carbonate (calcite?) gouge-like rock @ 1825' to end of int.
1846.5	12.5	"	2.53	95	0.02	Tr			—	—		$CO_3^=$	do		Db	Similar to above becoming somewhat coarser gr'd beyond 1840.' Unmin'd. St. carbonate content to ± 1841.5'
1856.6	10.1	"	2.55	97	0.02	Tr			-	-		$CO_3^=$	do		Db	Similar to above w/variable $CO_3^=$ content ±.
1866.3	9.7	"	2.54	97	0.02	Tr			-	-		$CO_3^=$	do		Db. Gr-Gn.	Do. At ± 1861.6' extr. sh'd granitic gneiss w/ sl. sericite: muscovite int. part'l highly flaky)
1876.0	9.7	"	2.51	93	0.02	Tr			-	-		$CO_3^=$	Sericitized		Gr-Gn	Highly incompetent sh'd, chlor'd, ser'd, granitic-gneiss. Calcite int'ts.
1881.0	5.0	"	2.50	90	0.02	Tr			—	—		$CO_3^=$	Chloritized			
	E.O.H.															

Final Depth 2037'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

J. H. C.

DEC 18 1968

HOLE NO. S-122
Sheet No. 1 of 2
Date Completed 10-21-68 To 11-2-68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1545	1545	4¾" Ro	BIT												ALLUVIUM & CGL	
1551	6	NX													CGL	
1680	129	4¾" Ro	BIT													
1684.5	4.5	NX													CGL	
1750	65.5	4¾" Ro	BIT													
1755	5	NX													CGL	
1800	45	4¾" Ro	BIT													
1805	5	NX													CGL	
1855	50	4¾" Ro	BIT												CGL	
																BEDROCK PLACED AT 1855 FT
1863	8	4¾" Ro	BIT													
1869	6	NX			NOT ASSAYED			NON OBS					Wk sil & arg		LATITE(?) PORPH	A basically fg, reddish-gry rk displaying diss. chloritized biot and conspicuous, partially epidotized, anhedral blebs of white feld ranging 3-10 mm in diam. Core is wk'ly silif and v. wk'ly arg'lized. Mod to high angle fracs & slip surfaces w/st hm. No min obs.
1880	11	4¾" Ro	BIT					NON OBS					Chlor (?) & Serp (?)		LATITE PORPH(?) or ANDESITE PORPH(?)	Frags texturally similar to 1863'-69' core, but dk gry-grn. Flecks & stain of hm suggest frac deposits and/or partial ax'ion. Usual contamination of qtz, sch, etc. Mod mag and some vfg spec. No Cu min obs. Vial contains arg mud.
1900	20	4¾" Ro	BIT									Nat Cu	do		do	Similar. Small flakes of Nat Cu in conc. Org mud still present in vial.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-122
Sheet No. 2 of 2
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1910	10	4¾" Ro Bit							Tr (?)			Nat Cu	Chlor (?), Serp (?), & Ep		LATITE (?) or ANDESITE (?) PORPH	Similar. Fair percentage of v. small epidotized feld (?) frags. Tr of Nat Cu & a few v. small grains of possible py.
1920	10	4¾" Ro Bit							Mod		Tr-wk	mag	Silif		GR (?)	Contact w/above occurs somewhere in this interval. Sample displays an overall lighter color as a reflection of a marked increase in lt qtz & feld frags. Conc contains a high percentage of vfg mag, py, & cc (?). Qtz-feld frags exhibit vfg diss py-cc & spec. Mud in vial is a milky org-red.
2000	80	4¾" Ro Bit							Mod	Tr (?)	wk-mod	mag	do		GR (?)	Sample vials display an ever-increasing percentage of qtz-feld w/depth. In general mag, vfg py, cc (?), cpy (?), & spec st in conc.
2030	30	4¾" Ro Bit							Mod	wk-mod	mod-st	mag	do		GR (?)	Samples essentially homogeneous. Overall color lt gry fr/qtz-feld frags. These prob'ly represent a qtzose, alt'ed GR, most likely originally encountered c. 1910 ft. High percentage of vf grains of mag, py, cpy (?), cc, & cov (?) reflect mod-st Cu min. Mud in vials is a pale, milky pink below 1920 ft.
								MUD c. 2010 FT.	REPORTED		CHARCOAL		GRY			
2035	5	4¾" Ro Bit														No SAMPLE
2037	2	NX			NOT	ASSAYED			Mod	Tr (?)			do		GR	A lt gry, mod'ly-st'ly alt'ed, mg, qtzose GR. Well frac'ed & br, and displaying mod conc of vfg py. Tr of cpy (?).
BOTTOM																

Final Depth 2035.3'
Collar Elevation
Coordinates
Inclination -90°

ARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-121
Sheet No. 1 of 3
Date Completed 11/19/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Mo Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
0-1619	1619.0	4¾" RB														Alluvium and conglomerate.
1624.4 – 1669.3	44.9	NXWL						START OF D.D. CORE							Tcgl	Gen'ly a med to c. gr'd matrix w/mixed fragm. of granite, porphyry w/acc. schist
1669.3 – 1701.6	32.3	"						wk	–	–	–	–			do	As above. From 1694 to 1701.' CuOx occurs as vnlts, along fract and staining feldspars → clay min. Rock type: cgl consisting of a granitic appearing matrix with vague flow structure around fragments.
1706.4	4.8	"													do	St. hematized from 1704.0 to end of int.
1711.4	5.0	"	2.53	100				–	–	–	–	–	Kaolinized, Sericitized		Tcgl	As above with st. alte fragm. to 1708.0 St. clay. BEDROCK PLACED AT 1708.0'
					0.11	0.08		wk	–	–	–	tr Limo	do		Gr.	From 1708.0 to end of int. st. Bx, silicif sh'd gran. At 1711.0 some CuOx along fract. St. FeOx.
									SULPHIDES							
1720.7	9.3	"	2.56	84	2.01	0.12	0.007	tr	–	–	mod-st	tr spec.	Qtz-Ser		"	Noted appearance of cc @ 1715.7 ±. Locally silicif Bx and sh'd.
1730.8	10.1	"	2.64	95	2.54	0.15	0.011	–	–	–	mod-st	–	do		"	Bx'd w/wk FeOx throughout. St. sericitized
1739.1	8.3	"	2.69	95	2.58	0.12	0.013	–	–	–	st	–	do		"	Gen'ly st. Bx'd and well mineralized.
1750.6	11.5	"	2.65	94	0.58	0.08	0.019	–	–	–	wk-mod	–	do		"	As above to 1742, thence int. becomes st. fragmented w/FeOx and wk. jarosite to end of int.
1761.2	10.6	"	2.62	94	0.30	0.01	0.010	–	–	–	–	–	do		"	Do. Int. is leached and oxidized w/mod shearing.
1769.8	8.6	"	2.52	76	0.04	0.02		–	–	–	–	–	Qtz-Ser		Gr	Cont'd Bx'd. sh'd with hem along surf. No Cu min. obs. Tr jarosite.
1778.7	8.9	"	2.37	78	0.50	0.42		tr azurite	–	–	–	tr cuprite	chloritized Kaolinized		Gr. And. porph	As above to 1775.0' thence highly sh'd, hematized slickensides, vole. porph. Bi → chl. CuOx @ 1776' as cuprite, azurite.

Final Depth 2035.3'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-121
Sheet No. 2 of 3
Date Completed 11/19/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	~~Average~~ Mo	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
1788.2	9.5	NX10L	2.63	95	1.25	0.08		–	–	–	mod	wk nat. Cu	do	+	And?	As above to 1781.8' – Chlor'd biotite,
													Qtz-	Ser.	porph	feldspar phenos → clay min. Highly polished
															Gr	hem. fractures. Thence fine to med gr'd
																granite? w/st. diss. cc. to end of int.
1799.0	10.8	"	2.47	98	0.12	0.03		–	–	–	tr	–	do		do	At 1788.7' mod angle struct(?) ct again with
																a dk greenish-gry chlor'd. And? porph.
																Variable hem'd; st along fract. surf.
1809.3	10.3	"	2.55	97	0.03	0.02		–	–	–	–	–	chloritized		And?	Volc. (and?) porph. w/feldspars → clay
1821.7	12.4		2.53	95	0.02	0.02							Kaolinized.		porph.	or epidote. Sporadically distrib. qtz.
1830.9	9.2		2.51	98	0.03	0.02										phenos. st. hematized fractures and
1831.6	0.7		—	—	No	Recovery										shears. – locally Bx'ed. Unmineralized.
1843.8	12.2		2.55	80	0.02	0.02	0.002									
1851.4	7.6	"	2.49	100	0.02	0.02	0.002	–	–	–	–	–	do		do	Essentially as above – chlor'd and/or ser-
1859.2	7.8		2.57	99	0.02	0.01										pentinized volc. porph with pronounced
1868.8	9.6		2.42	100	0.03	0.01										polished hematized shears and fract.
1879.2	10.4	"	2.51	100	0.42	0.06										As above – decrease in hem @ 1870.8 becoming
1889.2	10.0		2.48	96	0.50	0.06		–	–	–	–	tr nat. Cu	do		"	wk to 1892'. Tr. of native Cu coating
1899.3	10.1		2.41	99	0.06	0.02						do				fract. surf @ 1889'.
1909.8	10.5	"	2.64	99	0.03	0.01		–	–	–	–	–	do		"	Variably Fe_2O_3 stained porph. $CO_3^=$ coating
1919.0	9.2		2.60	98	0.02	0.01										surf. and as veinlets. Groundmass locally
																chlor'd w/c.p. Occ. large qtz. phenos. From
																1916.0' to end of int. st. Bx'd, hematized.
1928.4	9.4	"	2.53	55	0.04	0.04		–	–	–	–	tr nat. Cu	do		"	St. Bx'd. hem. to 1923.3' Variable to end of
																int. Occ. native Cu. St. alt.
1939.0	10.6	"	2.56	88	0.70	0.03		–	wk	–	mod	–	do		And?	Chlor'd/serpen'd, sh'd w/pronounced hem
													+Qtz-	Ser	porph	along them. At 1934.2 mod angle
															Gr.	contact w/Bx'd gran. alt'g w/Mx porph.
															Mp	to end of int.
1948.4	9.4	"	2.59	89	1.94	0.02		–	wk-mod	tr	st	–	Qtz-	Ser	Mp, Gr	An interfingering sequence of Gr. Mp, the
																latter predominating. Appears well min'd
																by cc. cov. St. Bx'd in part.

Final Depth 2035.3'
Collar Elevation
Coordinates
Inclination – 90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-121
Sheet No. 3 of 3
Date Completed 11/19/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	~~Average~~ Mo	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG.
1959.2	10.8	NXWL	2.63	89	1.77	0.02			wk-mod	wk	st.	–	Qtz-ser		Gr.	St. Bx'd, gran'd, sericitized and chl'd cov. cpy freq. Locally st. gouge.
1970.8	11.6	"	2.64	77	1.69	0.02			wk-mod	–	mod-st	tr spec.	do		"	Essentially as above. Covellite locally strong.
1978.6	7.8	"	2.70	100	0.91	0.01			wk	?	wk-mod	–	do		"	Silicif in places w/some brecciation.
1988.4	9.8	"	2.67	60	1.00	0.02			wk	wk	wk-mod	–	do		"	Do; Granite gen'ly f.gr'd. Mp occurs from 1983.0± to 1988.0±. cc persists as localized occurrences.
1998.0	9.6	"	2.64	81	0.59	0.01			wk	–	wk	–	do (+chlor)		"	St. quartzose alternating with gouge ser. zones. Chlor'd from 1995' w/suggestion of porphyry.
2008.2	10.2	"	2.57	70	1.33	0.01			wk	tr	mod	–	do		Mp?	St. Bx'd, gran'd int. Mp? Min. appears principally as covellite.
2017.4	9.2	"	2.60	56	0.64	0.01	0.019		wk	–	–	–	do (+silicif.)		do + Gr.	Int. remains porph w/diseem "fresh" bi to 2013.4. Thence c.st. locally quartzose, gr. No Cu min. obs.
2026.6	9.2	"	2.59	49	0.52	0.01			wk	tr	–	–	silicif. (+sericite)		Gr	Gen'ly st. silicif w/tr. cpy.
2035.3	8.7	"	2.61	82	0.05	0.01			tr	–	–	–	Chloritized		Gr, And? porph.	As above to 2028.3', thence chlor'd/serp Volc. porph. Bi ⇒ chl. (complete).
	E.O.H.															

Final Depth 1915.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SPCITAN

J. [illegible]

JAN 7 1905

HOLE NO. S-120
Sheet No. 10 of 5
Date Completed 12/10/66
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
0-973	973	4¾" RB														Alluvium and conglomerate.
979.2								Start of D.D. core.								BEDROCK PLACED AT 880'
984.3	5.1	NX(OL)	2.41	75	0.03	0.01		–	–	–	–	–	Qtz-Ser Kaolinized		GrBx	St. gran'd, hem'd as flooding a fract. St. sericite, kaolinite alteration, clay min'd.
986.7	2.4	"	–	–	No	Recovery										
988.8	2.1	"	2.32	100+	0.03	0.01		–	–	–	–	–	do		"	As above.
991.7	2.9	"	–	–	No	Recovery										
1001.0	9.3	"	2.45	100	0.02	0.01		–	–	–	–	–	do		"	St. sh'd, gran'd, hem'd, leached granite.
1010.7	9.7	"	2.45	88	0.03	0.02		–	–	–	–	–	Qtz-Ser			Int. remains strongly leached and oxidized.
1020.2	9.5	"	2.52	58	0.02	0.02		–	–	–	–	–	do		"	Mno fracture st. porph (Mp?) noted.
1031.8	11.6	"	2.48	69	0.03	0.02		–	–	–	–	–	Qtz-Ser Kaolinized		"	St. gran'd Bxd and hem'd. No Cu min.
1036.7	4.9	"	–	–	No	Recovery										
1046.3	9.6	"	2.41	79	0.05	0.02		–	–	–	–	–	Qtz-Ser		"	As above. Mod to high arch struct. abovs, hem'd w/jarosite, decreases @ 1042.0
1052.7	6.4	"	–	–	No	Recovery										
1057.2	4.5	"	2.45	100	0.04	0.02		–	–	–	–	tr spec.	do		"	St. gran'd, quartzose w/tr. of FeOx.
1062.6	5.4	"	–	–	No	Recovery										
1069.8	7.2	"	2.49	100	0.91	0.87		mod	–	–	–	–	do (Kaolinized)		"	St. sh'd, clayey, pale green color to 1066.6'. From this point on CuOx's (Brochantite?) show lining fractures. Rock is now quite competent.
1077.5	7.7	"	2.56	84	0.83	0.82		mod	–	–	–	–	Qtz-Ser		"	Do. – to 1714.2'. Int. there becomes leached and oxidized. St. gran'd.

Final Depth 1915.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SPECTON

HOLE NO. S-100
Sheet No. 2 of 5
Date Completed 12/10/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOGG
1086.0	10.5	NXWL	2.55	100	0.06	0.04		–	–	–	–	–	Qtz-Ser		Gr	Gently st. bx'd, gran'd w/brecciations
1096.1	8.1	"	2.57	76	0.09	0.08		–	–	–	–	–	Kaolinized		↓	Steeply dipping bx'd structures. Wk. Cu ox
1106.3	10.2	"	2.52	100	0.42	0.16		wk	–	–	–	mod indigLm + LLm.	↓		↓	@ 1102.2'
1116.0	9.7	"	2.53	100	1.36	1.22		mod-st	–	–	–	wk-mod indigLm + LLm.	do		"	As above to 1110.2' thence abrupt incr. of
1126.5	10.5	"	2.54	95	2.78	2.68		st	–	–	–	LLm.	↓		↓	Cu ox as surf. coatings. Hem along fract.
1137.0	10.5	"	2.50	96	1.83	1.76		st	–	–	–	mod LLm	↓		↓	Variable brecciation.
1147.5	10.5	"	2.51	89	2.50	2.50		st	–	–	–	wk LLm	do		"	Principally as above. Steeply angled bx'd
1158.0	10.5	"	2.49	97	2.01	1.93		st.	–	–	–	do	↓		↓	structures. Cu ox st (antlerite/brochantite)
1168.3	10.3	"	2.52	100	2.20	2.11		mod-st	–	–	–	–	↓		↓	as acicular prismatic x'tals dispersed
1178.6	10.3	"	2.50	93	3.00	2.89		mod-st	–	–	–	mod LLm	↓		↓	throughout core.
1189.0	10.4	"	2.48	96	1.65	1.57		mod	–	–	–	wk LLm (+azurite)	↓		↓	
1200.2	11.2	"	2.51	95	1.99	1.90		st	–	–	–	wk LLm	Qtz-Ser		Gr	Conspic. veinlets of brochantite more or less
1209.3	9.6	"	2.53	96	0.89	0.85		mod-st	–	–	–	do	↓		↓	parallel to core. Cu ox diminishes toward
1219.7	9.9	"	2.47	99	0.04	0.04		–	–	–	–	do	↓		↓	1205.4'. Int'l leached. No Cu min. recog-
1231.3	11.6	"	2.54	90	0.12	0.11		tr	–	–	–	tr	↓		↓	nized, except for tr. amounts in fastint.
																Variably brecciated throughout.
1242.1	10.8	"	2.55	87	2.28	2.17		st	–	–	–	wk-mod LLm	do		"	St brochantite, well x'tallized throughout
1252.3	10.2	"	2.52	96	0.04	0.03		–	–	–	–	mod-st indigLm + LLm	↓		↓	to ≈ 1240'. Conspic LLm. Cu min. strong
1262.8	10.5	"	2.50	59	2.58	2.47		st	–	–	–		↓		↓	once more from 1255' to end of int.
1272.0	9.2	"	2.55	87	0.82	0.77		mod-st	–	–	–	mod LLm	↓		↓	FeOx and brecciation quite variable.
1281.8	9.8	"	2.53	94	0.35	0.28		wk-mod	–	–	–	wk LLm	do		Gr Bx	St. Bx'd gran'd w/local st. FeOx. From
1292.2	10.4	"	2.49	94	0.48	0.41		wk-mod	–	–	–	–	↓		↓	1281.8 - 1292.2' tr-wk FeOx. thence
1302.0	9.8	"	2.51	64	0.84	0.78		mod	–	–	–	–	↓		↓	to end of int. extr. granulation w/FeOx.
1312.4	10.4	"	2.52	85	2.41	2.26		st	–	–	–	–	Qtz-Kaolin		"	Do. The granite has distinct purple
1322.2	9.8	"	2.53	98	3.09	3.00		st	–	–	–	wk LLm	↓		↓	clayey groundmass. Brochantite
1332.1	9.9	"	2.47	87	1.26	1.19		mod	–	–	–	–	↓		↓	persists as veinlets and along fract.
1340.5	8.4	"	2.46	90	0.67	0.62		mod	–	–	–	–	↓		↓	surfaces.
1349.6	9.1	"	2.48	91	2.00	1.94		mod-st	–	–	–	wk-mod indigLm	Qtz-Ser		"	As above to 1351.0' thence st. FeOx, bx'd,
1359.0	9.4	"	2.47	88	0.23	0.19		wk-mod	–	–	–	do	Kaolinized		↓	gran'd to 1366.0' without Cu min. Cont.
1369.3	10.3	"	2.49	93	0.07	0.05		–	–	–	–	do	↓		↓	seat'd brochantite to end of int.
1379.0	9.7	"	2.50	95	0.42	0.35		wk-mod	–	–	–	do +LLm	↓		↓	

Final Depth 1945.2'
Collar Elevation
Coordinates
Inclination −90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-120
Sheet No. 3 of 5
Date Completed 12/10/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Mo Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1389.1	10.1	NXWL	2.56	97	0.91	0.05		–	–	–	–	wk-mod spec.	Qtz-ser		Gr	St, but variable FeOx w/brecciation. Wk-mod disem spec, w/hemm. elsewhere. No Cu min. observed.
1399.2	10.1	"	2.55	99	0.04	0.01		–	–	–	–	trace Lim/Lm	do		"	
1409.6	10.4	"	2.57	96	0.04	Tr		–	–	–	–	do	do		Gr	Similar to above. Complex disem Lm and spec. throughout core. Little FeOx staining.
1419.7	10.1	"	2.58	100	0.03	Tr		–	–	–	–	↓	↓		↓	
1430.0	10.3	"	2.59	97	0.03	Tr		–	–	–	–					
									SULPHIDES							
1440.2	10.2	"	2.61	100	2.35	0.04		–	tr-wk	–	st	–	do		"	Well disem cc encountered at 1433.0' in a somewhat porphyrit'd granite.
1450.6	10.4	"	2.63	95	2.31	0.03		–	tr-wk	–	st	–				
1460.9	10.3	"	2.61	99	2.11	0.02		–	wk	–	st	–				
1471.2	10.3	"	2.64	98	1.14	0.01		–	wk	–	st	tr. CuS	↓		↓	
1481.2	10.0	"	2.60	88	1.50	Tr		–	wk-mod	–	mod	–	do		Gr. Bx.	At 1473.0, gran becomes st. Bx'd, gran'd. At 1475± vnlt of cc, py; balance of run appears wkly min'd; mainly pyrite.
1490.8	9.6	"	2.61	86	0.54	Tr			wk	–	mod-st	wk. cov	do		"	Variably Bx'd w/minerized cc min.
1500.8	10.0	"	2.62	100	0.36	Tr			wk-mod	–	wk-mod	–	do		Gr. Bx.	St. gran'd, siliceous int. w/disem py and as vnlts. St. FeOx along fract.
1510.0	9.2	"	2.59	98	0.56	Tr			wk	–	mod	–			↓	
1520.0	10.0	"	2.60	94	0.55	Tr			wk	–	mod	–	do		do	Strongly brecciated; tr-wk iron oxides. Gen'ly well disem cc. From 1535-1540' high angle hem'd struct.
1530.2	10.2	"	2.63	94	0.27	Tr			wk-mod	–	wk-mod	–				
1540.3	10.1	"	2.61	94	0.36	0.01			wk	–	mod-st	–	↓		↓	
1550.0	9.7	"	2.65	98	0.55	0.01			wk	–	mod-st	–	Qtz-ser		do.	St. high angle sh'd and hem'd struct elements prac'ly parallel to core. In particular from 1551-1560'.
1560.3	10.3	"	2.62	100	0.41	0.03	0.066		tr	–	tr-wk	–				
1570.7	10.4	"	2.58	96	0.46	0.01			tr-wk	–	wk-mod	–	↓		↓	
1580.9	10.2	"	2.59	100	0.33	0.01			tr	–	tr	tr spec	do		Gr. Bx	Aplite dike (±3" wide) @ 1571.8'. Core remains st. Bx'd throughout. Gradual decr. in cc; beyond 1590' becomes wk. w/occasl. incr. in py, silicif.
1591.2	10.3	"	2.57	97	0.52	0.01			wk	–	wk-mod	–				
1603.4	12.2	"	2.60	85	0.41	0.01			wk-mod	–	wk	tr. moly	↓		↓	
1612.2	8.8	"	2.57	76	0.30	Tr			wk	tr	tr-wk	–	do		Gr	Mainly as above. St. Bx'd, gran'd. Sh'd from 1617.0-1620.8'
1620.8	8.6	"	2.53	93	0.23	0.01			wk-mod	tr-wk	–	–				
1630.6	9.8	"	2.51	100	0.26	0.01			wk	tr	wk	tr. moly				
1640.6	10.0	"	2.54	95	0.29	Tr			wk	tr	–		↓		↓	

Final Depth
Collar Elevation
Coordinates
Inclination + -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SPECTRON

HOLE NO. S-120
Sheet No. 4 of 5
Date Completed 12/10/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average Mo	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1649.0	8.4	NXBL	2.53	95	0.25	Tr			tr-wk	wk	–		Qtz	Ser	Gr	Wk-mod alt w/only scat'd cpy min.
1658.8	9.8	"	2.55	92	0.26	0.01	0.029		tr	tr-wk	tr					Noted some cc @ 1651'
1666.4	7.6	"	2.54	92	0.33	0.02	0.029		tr	tr-wk	–					
1676.8	10.4	"	2.58	99	0.31	0.01	0.048		tr	wk	–	tr Cus?	do		"	Do – w/variable brecciation and FeOx.
1686.2	9.4	"	2.56	89	0.32	0.01	0.027		wk	tr	–	do				
1697.2	11.0	"	2.55	100	0.24	0.01	0.040		wk	tr	–	–				
1708.0	10.8	"	2.51	55	0.25	0.01			tr-wk	tr	–		do		Gr. Bx.	Incr. in brecciation becoming strong
1718.7	10.7	"	2.50	91	0.18	0.01			tr	tr	–					@ 1728.2
1728.2	9.5	"	2.52	95	0.34	0.01			tr-wk	tr	–					
1739.5	11.3	"	2.50	90	0.35	0.01			tr-wk	tr	–					
1748.1	8.6	"	2.55	94	0.37	0.01			wk	tr-wk	–		do		"	Essentially as above. Incr. in chlor beyond
1759.3	11.2	"	2.53	91	0.19	0.01			wk		–		+ chlor.			1759.3' while core becomes devoid of any
1771.5	12.2	"	2.51	96	0.13	Tr			tr-wk	–	–					megascopic Cu min. Core becomes highly
1781.5	10.0	"	2.54	73	0.23	Tr			tr	–	–					fibrous; gouge (cc?) between 1798.0 and
1791.3	9.8	"	2.56	98	0.20	Tr	0.041		tr-wk	–	–					1801.6
1801.6	10.3	"	2.58	85	0.30	0.01	0.027		wk-mod	–	?					
1809.7	8.1	"	2.53	100	0.35	0.01	0.041		wk	tr	–		Chlor'd		Gr. Bx.	Extreme granulation and brecciation fragments
1812.0	8.3	"	2.52	84	0.50	0.01			wk	wk	–		Sericitized			interspersed by st. shd. zones and fault
1827.5	9.5	"	2.56	84	0.32	Tr			wk	tr	tr-wk poly					breccia (Upper shoot of Basement Fault?)
1836.6	9.1	"	2.58	98	0.23	Tr			wk-mod	tr	tr-wk poly					Noted occ. tr. of cpy. Mo @ 1832'
1847.2	10.6	"	2.57	97	0.11	Tr			wk-mod	–	–	calcite	Fault breccia + mylonite		BASE-MENT FAULT	Extreme granulation of core cont. wk-mod py as disseminations or veinlets to 1849.6'. Thence fault gouge cont. intercalated to subangular grains fragments w/disseminated py to 1842.1'. Chlor'd gouge cont'g calcite veinlets to end of int.
1857.6	10.4	"	2.61	95	0.02	Tr			–	–	–	do	Chlor'd		Diabase	Sft. mod. green clay-like rock becoming
1869.7	12.1	"	2.63	94					–	–	–		Sericitized		?	gradually more competent to 1852.4'. Fine-grained w/scat'd calcite veinlets. Int. becomes st. shd w/gouge @ 1863'
1878.1	8.4	"	2.60	98	Tr	Tr			–	–	–	–	Chlor/Sep. Ser'd/clay		Gouge w/fault breccia	St. shd laminated aspect w/st. gouge developments. Domin'd occ. of fragmented and granulated.

Final Depth 1915.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACRTON

HOLE NO. S-120
Sheet No. 5 of 5
Date Completed 12/10/60
Logged By PHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1888.8	10.7	NXWL	2.58	92	0.01	TR			–	–	–	–	do		Fault gouge & breccia	Pebble-like ptxose fragments to 1890.6± followed by 5' of grey clay gouge cont'g numerous siliceous fragments. Thence about 2' of fine gr'd pale greyish-green rock, quite competent cont'g pale green micaceous phenocrysts. Noted scat'd lathlike transparent x'tals throughout matrix. (a reconstituted rock?)
1896.4	7.6	"	2.55	100	0.01	0.01			–	–	–	–		–	do + Gneiss.	In essence similar to above, but @ 1893' sequence becomes gneissic in appearance and highly shd. w/local gravid portions.
1907.8	11.4	"	2.59	95	0.01	0.01			–	–	–	–		–	Gneiss Porph. And.	Gneissic laminations dip steeply to core (60-70°). At 1908' a fine gr'd dk grey somewhat porph. vole. (andesite) rock.
1915.2	7.4	"	2.61	100	0.01	0.01			–	–	–	–		–	And. Gneissic Granite.	Andesite cont to 1910.4' displaying intrusive contact w/Precambrian gneiss which is variably sh'd. At 1912' coarse gr'd granite showing gneissic features.
	E.O.H.															

Final Depth 1921.0
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-119
Sheet No. 1 of 2
Date Completed 10/17/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
0-1510	1510	1 1/4" RB													Al, Cgl.	Overburden and conglomerate drilled with rockbit.
						START OF		CORE (1510')								
1742.0	232	1.860"													Cgl.	Generalized description only: A quartzose, sandy matrix, wkly stained by iron oxides containing rounded to angular fragments of chlorite, muscovite schist; quartzose and granitic pebbles and boulders. Vole. (and?) porphyry occasionally.
																Bedrock encountered in core @ 1742.0'
1756.5	14.5	"	2.57	25	0.03	0.03		—	—	—	—	—	Qtz-Ser		Gr	Very fragile, leached and oxidized. St. FeOx, brecciated.
1761.5	5.0	"	-	-	No	Recovery										
1771.5	10.0	"	2.49	.18	0.02	0.01		-	-	-	-	—	do		"	Core consists of sericitized granitoid fragments. Mod-St. FeOx.
									SULPHIDES							
1781.0	9.5	"	2.54	7	0.97	0.13		—	—	—	wk-mod	—	do		Gr?	Do. Noted cc.
1790.0	9.0	"	2.77	27	1.07	0.16		-	wk	—	mod	-	do		Gr/Mp ?	As above. Core highly granulated.
1800.0	10.0	"	2.50	28	0.79	0.08		-	wk	-	wk-mod	tr. spec.	do		"	Do.
1811.0	11.0	"	2.53	36	0.49	0.02		—	wk	-	tr	tr. spec.	Sericitized Kaolinized		Mp	An interfingering sequence of granulated rock and Mp fragments.
1821.0	10.0	"	2.63	31	1.10	0.02		—	wk-mod	—	mod	tr. moly	Qtz-Ser		Mp/Gr ?	Granulated, sheared qtz-ser. locally st. gouge with py, moly. Impossible to determine original rock type.
1831.5	10.5	"	2.60	54	0.71	0.01			wk	-	wk-mod	—	do		Gr	Sericitized-chloritized granulated rock with high angle structures cont. py, black gouge.
1841.0	9.5	"	2.64	49	0.89	0.02			wk-mod	tr	mod	-	do		"	Cont'd sh'd, gran'ted, qtzose as above.

Final Depth 1921.0
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-119
Sheet No. 2 of 2
Date Completed 10/17/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1850.0	9.0	1.860"	2.56	59	0.26	0.02		—	wk	—	tr	—	Qtz.	Ser	Gr. And. porph?	Principally as above to 1843'.0 Thence to end of int. a dense f.gr. hem/chl./serp. porph. with occ. qtz. phenos.
1862.0	12.0	"	2.59	86	0.11	0.01		—	wk	—	—	—	do + chl./serp		And. porph?	As above to 1857.6 with bx throughout To end of int. white-dk grey gran. rock cons'g. of qtz. gran's/ser; wkly dissem py.
1874.0	12.0	"	2.67	84	0.18	0.01		—	—	—	—	—	BASEMENT FAULT		—	Highly chlor/serp rock to 1867'. Assign Fault here. Thence st. broken mass of black gouge with calc. coating surf. From 1869.6 to end of int. st. fract chl/serp/qtz-ser cont. fault breccia. No min. obs.
1886.5	12.5	"	2.68	83	0.01	Tr.		—	—	—	—	—	do		—	Fault breccia cont. num. calc/dol. fragments
1895.0	8.5	"	2.69	88	0.01	Tr.		—	—	—	—	—	do		—	Extreme sh'd, gouge, fault brec. w/CO_3 fragm.
1904.0	9.0	"	2.66	100+	0.01	Tr.		—	—	—	—	—	do		—	Do. Int. cont. high prop. of calc/dol. fragm.
1915.0	11.0	"	2.72	53	0.02	Tr.		—	—	—	—	—	chlor.		And. porph?	Abrupt contact @ 1904' with dense f.gr. dk grey coherent porph w/calc. lining fract.
1921.0	6.0	"	2.70	66	0.01	Tr.		—	—	—	—	—	do		Gr	Chl. med. to c.gr. granite (Pre-Є) with vague gneissoid text.
	E.O.H.															

Final Depth 2048.5'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

J.H.C DEC 2 – 1968

HOLE NO. S-118
Sheet No. 1 of 6
Date Completed 11/21/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	~~Average~~ Mo	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
0-1330.0	1330	4 3/4" RB														Alluvium and Conglomerate.
																BED ROCK PLACED AT 1318.0'.
1331.8																Start of D.D. core.
1340.0	8.2	NXWL	2.55	42	0.92	0.87		mod		–	–	Tr Lim	Qtz-Ser		Gr.	Med. to coarse grd granite, somewhat gran'd for the first 2' w/st. FeOx along fract. Moderate dissem CuOx. Tr Lim
1351.4	11.4	"	2.61	57	2.51	2.47		mod-st	–	–	–	wk-mod Lim.	do		"	Cgr. gr. w/CuOx and FeOx along shears and like stains within matrix. Conspic Lim throughout.
1360.0	8.6	"	2.60	90	2.30	2.25		st	–	–	–	wk-mod Lim	do		"	Conspic. CuOx flooding of matrix.
									SULPHIDES							
1371.8	11.8	"	2.59	93	0.77	0.42		mod	–	–	mod	mod-st Lim	do		"	CuOx tend to diminish and by 1365.5 virt. disappeared. Indig lm quite persistent. cc. noted @1370'.
1380.5	8.7	"	2.59	96	0.60	0.10		tr	tr	–	mod-st	mod Lim	do		"	Mixed oxidized, cc zones. Int. becomes Bx.
1388.6	8.1	"	2.60	68	1.29	0.07		–	tr	–	st	wk Lim	do		"	Gen. soft st. gran'd. Otherwise as above.
1396.6	8.0	"	2.58	62	2.34	0.03		–	wk	–	st	–	do		Gr	Very well mineralized throughout.
1407.2	10.6	"	2.51	59	1.09	0.01		–	wk	–	st	–	do		"	Do.
1417.0	9.8	"	2.55	37	0.45	0.14		wk	tr	–	mod	–	do		"	Sh'd, soft. Noted CuOx @ 1415.0'.
1427.3	10.3	"	2.47	51	0.37	0.04		wk	tr	–	mod	–	do		"	Scattered CuOx to 1418.0' Wkly Bx.
1436.5	9.2	"	2.50	80	1.19	0.04		–	tr	–	st	–	do		"	Py remains subord. to cc.
1444.2	7.7	"	2.54	92	1.31	0.03		–	tr.	–	st	wk. spec	do		"	Do.
1453.7	9.5	"	2.58	72	0.92	0.03		–	tr	–	st	–	do		"	Do.
1464.0	10.3	"	2.53	74	1.18	0.02										

Final Depth 2048.5'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-118
Sheet No. 2 of 6
Date Completed 11/21/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Mo Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration	Rock Type	Remarks (CORE SPLIT PRIOR TO LOG)
1475.8	11.8	NXWL	2.51	100	0.77	0.04	0.015	-	wk	-	mod-st	tr. moly	Sericitized Kaolinized	Mp.	From 1486' - 1465' gran'd, sense (Fault?) thence f. to med. gr Mp, mod-st sericitized. Mineralization continues well.
1486.3	10.5	"	2.57	97	0.61	0.02		-	wk-mod	-	mod-st	-	do	Mp/Gr (sil)	Abrupt increase in hem. flooding of matrix within alt. Gr and/or sil Mp. (a fine to med gr'd rock)
1495.7	9.4	"	2.59	66	0.84	0.02	0.019	-	mod	-	mod	-	do	"	As above w/wk-mod FeOx.
1504.8	9.1	-	2.47	32	0.62	0.02	0.051	-	wk	-	wk-mod	tr. moly	Qtz-Ser	Gr	NXWL to 1502.8'. BXWL to end of interval.
1505.2	0.4	BXWL	—		0.70	0.02	(assumed)	No Recovery							
1513.7	8.5	"	2.62	56	0.78	0.02	0.042		wk-mod	-	mod	tr. moly	do	"	St. fragmented interval.
1522.5	8.8	"	2.51	59	0.44	0.03	0.033		wk	-	wk	-	do	"	As above.
1532.5	10.0	"	2.55	91	0.69	0.02	0.037		wk	-	wk-mod	tr. moly	do	"	Coarse gr'd granite w/tr. moly, cov.
1540.8	8.3	"	2.57	90	1.21	0.02	0.055		wk	tr	mod-st	tr. moly	do	"	Do. well min'd w/diss cc, py, cov. tr. cpy
1551.2	10.4	"	2.61	88	1.05	0.02	0.065		wk	-	mod-st	wk. moly	Qtz-Ser + Kaolinite	Gr	As above w/moly along fract. locally.
1561.8	10.6	"	2.65	76	2.33	0.04	0.043		wk	-	st.	tr. moly	do	"	Strong cc and cov. Otherwise as above.
1571.8	10.0	"	2.62	87	1.91	0.02	0.052		wk	-	st	wk moly	Qtz-Ser	"	Do
1581.2	9.4	"	2.64	89	1.73	0.02	0.036		wk	-	st	tr. moly	do	"	Do. Rock type quite qtzose locally. Min. coat. st as dissem & veinlets of cc-py
1592.0	10.8	"	2.65	51	1.20	0.02	0.040		wk-mod	-	mod-st	do	do	"	Principally as above, loc. st. gran'd.
1601.3	9.3	"	2.70	75	1.97	0.02	0.028		wk	-	st	do	do	"	Do
1610.7	9.4	"	2.57	87	2.71	0.11	0.062		tr	-	st	do	do	"	Mainly gran. but contains short sections of Mp. Some narrow zones of blk g.g. mainly at low angles.

Final Depth 2048.5'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SHCATON

HOLE NO. S-118
Sheet No. 3 of 6
Date Completed 11/21/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	~~Average~~ Mo	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG.
1620.2	9.5	BX10L	2.56	59	1.14	0.02	0.039		wk	–	mod	–	Qtz-Kaol	Ser-in.	Gr, Mp	Granite to 1616.0'. Mp to end of int. Bx'd, wk-mod alt. Appears wkly min'd.
1630.4	10.2	"	2.51	93	1.81	0.03			wk	–	mod?	–	Sericitized Kaolinized.		Mp	As above. Locally sh'd, Dissem "fresh" bi.
1638.7	8.3	"	2.53	86	2.03	0.03			wk	–	wk-mod	tr. moly	do		Mp and/or Dp?	Gen'lly st. sericitized and sh'd with brecciation. Num. frosted "qtz eyes" w/fresh biotite within groundmass. Noted little Cu min.
1648.0	9.3	"	2.52	77	1.22	0.02	0.086		tr	–	mod	wk moly	Qtz-	Ser	Gr	Granite below 1639.0' partially ox'ed.
1657.2	9.2	"	2.60	70	0.66	0.02			wk	–	wk-mod	tr. moly spec.	do		"	Do. wk-mod dissem. cc, cav (in part). Bx'd.
1667.4	10.2	"	2.59	90	0.32	0.01	0.018		wk	tr	wk	do	do		"	As above. Bx'd and gran'd. wk cc now.
1677.6	10.2	"	2.58	73	0.36	0.02	0.018		tr	–	wk	do	do		"	Do. Wk cc/spec. mixt.(?)
1687.6	10.0	"	2.53	100	0.29	0.03			tr	–	wk	wk spec.	do		"	Do. Mod FeOx.
1697.8	10.2	"	2.54	60	0.47	0.02			wk	–	wk-mod	–	do		"	Mod hem. Locally st. gran'd. Noted occ. porph. chips.
1705.6	7.8	"	2.56	53	0.58	0.03			wk	?	tr.	–	Kaolinized ~~Chloritized~~ (Ser'd)		Mp	From 1697.8' Mp, st. Bx'd w/hem. Note tr cc, cpy?
1714.0	8.4	"	2.64	93	0.57	0.04			wk	wk	–	tr. moly	Kaolinized (Sericitized)		"	Do. w/hem groundmass, and "fresh" bi. Bx'd gran'd from 1710 – 1714.0'
1725.7	11.7	"	2.56	96	0.58	0.02			wk	wk	–	–	Kaolinized		"	Do. st. hem. groundmass. Bi → chl. (in part)
1735.8	10.1	"	2.62	97	0.74	0.04			wk	wk-mod	–	tr. moly	Kaolinized (Sericitized)		"	Chlor'd Mp in part.
1745.8	10.0	"	2.58	88	0.59	0.01			mod	wk-mod	–	–	Qtz-	Ser	Mp, Gr	As above to 1741'. Thence intr. contact w/Gr. Bx'd in spots.
1754.6	8.8	"	2.55	78	0.38	0.01			wk-mod	wk	–	–	do		Gr	Do – except for Mp from 1754 – 1754.3
1762.2	7.6	"	2.60	93	0.20	0.01			wk-mod	wk	–	–	do		"	Weakly mineralized. wk-mod alt.

Final Depth 2048.5'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-118
Sheet No. 4 of 6
Date Completed 11/21/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks (CORE SPLIT PRIOR TO LOG)
1770.8	8.6	BxWL	2.55	9.5	0.36	0.02		–	wk	tr	tr	–	Qtz-	ser	Gr	As before, but noted tr. cpy. St. gran'd from 1767.2' to end of int.
1779.2	8.4	"	2.58	90	0.29	0.01			wk-mod	tr	–	tr moly	do		"	Locally st. gran'd, sericitized.
1788.2	9.0	"	2.61	79	0.23	0.01			wk	–	–	–	do		"	Do. No Cu min. obs.
1796.7	8.5	"	2.64	68	0.14	0.01			wk-mod	–	–	–	do		"	Do. From 1790-1791.2' almost pure sericite w/dissem py.
1806.2	9.5	"	2.58	89	0.37	0.01			wk-mod	tr	–	tr moly	do		"	Variably Bx'd throughout.
1814.5	8.3	"	2.60	94	0.36	0.01			wk	tr	–	–	Kaolinized		Mp	Mp from 1806.5'. Occ. sporadic "fresh" bi. Groundmass wk-mod chlor'd. Otherwise hematized. Variably Bx'd.
1824.2	9.7	"	2.58	100	0.28	0.01	0.044		wk	tr	–	tr moly	Qtz-	ser.	Gr.	A fine to med. gr. gran. w/tr. of dissem. cpy. Becomes st. Bx'd toward end of int.
1835.6	11.4	"	2.50	88	0.34	0.01	0.110		wk	tr	–	wk moly	do		Gr/(Mp?)	Variably Bx'd w/st. text. variation from fine to c. gr. gran, loc. suggestive of porph. Conspic. MoS_2 along some fract.
1844.2	8.6	"	2.55	88	0.60	0.01	0.025		wk	–	wk-mod	tr moly	do		Gr	St. Bx'd gran'd, w/ser.
1855.8	11.6		2.57	52	0.46	0.01			tr	–	wk	–	do		"	Do.
1864.7	8.9	"	2.53	88	0.33	0.01			tr	–	wk	–	do		Gr?	Essentially an extremely gran'd sequence comp. of qtz-ser. Orig. type obscure.
1874.5	9.8		2.59	89	0.63	0.01			wk	–	wk-mod	–	do		"	
1883.8	9.3	"	2.58	74	0.30	0.01			wk-mod	–	tr	–	do		"	Do. Locally st. quartzose.
1892.6	8.8		2.56	73	0.27	Tr			wk	–	?	–	Qtz (sericitized)		" (Mp)	Gen'ly quartzose becoming porph. toward end of int.
1904.2	11.6	"	2.57	67	0.27	0.01			wk-st	–	–	–	Kaolinized Sericitized		Mp, (Gr.)	Appears as a mixed int. w/Mp predominating. No cr. anywhere obs. @ 1900.6 steeply dipping py vein.
1914.8	10.6	"	2.63	81	0.43	0.01			wk	–	–	–	do		Mp	Mod-st. alt. Gran'd, gouge from 1911.5 to end of int. Mod FeOx along fract.

Final Depth 2048.5'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SPCATON

HOLE NO. S-118
Sheet No. 5 of 6
Date Completed 11/21/68
Logged By R.H.L.

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration	Rock Type	Remarks CORE SPLIT PRIOR TO LOG
1923.8	9.0	BXWL	2.64	70	0.47	0.01			wk	—	—	tr moly	Sericitized Kaolinized	Mp.	Wkly silicif. Variably Bx'd.
1932.2	8.4	"	2.66	99	0.55	0.01			wk	—	—	—	Qtz-Ser (+chlor'd)	Mp. Gr.	@ 1925.0'± abrupt change to Gr, reverting to porph @ 1928.0' which is variably chlor'd, ser'd and sh'd.
1941.8	9.6	"	2.59	82	0.57	0.01			tr	?	—	tr moly	Sericitized Chloritized	Mp.	Sh'd, Bx'd w/locally some granulation. Occ. conspic. black bi (2nd?)
1950.5	8.7	"	2.61	86	0.58	0.01	0.013		wk-mod	wk	—	—	Qtz-Ser	Gr (Mp)	Predom. gran. to 1949.0' thence Mp. Otherwise as above.
1959.8	9.3	"	2.65	95	0.55	0.01			wk	wk	—	—	Sericitized Kaolinized	Mp	Do. Locally v.t. gran'd, gouge. Wkly chlor'd
1967.9	8.1	"	2.64	98	0.37	0.01			wk	tr	—	—	Sericitized Chloritized	"	Essentially as above.
1977.2	9.3	"	2.61	96	0.38	0.01			wk-mod	wk	—	—	do	"	Bx'd, gran'd, sh'd. Increase in chlor.
1987.3	10.1	"	2.67	86	0.84	0.02			wk	—	—	wk. spec.	Sericitized	Mp.	Wkly silicified and variable chlor, brecciation. No Cu min obs.
1997.2	9.9	"	2.66	92	0.43	0.01			wk	—	?	tr moly spec.	Qtz-Ser	Gr, Mp ?	Sl. Bx'd, gran and porph. fragments. Locally sh'd and chlor'd. Bi usually fresh and may occur in large clusters.
2007.7	10.5	"	2.65	86	0.30	0.01	0.013		tr wk	—	—	—	Sericitized Chloritized	Mp? Gr.	Essentially as above. Orig. rock type obscure, but sequence contains occ. c.gr. granitoid segments. No cu. obs.
2018.9	11.2	"	2.62	89	0.50	0.01			wk	—	tr CuS	tr moly.	Qtz-Ser	Gr?	Thoroughly brecciated w/sericite and qtz, alt w/granulation. Rock is highly incompetent.
2030.2	11.3	"	2.65	92	0.39	0.01			wk	—	tr CuS	tr moly	do (fault gouge)	BASEMENT FAULT	Extreme granulation/brecciation, broken up by gouge. Fault breccia noted from 2025' to end of int., containing a "sliver" of granite.

Final Depth 2048.5'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-118
Sheet No. 6 of 6
Date Completed 11/21/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	~~Average~~ Mo	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
2040.2	10.0	BXWL	2.61	94	0.16	0.01			wk	–	~~Cu~~ CuS	$CO_3^=$	Fault		Mylonite	Essentially a dk green to black f.gr., laminated to fragmental soft rock st. sh'd, chlor'd/ser'd w/ fault gouge cont. wkly dispersed py and is locally calcareous.
2045.3	5.1	"			0.17	0.01			wk	–	–	$CO_3^=$	do		"	As above. Highly incompetent sh'd mass; gouge-like.
2048.5	3.2	"			0.46	0.03			WK	–	–	–	Qtz-Ser		Gr?	Physical appearance as simply a grey brown coloured sand, sprinkled with grains of pyrite containing locally broken fragments of granite w/disem. py
	E.O.H.															

Final Depth 298.0'
Collar Elevation
Coordinates
Inclination VERT

ASARCO

GEOLOGIC – ASSAY LOG

J.H.C
NOV 25 1968

Property SACATON

HOLE NO. S-117
Sheet No. 1 of 1
Date Completed 9-12-68 to 9-12-68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu			Mineralization					Alteration		Rock Type	Remarks
					Total	Non-S	Average	Oxides	Pyrite	Cpy	Cc	Other				
298	298	$5\frac{1}{8}$" Ro	BIT												ALLUVIUM & CGL	
BOTTOM																BEDROCK PLACED AT 298 FT.
																HOLE NOT CORED

Final Depth 481.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

J.H.C.

NOV 18 1968

Property SACATON

HOLE NO. S-114
Sheet No. 1 of 2
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
0-281	281.0	5 1/8" RB														Overburden and conglomerate. Bedrock reported at 278.0'
285						START OF		D. D. CORE								
296.4	11.4	NXWL	2.51	60	0.37	0.27		wk-mod	–	–	–	–	Kaolinized		Mp.	Mod-st FeOx. blood. of matrix. wk-mod chrys. coating fract. Indig Lmr.
306.5	10.1	"	2.46	94	0.77	0.65		wk-mod	–	–	–	–	do		"	Similar to above. Kaolinized. FeOx matrix w/disem. bi
316.7	10.2	"	2.72	93	1.70	1.62	.018	med-st	–	–	–	tr Lmn.	do		"	Pronounced CuOx's from 310.0 – 313.5' as chrys/turq. St. iron stained gouge from 313.5 – 316.7'
326.4	9.7	"	2.52	95	0.32	0.22	.013	wk	–	–	–	–	Sericitized Kaolinized		Mp	Highly grav'd, incompetent aquifer to ± 321.7'. St. FeOx. thereafter compt. Mp w/wk CuOx. silicif. from 324.0'
336.7	10.3	"	2.63	89	0.22	0.17	.018	wk	–	–	–	tr Lmn	do		Mp? and/or Gr?	A qtzose Mp? and/or Gr? w/occ. fragm. showing Bx. Sporadic blue CuOx from 331.5'
344.8	8.1	"	2.54	90	0.81	0.77		wk-mod	–	–	–	–	do		do	F.gr. FeOx. qtzose matrix. Rock type obscure. Cu ox variable throughout int.
355.1	10.3	"	2.45	83	0.15	0.08		–	–	–	–	–	do (+ silicif.)		Mp?	Wkly silic. Mp? w/tr. of orig. text. only. Brecciated w/st. FeOx in places. Tr. jar. No Cu min. obs.
365.5	10.4	"	2.50	93	0.21	0.17	.021	–	–	–	–	–	do (+ silicif.)		Mp and/or Gr?	Continues st. leached and oxidized w/sporadic Bx and shearing. wk silicif.
375.6	10.1	"	2.57	100	0.50	0.41	.015	wk	–	–	–	–	do (+ silicif.)		Mp. (sil. in part)	Shd. Bx'd w/local silicif. Noted CuOx @ 372.0' along fract, becoming more prominent towards end of int.
385.8	10.2	"	2.53	96	0.42	0.38		mod	–	–	–	–	Kaolinized (+ silicif.)		do (sil. in part)	wk. mod jar. coating fract. Mod silicif. Chrys. veinlets and as surf. coatings. Little evidence of Bx in this int.

Final Depth 481.2'
Collar Elevation
Coordinates
Inclination −90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SPCITON

HOLE NO. S-116
Sheet No. 2 of 2
Date Completed
Logged By R.H.L.

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
396.2	10.4	NXWL	2.56	95	1.35	1.28		mod-st	–	–	–	–	Kaolinized		Mp.	Variable FeOx stain within Mp to 389.0' thence to 390.9', a mylonitized yet competent rock, consisting of steeply dipping hematite "streaks" w/chrys veinlets traversing parallel to them. St. CuOx (chrys) as flooding of matrix and voids.
406.5	10.3	"	2.52	98	0.62	0.57		mod	–	–	–	–	do		"	Int. becomes incr. Bx w/incr. hematite. CuOx persists in diminished quantities.
416.4	9.9	"	2.51	71	0.14	0.10		tr	–	–	–	–	Kaolinized Sericitized		"	Variable FeOx stain. Tr. Cu min only.
423.2	6.8	"	2.55	68	0.07	0.05		–	–	–	–	–	do		"	Abrupt incr in Bx w/ass. FeOx. No Cu min obs. in this int.
433.3	10.1	"	2.45	98	0.07	0.03		–	–	–	–	–	do		Mp/Gr	St. Bx/FeOx. Int. becomes granitoid, c.gr. @ 427.3' w/cont'd st. hem. flooding of matrix.
444.0	10.7	"	2.49	91	0.08	0.05		–	–	–	–	–	do		Gr/Mp.	Appears as a strongly Bx/FeOx int. w/interspersed Mp segments. Local st sh'd, wkly silicif.
454.1	10.1	"	2.47	98	0.11	0.07		–	–	–	–	–	do		do	As above w/gran'd text. predominating. No discernable Cu min. Tr-wk jar.
462.7	8.6	"	2.52	92	0.27	0.24		tr	–	–	–	–	do		"	Granite to 459.6' thence Mp Bx to end of int. Cont. leached and oxidized.
472.7	10.0	"	2.54	90	0.34	0.27		wk	–	–	–	–	Kaolinized		Mp	Noted wk Cu Ox within int. Otherwise as above. Tr-wk jar.
481.2	8.5	"	2.63	93	0.18	0.14		tr	–	–	–	–	Kaolinized Ser. + silicif		Mp (sil)	A quartzose Mp with variable ser-kaolin and iron oxides.
	E.O.H															

Final Depth 455.6'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

J.H.C.

NOV 18 1968

HOLE NO. S-115
Sheet No. 1 of 2
Date Completed 10/21/68
Logged By RHL

Property SACATON

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration	Rock Type	Remarks
0-235	235.0	5 1/3" RB													Overburden and conglomerate. Bedrock placed at 232'
243.3	8.3	NXWL	2.54	100	0.06	0.03		–	–	–	–	–	Sericitized	Mp	Monz. with wk silicif. St. FeOx flooding with Bx. No Cu. min. obs.
252.7	9.4	"	2.45	94	0.05	0.03		–	–	–	–	–	do	"	Do. Tr. indig Lm.
260.6	7.9	"	2.52	76	0.09	0.03		–	–	–	–	–	Sericitized Kaolinized	"	Mod-st. alt, FeOx. Little evidence of Bx.
270.8	10.2	"	2.53	99	0.23	0.20		wk	–	–	–	tr spec	do	"	Do. wk. chys. coating fract. wk Bx.
281.2	10.4	"	2.60	95	0.18	0.16		wk	–	–	–	do	do	"	Essentially as above.
291.1	9.9	"	2.68	99	0.10	0.07		–	–	–	–	–	Qtz-Ser	Sil. Mp (?)	St. FeOx stained matrix. Gen. sil. sh'd. wkly chlor and competent.
301.7	10.6	"	2.58	95	0.08	0.06		–	–	–	–	–	Sericitized Kaolinized	Mp	St. FeOx, porph w/acc. qtz. phcms. Bi → chl. (in part)
312.2	10.5	"	2.61	100	0.28	0.24		tr	–	–	–	–	Kaolinized Chloritized	Mp	As above to 306.0', thence st. Bx, followed by chlor. Mp. interspersed with FeOx and tr. CuOx to end of int.
322.7	10.0	"	2.56	95	0.54	0.48		tr	–	–	–	–	Kaolinized.	Mp(sil) and/or Gr?	Do – to 314', thence st. FeOx flooding of matrix. Rock is coarsely grained and quite quartzose. Erratic distr. of CuOx. Massive cc @ ∠'s to core noted @ 338.3'.
333.2	10.5		2.57	74	0.18	0.16			SULPHIDES						
342.3	9.1		2.56	94	0.48	0.09		–	tr	–	mod-st	–			
352.3	10.0	"	2.58	98	1.57	0.15		–	–	–	wk-mod?	–	do	Mp	St. FeOx stained, sh'd, chlor'd. Sulphides hard to detect due to extreme FeOx.
362.6	10.3	"	2.55	97	0.56	0.06		–	mod	–	mod	–	Sericitized Kaolinized	"	Do. Py makes its appearance w/mod cc and cov.
372.8	10.2	"	2.64	98	0.71	0.05		–	mod-st	tr	wk	–	do	"	Bx'd. Int. highly pyritic with cc accordingly wkly distr. Tr. cpy.
383.3	10.5	"	2.60	71	0.37	0.02		–	mod	wk	–	–	do	"	Do. cc. no longer obs.

Final Depth 455.6'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SPCATOR

HOLE NO. S-115
Sheet No. 2 of 2
Date Completed 10/2/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration	Rock Type	Remarks
393.1	9.8	NYWL	2.61	99	0.46	0.03		–	mod	wk-mod	tr	–	Kaolinized	Mp.	Bx'd Mp w/bi → chl. Cpy as discreet veinlets. At 386.9'-387.7' chl. and porph. mottled w/py, cpy. Last 3" of int. massive gouge.
401.1	8.0	"	2.59	98	0.34	0.01		–	mod	?	?	wk spec.	Sericitized Chloritized	Mp?	St. sh'd, brecciated, hematized throughout. St. chlor. from 396.4'-397.6'. No Cu min obs.
412.0	10.9	"	2.51	89	0.25	Tr.		–	mod	?	–	do	Sericitized wkly. chlor.	"	As above. Some fragm. almost pure Fe_2O_3. Rock is very soft, pulverized. Cu sulph, if any, remain obscure.
420.4	8.4	"	2.51	99	0.31	0.01		–	mod	?	–	–	Kaolinized Sericitized	"	Do., Feldspars → green clay min. St. Bx.
430.5	10.1	"	2.56	95	0.58	Tr.		–	mod	wk-mod	–	–	Kaolinized Chloritized (Mod. sericite)	"	Mp Bx, w/distinct green mottled text. py/cpy as distinct vnlts. Loc. ext. sh'd.
440.5	10.0	"	2.58	98	0.29	0.01		–	wk-mod	wk	–	–	do	"	Do.
450.6	10.1	"	2.59	74	0.62	0.03		–	mod	mod	–	–	do	"	Steeply dipping py vein @ 441 ±1" wide.
455.6	5.0		2.62	9+	0.49	0.02									Sh'd. Bx cont. wk-mod silicif to 444.0'
	E.O.H														

Final Depth 555.4'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-114
Sheet No. 1 of 3
Date Completed 10/17/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
0-173	173.0	5 1/8" RB													Alluvium	Bedrock placed at 170.0'
182.3	9.3	NxWL	2.56	97	0.14	0.11		-	-	-	-	-	Qtz	-Ser	Mp	Sh'd Mp. breccia. St. FeOx cementing fragments and flooding matrix. No discernable Cu min. WK. indig Lm.
191.8	9.5	"	2.72	93	0.17	0.10		-	-	-	-	tr. spec.	do		Mp/Gr (sil)	As above. Beyond 200'± int. becomes quartzose and coarser grained.
202.2	10.4	"	2.65	93	0.14	0.08										
212.5	10.3	"	2.67	96	0.64	0.59		wk-mod	-	-	-	wk. spec.	Kaolinized Sericitized		Gr? Mp	Do:- to 207.5', thence Mp. Cu Ox appear @ 210.5' along fract. surf (without preferred orientation)
222.4	9.9	"	2.68	100	1.14	1.04		mod	-	-	-	wk. spec.	do		Mp	Cu Ox persists along distinct reinlets with random orientation. Host rock fine to medium grained with sparse qtz. phenos.
232.8	10.4	"	2.60	95	0.10	0.05		-	-	-	-	tr. spec.	do		"	St. FeOx as before with brecciation. WK-mod jarosite along fract.
243.2	10.4	"	2.57	96	0.07	0.04		-	-	-	-	-	do		"	St. leached and oxidized with indig Lm. WK jarosite.
253.1	9.9	"	2.55	98	0.02	0.02		-	-	-	-	wk Lm	do		"	Brecciated, Fe Ox stained with mod indig Lm.
264.5	11.4	"	2.48	82	0.03	0.03		-	-	-	-	do	do		Mp	Greyish-white sericitized rock w/indig Lm + Llm to 261.0'. Thence competent FeOx st'd to end of int.
274.9	10.4	"	2.63	92	0.03	0.03		-	-	-	-	do	Qtz-	ser	Mp/Gr (Sil)	St. Mp. Bx, variably st'd by FeOx with mod. indig Lm. Variable text. Int. becomes c.gr and qtz'ose from 266.5'
286.1	11.2	"	2.54	99	0.03	0.03		-	-	-	-	do	do		Mp/Gr (sil)	Quartzose Mp and/or Gr? St. Bx and siliceous. From 277-278' pron. gouge + slickensides. Indig Lm + Llm.
								SULPHIDES								
296.3	10.2	"	2.55	72	1.74	0.03		-	tr	-	mod-st	-	do		"	Do. Sulph. encountered @ 291.5'. St cc to 296.3.

Final Depth 555.4'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-114
Sheet No. 2 of 3
Date Completed 10/17/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
305.7	9.4	NXWL	2.59	89	0.61	0.04		–	v.wk	–	wk-mod	–	Qtz-Ser		Mp/Gr (sil)	Mod-st. FeOx Bx Mp/Gr? Mod cc to 300', thence wk to end of int.
313.2	7.5	"	2.61	77	0.82	0.11		–	wk	–	mod	–	do		"	Do. cc found throughout entire int.
323.3	10.1	"	2.71	93	0.95	0.12		–	v.wk		mod	–	do		"	As above. Variable FeOx.
333.5	10.2	"	2.62	100	0.36	0.06		–	wk	–	wk-mod	–	do		"	Do. locally st. cc along fract. At times rock is strongly suggestive of both granite and monz. porphyry.
343.2	9.7	"	2.62	89	0.34	0.05		–	v.wk	–	mod	–	do		"	St. Bx. Ore graded min. persists.
352.7	9.5	"	2.56	96	0.46	0.05		–	tr	–	mod	–	Sericitized Kaolinized		Mp	Mod-st alt. Good porph. tex. Mod FeOx
363.6	10.9	"	2.69	77	1.06	0.18			wk-mod	–	mod-st	mod. spec.	Qtz-Ser		Mp and/or Gr?	St. fragmented, soft, clayey FeOx stained Mp and/or Gr? Int. becomes gouge-like from 360'-363.6 with mixed spec-cc-py-hem.
373.3	9.7	"	2.59	97	0.32	0.05			wk-mod	tr	wk-mod	–	do		"	St. granted to 368.2', thence mod. competent rock sericitized, to end of int. Mod. min.
383.9	10.6	"	2.67	97	0.51	0.02			mod-st	wk	mod	tr. spec. moly.	do		"	St. Bx throughout. St cc & cov @ 373.5' and otherwise randomly distributed w/indig Lm.
384.6	0.7	"			No Recovery											
391.9	7.3	"	2.60	100	0.19	0.01			mod	tr	wk	tr. spec	do		"	As above for gen. charact. Min. appears wk and sporadic.
400.2	8.3	"	2.66	70	0.17	0.02			mod-st	–	tr	–	do		"	Do – to 397.4'. Int. becomes very siliceous w/st. indig Lm along fract.
408.4	8.2	"	2.64	94	0.32	0.01			mod	wk	–	–	do		"	St. quartzose to 401.0, thence qtz-ser w/mod FeOx within int. wk cpy.
415.7	7.3	"	2.58	92	0.44	0.02			mod	wk-mod	–	–	Sericitized Kaolinized		Mp	Mp Bx. Good porph. tex with Kaolinized euhedral phenocrysts. Dissem py, cpy.

Final Depth 555.4'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-114
Sheet No. 3 of 3
Date Completed 10/17/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
426.0	10.3	NXWL	2.62	93	0.36	0.01		—	mod	mod	—	—	Kaolinized		Mp.	Cont. st. Bx with mod-st. FeOx
436.2	10.2	"	2.62	93	0.47	0.02		—	wk-mod	wk	—	—	Sericitized Kaolinized		"	Do with steeply dipping min. struct. Last 2' of int. is sh'd and gougey.
443.1	6.9	"	2.69	90	0.52	0.02		—	wk-mod	wk	—	—	do		"	St. broken, gouge and sh'd w/st. FeOx shading. Little cpy noted.
453.6	10.5	"	2.67	87	0.49	0.01		—	wk	wk-mod	—	—	do		"	Mp. Bx. Cpy as minute dissem. and occ. as local conc.
464.1	10.5	"	2.62	92	0.38	0.01		—	mod	tr-wk	—	—	do		"	do w/st. high angle struct. // to core. Py dom. sulph. occ. vnlts.
475.5	11.4	"	2.61	90	0.48	0.01			mod	tr	—	—	do		Mp (sil) and/or Gr	St. Bx continues. wkly chlor, silicif. Py remains the dom. sulph.
484.0	8.5	"	2.61	71	0.30	0.01			wk-mod	?	—	—	do		"	Do - qtzose, granitoid text. No Cu min noted.
494.2	10.2	"	2.60	90	0.35	0.01			mod	?	—	—	do		"	St. Bx throughout. Orig. text. obsc. wk-mod FeOx interspersed w/st. chlor. No Cu min obs. Last 2' of int. st. chlor., sh'd.
504.9	10.7		2.63	94	0.36	0.01							mod. chlor.			
515.5	10.6		2.50	92	0.35	0.01										
525.2	9.7	"	2.54	95	0.28	0.01			mod-st	tr	—	—	Ser-chl.		Mp?	At approx 520.9 dense, f.gr. grey, somewhat qtzose Mp? wk. FeOx.
535.2	10.0	"	2.56	72	0.33	0.01			mod	—	—	—	do		Mp and/or Gr?	Int. becomes Bx, sh'd, sil, gran'd as before. Py noted only.
545.2	10.0	"	2.57	96	0.28	0.01			mod	tr	—	—	do		Mp?	As above to 540' (approx); thence f.gr. Mp?
555.4	10.2	"	2.61	99	0.25	0.01			mod-st	wk	—	—	Kaolinized		Mp	St. py as isolated occ. Mostly along fract. Mod. alt. Cpy wkly dissem.
	E.O.H.															

Final Depth 2145.7'
Collar Elevation
Coordinates
Inclination – 90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

J. H. C.

NOV 1 1968

HOLE NO. S-113
Sheet No. 1 of 4
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
0–1583.0	1583	3¾" RB														Bedrock placed @ 1570 ±
									SULPHIDES							
1588.0	5.0'	NX						–	wk-mod	–	wk-mod	–	Qtz-Ser		Gr?	Strongly hematized, sericitized, brecciated granite? Diss py, cc. within groundmass & fractures.
1586	5.0	NX	2.71	100	1.65	0.26										ROTARY CORE CORRECTED TO D.D. FOOTAGE
1598.2	10.2	NXWL	2.71	42	0.90	0.09		–	mod	–	mod	–	do		Gr/Mz ?	Mod-FeOx. St. sericitized, brecciated groundmass Med. to coarse gr, with occ. porph. texture.
1607.4	9.2	"	2.80	95	2.00	0.16		–	wk-mod	–	mod-st	–	do		"	Wk-mod FeOx. Rock is thoroughly sericited and well mineralized by cc.
1615.8	8.4	"	2.66	88	1.88	0.16		–	wk-st	wk	mod-st	–	do		"	As above. Massive py, cc, wk cpy from 1614.7 – 1615.6'.
1623.1	7.3	"	2.62	84	2.35	0.05		–	wk	–	mod-st	–	do		"	Int. assumes a light-grey aspect with occasional FeOx. Brecciation continues strong.
1635.4	12.3	"	2.48	79	2.60	0.05		–	wk	–	mod-st	tr. moly	do		Gr	As above. Good c.gr. granitoid text. from 1631. – 1632.0'.
1645.3	9.9	"	2.60	52	2.48	0.03		–	wk-mod	–	mod st	–	do		"	Do.
1653.2	7.9	"	2.58	73	0.83	0.02		–	wk-mod	–	mod	–	do		"	Do. Int. becomes strongly broken with incr in FeOx from 1650'.
1664.5	11.3	"	2.69	64	0.15	0.02		–	mod-st	–	tr	–	do		"	Massive py from 1656.2-1657.2'. Mod-st. FeOx staining of matrix. Noted just traces of cc.
1672.6	8.1	"	2.66	95	0.30	0.01		–	wk-mod	–	tr	–	do		Gr/Mz ?	Mod. FeOx. stain. For the most part very strongly broken. Smaller fragments suggest Mz. Porph. Larger pieces show good granitoid text.
1681.2	8.6	"	2.69	93	0.14	0.02		–	mod	–	wk	–	do		Gr	Brecciated and sericitized. Mod FeOx.
1690.0	8.8	"	2.69	95	0.12	0.02		–	mod	–	wk	tr. moly	do		"	Do. Steep, 4" wide py vein @ 1685'.

Final Depth 2145.7'
Collar Elevation
Coordinates
Inclination −90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON.

HOLE NO. S-113
Sheet No. 2 of 4
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
1698.7	8.7	NXW2	2.54	75	0.73	0.03			wk-mod	–	mod-st	–	Qtz-Ser		Gr	Diss. py within groundmass, but locally found as conc. along distinct reinlets. Appears well min. by cc.
1711.3	12.6	"	2.61	77	0.86	0.04			wk-mod	–	mod	–	do		"	do.
1721.5	10.2	"	2.69	54	0.05	0.01			mod	–	tr	–	do		"	Strongly broken interval. Little cc. noted.
1732.0	10.5	"	2.61	81	0.13	0.01			mod	–	wk	–	do		"	As above. Py remains the dominant sulphide.
1742.0	10.0	"	2.54	56	0.07	0.01			mod	–	wk	–	Qtz-Ser		"	Do.
1753.8	11.8	"	2.69	77	0.47	0.01			wk-mod	–	tr	–	do		"	St. broken int. Noted wk. cc.
1763.1	9.3	"	2.66	76	0.62	0.02			wk-mod	–	wk-mod	–	do		"	Do. Occ. well dissem. cc
1773.3	10.2	"	2.55	59	0.71	0.01			wk-mod	–	wk	–	do		Gr/Mp	As above to 1770.8. Thence f.gr. Mp to end of int, which is weakly min. by py. St. broken.
1781.8	8.5	"	2.54	94	0.87	0.01			wk	–	wk-mod	tr. moly	Qtz-Ser		Gr	Int. remains highly sericitized and broken.
1791.4	9.6	"	2.54	92	1.15	0.01			mod	tr	mod	–	do		"	Well dissem py. cc and occ. cpy within groundmass.
1801.3	9.9	"	2.61	94	1.24	0.01			mod	wk	mod	–	do		"	As above with conspic. blebs of cpy, py.
1809.0	7.7	"	2.59	84	1.03	0.02			wk-mod	tr.	mod-st	–	do		"	Do. Mod. FeOx within groundmass.
1818.2	9.2	"	2.48	86	0.90	0.01			wk-mod	wk	wk-mod	–	Qtz-Ser		"	Light-grey bleached appearance. Min. remains persistent.
1827.2	9.0	"	2.58	89	0.70	0.01			wk	tr.	wk	–	do		"	Mod FeOx from 1819.5'. Wkly min.
1838.3	11.1	"	2.58	64	0.51	0.01			wk-mod	tr.	wk-mod	–	do		"	–
1847.8	9.5	"	2.54	74	0.69	0.01			wk	tr.	wk-mod.	–	do			V.St. broken int. Min. Variable in intensity from "barren" to mod. dissem. cc.

Final Depth 2145.7
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-113
Sheet No. 3 of 4
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1858.6	10.8	NXWL	2.56	32	0.58	0.01			wk-mod	–	wk	–	Sericitized		Gr	A strongly broken up int. Cc. sporadically distributed throughout.
1868.8	10.2	"	2.56	80	0.32	0.01			wk.	tr	wk	tr moly	do		Gr, micro-granite?	Variable in texture. From 1865.3' a fine grained quartzose, somewhat granular rock. Sulphides generally wkly distr.
1878.5	9.7	"	2.58	91	0.77	0.01			wk	–	wk	tr moly	Qtz-Ser		Gr	C.gr. typical granitoid rock consisting of qtz-sericite. At 186.9' ½" wide molybdenite at 90° to core. Otherwise as above.
1888.0	9.5	"	2.57	83	0.72	0.01			wk	tr	wk?	–	do		Mp? @ 1881'.	Sh'd, porph. quartzose. Fine to med. gr. groundmass. Occ. finely dissem cc. Biotite conspicuous.
1897.8	9.8	"	2.57	100	0.58	0.01			wk	wk	wk	tr moly	Sericitized Kaolinized		Mp	Do. Rock displays good porph. text.
1907.2	9.4	"	2.53	95	0.50	0.01			wk	tr	wk	tr moly	do		"	Sporadic finely dissem cc, py, cpy within a sericitized groundmass.
1915.0	7.8	"	2.57	76	0.51	0.01			v.wk	tr	–	tr. moly	Kaolinized		"	Appears very weakly mineralized. No cc. obs. Mod. alt.
1925.2	10.2	"	2.56	84	0.72	0.01			wk	tr.	wk	tr. moly	do			Sh'd. Variably mineralized.
1934.7	9.5	"	2.56	90	0.32	0.01			v.wk	tr	–	–	do		"	Noted occ. specks of cpy within the groundmass.
1944.8	10.1	"	2.53	75	0.35	0.01			wk-mod	tr	–	tr. moly	do		"	Mod. alt. Mx. porph. Conspic. biotite (2nd day.) V.wk min. mainly pyrite. Sl. breccia from 1944.8 – 1952.5' with tr. moly.
1954.2	9.4		2.55	81	0.39	0.01										
1964.8	10.6		2.54	94	0.32	0.01										
1973.5	8.7		2.53	92	0.31	0.01										
1982.2	8.7	"	2.57	80	0.39	0.01			wk	wk	–	–	do		Mp.	As above. Wkly dissem cpy throughout, except at 2001.5' where @ ¼" steeply dipping cpy vein was noted.
1992.6	10.4		2.51	98	0.28	0.02										
2002.0	9.4		2.53	86	0.52	0.01										
2010.7	8.7	"	2.57	86	0.46	0.01			wk-mod	wk	–	–	do		"	Do. In places, the int. is conspicuously brecciated.

Final Depth 2145.7'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-113
Sheet No. 4 of 4
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
2021.4	10.7	NXWL	2.60	71	0.65	0.01			tr-mod	wk	–	wk spec.	Kaolinized		Mp	Sh'd, brecciated. Mineralized mainly by pyrite
2030.3	8.9		2.56	84	0.48	0.01						tr. moly	Sericitized			with occ. "blebs" of cpy. Mod alt.
2041.4	11.1	"	2.55	87	0.63	0.01			tr-mod	wk	–	wk. spec.	do	wkly chlor.	"	As above. Incr. in spec. noted.
2051.6	10.2	"	2.60	77	0.57	0.01			wk-mod	wk-mod	–	wk-mod spec.	do		"	Do.
2059.0	7.4		2.62	58	0.65	0.02										
2070.0	11.0		2.57	30	0.78	0.01										
2080.0	10.0	"	2.61	69	0.79	0.01			wk	wk-mod.	–	wk. spec.	do		"	Occ. sh'd. chl. Mp. with dissem or "blebs" of cpy. Alteration becomes intense last 2' of int.
2089.4	9.4	"	2.59	100	0.96	0.01			wk	wk	–	tr spec.	do	+chl/serp.	"	Int. becomes increasingly sheared with chl/serp along fracture surfaces. From 2085.8' to end of int. becomes gougey and granulated.
2097.8	8.4	"	2.63	89	0.73	0.01			wk	wk	–	tr. spec.	do	+chl/serp	BASEMENT FAULT Mp?	Original rock characteristics become less distinct due to intense shearing and gouge development locally quartzose with chl/serp in interstices. Min. sporadic but continues to persist.
2108.7	10.9	"	2.60	21	0.81	0.01			wk	tr	–	tr spec.	Qtz-ser	chl/serp	do	Highly sheared, granulose, siliceous and sericitized rock with pronounced chl/serp along slickensided surfaces.
2116.8	8.1	"	2.68	79	0.04	0.01			–	–	–	$CO_3^{=}$ (trace)	do		do	Essentially an interval of gouge containing fault breccia (rounded to subangular quartzose fragments) Highly chlor/serp in places. No sulphides noted.
2125.7	8.9	"	2.67	98	0.02	0.01			–	–	–	–	chlor.		Gr. (Pre-€)	Pre-min granite. Med. to c. grained with a chl. groundmass. Serpentine? along fracture surfaces. Unmineralized.
2135.9	10.2	"	2.68	95	0.01	Tr.			tr	–	–	–	do		Gr.	As above. Noted an occ. grain of py.
2137.5	1.6				No recovery											
2144.7	7.2		2.65	6	0.87	0.03										
2145.7	1.0				No recovery											
	E.O.H.															

Final Depth 786.0'
Collar Elevation
Coordinates
Inclination −90°

ASARCO

GEOLOGIC – ASSAY LOG

J.H.C
OCT 14 1968

Property SACATON

HOLE NO. S-112
Sheet No. 4 of 4
Date Completed 10/4/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
737.6-747.8	10.2	NXWL	2.59		0.61	0.01		–	wk-mod	wk-mod	tr	–	Sericitized		Gr/Mz.	Mod-st. broken core with just traces of cov-cc.
747.8-754.7	6.9	"	2.66		0.42	0.01		–	mod	wk	–		do		Mz?	Gen. f. to med. gr. quartzose rock, and in places shows strong brecciation. cc. no longer observed. Mod. FeOx.
754.7-761.9	7.2				0.70	0.02										
761.9-771.8	9.9	"	2.66		0.41	0.01		–	mod	wk		tr. spec.	Kaolinized		Gr-Mz (?)	Mod-st. quartzose, brecciated. Texturally resembles granite in places, but could also be silicif. monz. wk-mod indig. tr. Vole. @ 780'.
771.8-781.9	10.1		2.59		0.46	0.01							Sericitized		And. porph?	
781.9-784.2	2.3	"	2.43		0.06	Tr.		None	observed				Kaolinized		And. porph (?)	Sh'd. chloritized/serp. with wk. sericitized feldspar phenos. and "fresh" black biotite (2nd?) set in a dk greenish-grey groundmass. No sulphides obs. Last foot of int. highly chlor/serp.
784.2-784.8	0.6				No Recovery											
784.8-785.1	0.3				" "											
785.1-786.0	0.9		2.53		0.09	0.01										
	E.O.H.															

Final Depth 786.0'
Collar Elevation
Coordinates
Inclination - 90°

ASARCO
GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-11
Sheet No. 3 of 4
Date Completed 10/4/6
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
504.7-511.7	7.0	NX(WL)	2.61		0.43	0.26		tr	–	–	–		Kaolinized			Abrupt change @ 507' to f.gr. And. porph(?) showi
511.7-521.4	9.7		2.60		0.14	0.05							Sericitized		And. porph (?)	occ. incl. of granitoid rock. Wkly chloritized. St
521.4-532.0	10.6		2.58		0.08	0.03										hem. of matrix. locally. Text. variable. Granitoid
532.0-538.2	6.2		2.46		0.10	0.03									Gr(?)	qtzose segments from 532.0-532.8' and 535.8-537.
538.2-549.0	10.8	"	2.57		0.08	0.03										
549.0-553.7	4.7		2.46		0.70	0.45		wk	–	–	–	tr. spec.	do		And. porph. Gr, Mz?	Essentially an interfingering sequence of
553.7-563.9	10.2		2.48		0.39	0.24										And. porph(?) with qtzose granitoid rock.
563.9-572.4	8.5		2.68		0.46	0.31										(Gr/Mz?). Bx'ed where especially st. FeOx
																Occ. CuOx stain within groundmass and along
																fract. Space, but contains qtz. phenos within the volc
																rock. (2nd?)
572.4-584.9	12.5		2.51		0.08	0.04		tr	–	–	–	–	Kaolinized		And. porph (?) Mz?	St. FeOx pervasive throughout. Orig. text obliterated
584.9-594.7	9.8	"	2.70		0.04	0.01							wk. silicif			Orig. feldspar → qtz in places. Mod. fractured
594.7-605.4	10.7		2.65		0.02	Tr.										Porph. text discernable at times.
605.4-612.8	7.4		2.64		0.07	0.03		tr mod	–	–	–	–	Kaolinized		And. porph (?)	Brecciated, sheared, hematized volc. rock(?)
612.8-620.6	7.8	"	2.59		0.64	0.56							chloritized (in part)			Occ. weakly alt. portions show a fine gr. ground-
620.6-627.3	6.7		2.57		1.00	0.90										mass, dk-grey in colour with euhedral feldspar
627.3-635.8	8.5		2.53		0.45	0.37										phenocrysts. Stly chlor/serp. in part. Tr. CuO
635.8-643.7	7.9		2.57		0.85	0.79		wk	–	–	–	Cu	Kaolinized		And. porph (?)	Principally as above. Rock is mostly a massive
643.7-649.3	5.6	"	2.56		0.81	0.48							Sericitized			hematite. St. sh'd. broken from 643.7-649.3'
649.3-658.0	8.7		2.58		0.21	0.13										Noted brilliant adamtina red stals of Cu_2O @
658-667.5	9.5		2.62		0.25	0.17										641.7'. Feldspar → clay or sericite. Tr.
																malachite, native Cu from 658.0-667.5'.
667.5-677.8	10.3		2.41		0.17	0.06			SULPHIDES			Cu	do		And. porph (?) Mz/Gr 686.6	As above. Pyrite @ 686.6', where core become
677.8-688.1	10.3	"	2.54		0.24	0.03		–	wk	↓	wk	Cu				granitoid in character. Cpy and cc found @ 687.
688.1-697.3	9.2		2.67		0.55	0.02										Remainder to 704.2 is quartzose, sericitized w/
697.3-704.2	6.9		2.60		0.67	0.02										st FeOx throughout. Tr. native Cu.
704.2-715.7	11.5		2.63		0.59	0.01		–	wk-mod	wk-mod	wk		Sericitized		Mz/Gr	Brecciated, quartzose, sericitized with mod
715.7-722.0	6.3		2.62		0.68	0.01										FeOx. Cpy dissem. w/cov. St. broken from
722.0-729.6	7.6		2.43		0.56	0.01										727.6-729.6'.
729.6-737.6	8.0		2.63		0.76	0.02		–	wk	wk	wk		do		"	Strongly brecciated interval.

Final Depth 786.0
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-112
Sheet No. 2 of 4
Date Completed 10/4/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
358.2-368.6	10.4	NXWL	2.64		0.11	0.11										
								tr	–	–	–	tr spec.	Sericitized		Gr	Brecciated with wk. jarosite coating fract.
368.6-373.8	5.2	"	2.77		0.18	0.13										Med-st. hematite. Tr. CuOx @ 373.0'.
373.8-374.1	0.3	"			NO RECOVERY											
374.1-374.2	0.1	"														
374.2-379.8	5.6		2.53		1.35	0.99										A fine grained rock with mod-st. FeOx throughout.
379.8-387.5	7.7	"	2.52		2.58	2.25		mod	–	–	–	–	wk. Kaolinized		And. porph.(?)	In general a dark grey groundmass with conspicuous
387.5-397.5	10.0		2.53		1.40	1.12							wk. sericitized			alt. sometimes Cu stained, feldspar x'tals. (3-8 m.m in
397.5-406.8	9.3		2.71		0.85	0.67										length) Sparse euhedral biotite, with occ. qtz phenocrysts
																locally weakly magnetic. CuOx (botryoidal in part)
																along veinlets and fractures.
406.8-416.2	9.4		2.69		0.11	0.03										
416.2-427.6	11.4	"	2.63		0.27	0.16		wk	–	–	–	–	do		"	In general as above, but weak CuOx. For
427.6-436.9	9.3		2.79		0.67	0.47										the most part the rock is thoroughly he-
436.9-446.5	9.6		2.69		0.85	0.53										matized. Bi is "fresh" (2nd?)
446.5-456.2	9.7	"	2.58		0.60	0.36		wk	–	–	–	–	do		And. porph (?) Gr.	Textural change: – Sericitized small (1-3 m.m in
																length) feldspar phenos set in FeOx stained matrix.
																At 454.4' abrupt change to sericitized granite
																to end of int. Steeply dipping contact.
456.2-465.5	9.3	"	2.75		0.60	0.53		wk	–	–	–	–	Sericitized Kaolinized		Gr. And. porph.	And. porph(?) to 458.2', thence fine to med. gr. gran
																CuOx along fract. surf.
465.5-475.6	10.1	"	2.56		0.16	0.10		tr	–	–	–	tr. spec.	do		Gr?	As above with indig./lm coating fractures. Tr.
																jarosite. CuOx persists as encrustations and along
																fract.
475.6-483.8	8.2	"	2.64		0.05	0.02		–	–	–	–	–	do		Gr-Mz?	Variable textured and qtzose, granitoid.
483.8-494.6	10.8		2.61		0.05	0.01										locally st. hem flooding in particular where
																brecciated. Scattered indig. lm.
494.6-504.7	10.1	"	2.69		0.08	0.04		–	–	–	–	–	do		Gr Mz? And. porph	As above. Last foot of int. f.gr. and. porph.

Final Depth 786.0'
Collar Elevation
Coordinates
Inclination - 90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-112
Sheet No. 1 of 4
Date Completed 10/4/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
0-205.2	205.2	5 1/8" RB													Alluvium	Bedrock reported at 201'.
205.2-214.4	9.2	NXWL	2.36		0.63	0.49		WK	–	–	–		Sericitized & Kaolinized		Gr	St. alt. granite, granulated. Oxidized. Mod FeO Cu Ox to 209.2'.
214.4-224.8	10.4	"	2.64		0.07	0.02		–	–	–	–		do		Gr(?)	Int. becomes incr. granulated with st. FeOx @ 217.5' to end of int.
224.8-234.5	9.7	"	2.48		0.05	0.02		–	–	–	–		do		Gr(?)	St. broken. Orig. rock type obscure. Leached and oxidized.
234.5-245.6	11.1	"	2.60		0.03	0.01		–	–	–	–		do		Gr	Do. No Cu min obs. so far.
245.6-255.2	9.6	"	2.48		0.04	0.01		–	–	–	–		do		Gr.	Do. Vivid hem. stain of matrix.
255.2-265.7	10.5	"	2.48		0.05	0.01		–	–	–	–		do		Mx/Gr?	Appears as a mixed assemblage, but distinction due to alteration obscure. Shows brecciation in places.
265.7-275.8	10.1	"	2.73		0.03	0.01		–	–	–	–	270.9' Spec	do		Gr ?	Granitoid features faintly discernable at times. Mod-st. hematite, especially where brecciated.
275.8-286.2	10.4	"	2.64		0.03	0.01		–	–	–	–	WK Lim	do		"	Do.
286.2-296.8	10.6	"	2.62		0.04	0.01		–	–	–	–	do	do		"	Indig. lm. coating fract. with occ. py casts. No Cu min. obs.
296.8-306.8	10.0	"	2.67		0.04	0.01		–	–	–	–	do	do		"	Mod-st. brecciation of interval healed by FeOx. Otherwise as above.
306.8-317.2	10.4	"	2.61		0.05	0.01										Mod-st. hem. flooding of matrix. Occ. frs. of pri specularite. Some jarosite coating fract. with indig lim. Mod. brecciation last 10' to 338.2'. No visible Cu min.
317.2-327.8	10.6	"	2.66		0.03	0.01		–	–	–	–	WK Lim.	do		"	
327.8-338.2	10.4	"	2.70		0.14	0.01										
338.2-348.5	10.3	"	2.65		0.11	0.07										Essentially as above. WK. silicif. St. hem especially along fract. Noted some yellow, adamantine platy x'tals @ 353.2' - Ferrimolybdite? w/jarosite.
348.5-358.2	9.7	"	2.78		0.08	0.05		–	–	–	–		Sericitized		"	

Final Depth 600.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC + ASSAY LOG

Property SACATON

J. H. C.

OCT 24 1968

HOLE NO. S-111
Shoot No. 1 of 4
Date Completed 10/11/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
0-154'	154'	5"RB													Al.	Bedrock placed at 152'.
166.3	12.3	NXWL	2.61	94	0.60	0.56		wk-mod	-	-	-	-	Qtz-ser		Mz(?)	Scattered CuOx through 1st ft of int. St. sericite-qtz. alt. No other Cu min. obs. WK. indig Lmn.
177.4	11.1	"	2.62	84	0.08	0.05		-	-	-	-	-	do		"	V.St. FeOx flooding of matrix. Qtz-sericite alt. St. brecciation.
184.5	7.1	"	2.51	85	0.06	0.02		-	-	-	-	-	do		Mz/Gr.?	As above, but portions of core do show good, coarse granitoid charac. St. leached. Last foot of int. st. clay/sericite with FeOx. St. brecciation.
194.8	10.3	"	2.31	88	0.05	0.02		-	-	-	-	-			Mz	Essentially as above. Int. displays fine to med. gr. grey qtzose groundmass.
199.6	4.8	"	2.52	87	0.06	0.01		-	-	-	-	-	do		Mz	Do. No Cu. min. obs. so far.
199.8	0.2	"			No recovery											
205.0	5.2	"	2.51	90	0.07	0.01		-	-	-	-	-	do		"	Do.
215.4	10.4	"	2.57	92	0.07	0.01		-	-	-	-	-	do		"	Abrupt decrease in FeOx stain @ 207' to wk-mod. Few segments show mod. brecciation.
223.4	9.0	"	2.62	95	0.04	0.01		-	-	-	-	-	do		"	Do. WK. indig Lmn.
233.8	10.4	"	2.65	93	0.04	0.01		-	-	-	-	-	do		"	Mod brecciated which is associated with the stronger hematite. No visible Cu. min.
243.9	10.1	"	2.63	96	0.04	0.01		-	-	-	-	-	do		"	Mod-st. hem within matrix. Last foot of int st. broken with qtz-sericite-FeOx. Occ. brecciated segments with ass. st. FeOx.
250.9	7.0	"	2.70	97	0.45	0.41		wk	-	-	-	wk spec.	do		"	Increase in brecciation. Mod-st. hem. WK CuOx within last foot of int.
261.2	10.3	"	2.62	95	0.40	0.36		wk	-	-	-		do		"	St. brecc. last 2' of int. conspic. vuggy with some indig. Lmn. Alteration: st qtz-sericite.

Final Depth 600.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-111
Sheet No. 2 of 4
Date Completed 10/11/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
266.9	5.7	NXWL	2.73	100	0.09	0.04		-	-	-	-	tr. spec.	Qtz	Ser	Mz	St. hem. within matrix with st. brecciation. WK-mod indig. Lm.
277.1	10.2	"	2.57	97	0.10	0.05		-	-	-	-	WK Llm spec.	do		"	Mod. Hem. with indig Lm and Llm. Occasional Vugs. Tr. of spec. lining cavities and fractures.
287.2	10.1	"	2.58	97	0.06	0.03		-	-	-	-	WK-mod spec.	do		"	do.
297.4	10.2	"	2.60	96	0.09	0.05		-	-	-	-	tr Llm	do		"	Continued qtz-ser. alt. Mod hem. stain. Last 4' of int mod-st. brecciated.
									SULPHIDES							
307.5	10.1	"	2.68	97	0.59	0.08		-	WK-mod	-	WK-mod	tr Llm WK. spec	do		"	St. brecc. first two feet of int. with st. FeOx. Indig. Lm with tr Llm. WK. prim. spec. Py coated by cc. w/spec. veinlet @ 304'. Leached & oxidized to end of int.
317.7	10.2	"	2.66	96	1.33	0.10		WK	WK	-	mod-st	-	do		"	Variably brecciated. Appears well mineralized by cc.
327.9	10.2	"	2.72	95	9.88	1.14		WK-mod	WK-mod	-	very st	WK spec.	do		"	St. brecciation throughout. St. FeOx with primary specularite to 322.5'. Veinlets of massive cc-py parallel to core to 324'. Thence Leached Mz to end of int.
337.9	10.0	"	2.75	97	1.94	1.30		WK-mod	WK	-	WK	tr spec	do		"	Interfingering segments of sulphides and oxides. Increase in brecciation with FeOx last 3' of int.
348.2	10.3	"	2.67	96	3.35	2.44		WK	WK	-	WK-mod	mod spec.	do		"	St. brecciation. Mod hem. stain.
358.3	10.1	"	2.66	97	0.90	0.30		tr	tr	-	mod	-	do		"	WK. CuOx first 6" of run. WK dissem cc. remain-def. Mod-St. FeOx throughout with ass. brecciation
370.5	12.2	"	2.48	97	0.97	0.06		-	WK-mod	-	mod	-	do		"	Dissem. cc, cov. Brecciation persists. St. hem. gouge from 359.8 - 360.4.
380.8	10.3	"	2.50	99	0.45	0.03		-	WK-mod	WK-mod	tr	-	Kaolinized		"	Mod-St. brecciated core, with associated FeOx. Mod. alt. Tr. cc. to 380.8'. Pronounced cpy, cov, py vein .2" wide @ 383.4". Cpy otherwise sparadic along tract.
391.3	10.5		2.62	91	0.94	0.04							Sericitized			
401.8	10.5		2.63	96	0.57	0.05										

Final Depth 600.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-111
Sheet No. 3 of 4
Date Completed 10/11/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks * For "Mz" now read "Mp" (monzonite porphyry)
411.8	10.0	NXWL	2.60	88	0.62	0.02		–	wk-mod	wk	–	–	Kaolinized		Mp*	Brecciated, hematized. wk cpy in places. No
421.7	9.9	"	2.59	97	0.41	0.01							Sericitized			further cc. noted obs. wk. indig. Au
432.2	10.5	"	2.70	93	0.69	0.02			wk	wk	–	–	do		And. porph (?) @ 30° Gr	Fine grained volc. rock with contact @ 421.6'. DK grey groundmass with conspic. feldspar phenocrysts. At 424.1' a "sliver" of granite, 1.2' long. Conspic. cpy, py, cc. veinlet @ 426.8' within the And(?) porph. St. alt. Gr again from 431.0 to 432.2'. Wkly diss. py within And(?) porph. groundmass
442.7	10.5	"	2.66	95	0.56	0.02			wk	wk	–		do		Gr. And. porph ?	Wkly min. granite to 435.1', thence mod-st. alt. And. porph.? to 440'. Thence sericitized, Kaolinized porph. to end of int.
452.9	10.2	"	2.62	95	0.62	0.04			wk-mod	wk	–	–	do		And. porph ? Mp.	And. porph, chl-ser to 444.0'. Thence Mp. breccia to end of int, with st. FeOx. Discreet veinlets of cpy, py. Massive py vein, steeply dipping @ 446.0'.
462.8	9.9	"	2.48	92	0.45	0.01			wk-mod	wk	–	–	do		Mp	Brec. Mp. Wkly dissem cpy, py with occ. veinlets.
473.0	10.2	"	2.57	93	0.47	0.02			wk-mod	wk	–	–	do		"	Do. Mp Bx. Generally st. hematized. At
483.3	10.3	"	2.60	89	0.65	0.02							wk. silicif.		Gr?	480-483.3' becomes c.gr. granitoid. Finely diss. py
493.5	10.2	"	2.57	89	0.44	0.04										with occ. cpy along veinlets. Brecciation
504.3	10.8	"	2.56	65	0.42	0.04										becomes intense toward end of int.
512.7	8.4	"	2.55	93	0.50	0.05			wk-mod	tr-wk	–	–	Sericitized		Mp?	Strong brecciation remains the dominant
521.9	9.2	"	2.66	89	0.56	0.04							wkly chlor,		Gr?	feature of the core. Orig. rock dubious.
531.6	9.7	"	2.58	88	0.41	0.04							silicif.			Py is the main sulphide. Cpy tr-wk. Superficially appears as a mixed assemblage of Mp-Gr.
542.3	10.7	"	2.56	72	0.52	0.03			wk	wk	–	–	Qtz-ser		Mp?	Int's become increasingly granulated. Orig
550.5	8.2	"	2.62	70	0.58	0.02									Gr?	text very obscure. Wkly hematized, mainly along fract. Granitoid features discernable @ 540.0' to end of int.

Final Depth 600.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-111
Sheet No. 4 of 4
Date Completed 10/11/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
562.6	12.1	NxW2	2.60	72	0.39	0.02							Qtz-ser.		Mp, Gr.	Brecciation is extreme. Rock is mainly a
573.2	10.6	"	2.63	59	0.58	0.03		–	WK	–	–	–	wkly chlor.		Bx.	sericitized, quartzose mass containing Mp and
																Gr. fragments with occ. specks of py. No Cu
																min. obs.
584.1	10.9	"	2.59	49	0.26	0.02		–	wk-mod	–	–	–	do		Gr	Granite breccia. No Cu min. observed.
594.6	10.5		2.61	88	0.21	0.01										
600.2	5.6		2.58	100	0.36	0.01										
	E.O.H															

Final Depth 883.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC - ASSAY LOG

H.C.
OCT 9 1968

Property SACATON

HOLE NO. S-110
Sheet No. 1 of 8
Date Completed 9/25/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Avgraga Mo.	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG.
0-84	84	5½" RB													Alluvium	Bedrock reported at 84'
84-93.6	9.6	NXWL	2.48	66	0.05	0.03							Sericitized		Gr(?)	Strongly altered granite (?) with strong hematite flooding of rock. Intense sericite development, locally
93.6-104.1	10.5	"	2.56	96	0.08	0.06	.023						do		Gr	Alteration as above with associated hematite. WK jarosite coating fractures. Occ. slickensided surfaces. Granitoid text. exhibited locally.
104.1-113.4	9.3	"	2.55	96	0.41	0.38	.020	wk					do		"	As above w/mod-st. FeOx. WK CuOx as chrysocolla and malachite along veinlets and coating fracture surfaces. Int. becomes strongly sericitized from 111.0 - 113.4.
113.4-123.7	10.3	"	2.66	96	0.04	0.04	.022					Lim mod	do & Kaolinized		"	St. alt. Mod-st. sericite, clay development. Wk-mod hematite flooding of matrix and along fractures.
123.7-133.4	9.7	"	2.64	99	0.28	0.04			SULPHIDES wk-mod	wk	wk-mod	Lim wk	do		Gr	Mineralized from 124.7 - 127.0'. Remainder of int. st. alt with st. sericite and mod. hematite within groundmass.
133.4-143.8	10.4	"	2.69	94	0.05	0.05							do		"	St. alt. wk-mod hematite. Otherwise as above
143.8-154.3	10.5	"	2.70	88	1.30	0.05			wk-mod	tr	mod		do		"	As above. From 149.7 - 154.3 dissem. cc and py coated by cc. Occasional short oxidized portion within. Tr. cpy within py FeOx veinlets.
154.3-164.2	9.9	"	2.66	98	1.14	0.03			mod		mod		Kaolinized		"	Irregular segments of cc, py within interval. Decrease in sericitization. Alteration still strong. Wk-mod FeOx
164.2-174.2	10.0	"	2.67	98	0.66	0.03			mod	tr	wk-mod		do		"	Sulphides from 168.0' along veinlets and as dissem. Wk hematite. Mineralized veinlets run parallel to core.
174.2-183.9	8.7	"	2.68	100	0.80	0.02			mod		wk-mod		do		"	Dissem. sulphs within light grey argillized groundmass. Wk. silicif. Tr. FeOx.

Final Depth 883.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property

HOLE NO. S-110
Sheet No. 2 of 8
Date Completed 9/25/68
Logged By CHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average Mo.	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
182.9-193.0	10.1	NXWL	2.75	95	0.04	0.01							Kaolinized & sericitized		Gr	Abrupt increase in mod-st hematite flooding of matrix. Mod. silicif. locally. No Cu min. obs.
193.0-203.2	10.2	"	2.69	97	0.13	0.02			WK		v.wk		Kaolinized			Essentially as above. Latter part of int. from 198.4' sporadic WK sulphides. Iron oxides tend to coat fractures rather than permeating matrix.
203.2-213.3	10.1	"	2.59	94	0.03	0.01							do		Gr?	Interval characterized by strong iron oxides permeating rock. Rock type obscure. From 204-205' exhibits breccia texture. WK-mod silicification occurring as irregular masses. No Cu. min. observed.
213.3-223.6	10.3	"	2.62	93	0.03	0.01							Sericitized		Gr	Generally as for previous interval but from 215.8-218.6' pronounced sericite development. Iron oxides tend to concentrate along fractures and as veinlets. Overall aspect is of intense brecciation healed by iron oxides.
223.6-233.3	9.7	"	2.68	97	0.63	0.05			WK-mod	tr	WK		Kaolinized & sericitized		" Do	Alternating sulphides and leached zones characterize this interval. WK-mod Fe Ox. From 229-230.4' fine grained rock with conspicuous rounded quartz "eyes" and pale grey Kaolinized feldspar phenocrysts set in a pink groundmass (Dacite porph.?)
233.3-243.8	10.5	"	2.70	94	0.04	0.01	.019					243.7' Spec	do		"	Mod-St. hematite throughout int, st. alt. Occ. specularite flakes (primary?) No Cu min observed.
243.8-253.8	10.0	"	2.65	97	0.07	0.02	.009					tr Spec	do		"	As above.
253.8-264.0	10.2	"	2.64	96	0.04	0.01	.018					tr Spec.	do		"	Mod. hem staining, weakening toward end of int. Tr. of specularite. Alteration cont. strong.
264.0-274.0	10.0	"	2.59	87	0.04	0.01	.012					tr Spec	do		"	Mod Fe Ox. St. alt. No Cu min obs. Tr. jarosite along fract.

Final Depth 883.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-110
Sheet No. 3 of 8
Date Completed 9/25/
Logged By CHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average Zn	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
274-284.5	10.5	NXWL	2.57	90	0.32	0.24	.017	wk					Kaolinized		Gr	Essentially as before w/tr. jar. WK Cu Ox @ 28
284.5-295.0	10.5	"	2.62	90	0.81	0.10					wk	Tr Lim	Sericitized		"	Light to dk. grey granite? Rocktype at times obscure. St. alt. wk FeOx. wk. dissem cc alternating with oxidized segments.
295.0-303.4	8.4	"	2.59	100	0.17	0.03	.022				Tr	wk Lim	do		"	At 296.6-297.3' v. coarse gr. granitoid rock. 7/10°/0 (similar in appearance to "Silverbell alaskite".) Tr-wk FeOx.
303.4-313.9	10.5	"	2.89	86	3.84	0.07			tr	wk	mod-st		do		"	Fine grained highly altered, light grey to white granite(?) Well dissem. cc. Tr. FeOx. Mod. bro
313.9-324.1	10.2	"	2.91	87	2.73	0.09			tr	wk	mod-st		do		"	Interval assumes an almost bluish-grey color. Rock strongly altered so that original textures ha been almost completely obliterated.
324.1-333.3	9.2	"	2.74	64	0.56	0.08			wk	–	wk-mod		Sericitized & Kaolinized		"	Essentially as above. Granitoid text. almost go
333.3-344.2	10.9	"	2.80	72	0.90	0.04			wk		mod		Sericitized		"	As above.
344.2-353.5	9.3	"	2.57	32	0.41	0.02			wk		wk-mod		do		"	As above.
353.5-363.1	9.6	"	2.48	66	0.55	0.03			wk		wk-mod		do		"	Mod-st. broken, fragile. Alteration remains intense
363.1-374.8	11.7	"	2.50	85	0.23	0.02			wk-mod		wk.		do		Gr (Mz?)	Fine to medium grained intrusive. Mod hem principally along fracture surfaces. Little o no visible quartz present.
374.8-385.5	10.7	"	2.74	65	0.21	0.02			wk-mod		wk		do		Mz?	Interval strongly shattered. Otherwise as above
385.5-385.8	0.3					NO RECOVERY										
385.8-396.8	11.0	"	2.73	86	0.66	0.01			wk-mod		wk-mod		do		"	Occasionally wk hem stain. Fracturing less intense, St. alt.
396.8-403.3	6.5	"	2.52	24	0.58	0.01			wk		wk-mod		do		Mz?	Characteristics as above, mod. broken. At 400.0', medium grained granitoid text w/black biotite. Mod. alt. little or no qtz. obs.

Final Depth 883.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC — ASSAY LOG

Property SACATON

HOLE NO. S-110
Sheet No. 4 of 8
Date Completed 9/25/6
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	~~Average~~ MO.	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
403.3-412.8	9.5	NXWL	2.55	92	0.55	Tr			wk-mod		wk-mod	tr moly	Sericitized		Mz. Gr	Interfingering segments of Mz. Gr. The granite is very coarse grained with conspicuous qtz. phenos and sericite with clay min. occ. interstices. The monzon is generally fine to medium grained, lacks obvious quartz and shows distinct euhedral feldspar x'tals 1-3 m.m in length set in a dK grey groundmass. Hematite, when present, generally is confined to fracture surfaces.
412.8-421.0	8.2	"	2.61	91	0.75	0.01			wk	tr	wk-mod		Kaolinized		Mz	Mod. alt. Euhedral feldspar → clay min phenos set in a dK grey matrix. Mod. FeOx stain along fract. Qtz. virtually absent. Occ. black biotite (2nd?)
421.0-432.5	11.5	"	2.62	91	0.55	0.01			wk-mod	tr-wk	wk-mod		Sericitized		Mz. Gr	Fine grained, st. alt. to 425'. thence granite to 492.2'. To end of int. med. gr. porph. rock with conspic. feldspar phenos and black biotite set in a purple-grey matrix. Mod-st. alt. Mod FeOx s
432.5-442.5	10.0	"	2.68	93	0.60	0.01			wk	tr.	wk mod		do		Mz? Gr	Grainsize and textures highly variable. Granite appears to dominate the interval. St. alt, Mod. FeOx.
442.5-451.1	8.6	"	2.69	94	0.57	0.01			wk-mod	—	wk-mod.		do		Gr	Highly alt. granite with large qtz. phenos. Locally pods of pyrite. Mod FeOx.
451.1-460.4	9.3	"	2.65	94	0.57	0.01			wk-mod		wk-mod		do		Mz. Gr. ?	Conspicuous feldspar phenos and euhedral biotite w/ occ. qtz and pink feldspar. Slightly chloritized. Latter 5' of int. strongly broken.
460.4-471.2	10.8	"	2.84	97	0.60	Tr			wk-mod		wk-mod		do		Gr	Thoroughly shattered in places, but original rock type still discernable in places.
471.2-479.9	8.7	"	2.80	79	0.11	Tr	.009		wk-mod		tr		do		Gr?	St. broken interval with extreme alteration
479.9-489.0	9.1	"	2.96	59	0.13	Tr	.016		mod		tr		do		"	As above to 485.8'. To end of int. incr. in FeOx. Pyrite occurs as isolated pods and occ. veinlets

Final Depth 883.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-11
Sheet No. 5 of 8
Date Completed 9/25/
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	~~Average~~ Mo.	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
489.0-498.3	9.3	NXWL	2.53	92	0.44	0.01	.010		wk		wk		Sericitized		Gr Mz?	Strongly altered granite to 493.3'. From 493.3' to end of int. orig. rk type obscure due to extreme alt and appears brecciated. Abrupt incr. in FeOx flooding of matrix.
498.3-508.5	10.2	"	2.62	97	0.66	0.01	.019		wk-mod	tr	wk-mod		Sericitized & Kaolinized		Mz? Gr	At approx 500', st. alt. gran. to 505'. One ft of monz? to 506', thence gran. to end of int. Mod-st FeOx.
508.5-519.0	10.5	"	2.61	95	0.51	0.01	.028		wk	tr	wk-mod		do		Mz. Gr	Mixed assemblage. Cu min. appears to favor the alt. gran. Mod-st. iron oxide staining of groundmass.
519.0-529.3	10.3	"	2.56	97	0.29	0.01	.043		wk		wk	tr moly	do		Gr. Mz	Similar to above. Coarse grained granite to 526.8', then essentially monzonite to end of int. The latter is slightly chloritized in places. Tr of spec. along fract. within the gran.
529.3-537.0	7.7	"	2.54	99	0.37	0.01	.017		wk	?	?	tr moly	do		Mz	Monzonite dominates this interval. St. alt but carries ± 2% black (2nd?) biotite, with occasional alt → white mica.
537.0-547.8	10.8	"	2.53	90	0.31	0.01	.022		wk	tr	?	tr moly	do		"	Essentially as above. Mod-st iron oxides.
547.8-558.2	10.4	"	2.57	93	0.69	0.01	.022		wk		wk-mod		do		"	Appears as a mixed assemblage of fine to medium grained monzonite. Mod-st. hem. Last foot of int. st gouge with hem and pyrite.
558.2-566.8	8.6	"	2.54	97	0.26	0.01			wk		wk		Qtz-Ser.		Gr or FAULT? Sil. Mz?	St. broken with gouge to 561.7'. In places displays fair to good granitoid text. Bi, qtz with conspic. alt. feldspar show up locally.
566.8-576.3	9.5	"	2.65	95	0.44	0.01	.038		wk	tr	wk-mod	tr spec. moly	do		Gr or Sil. Mz?	At 567.4', 2½' post-ore andesite dike. To end of int. rock becomes quartzose with conspic. bi and feldspar phenos. Med. gr (qtz. Mz)
576.3-585.3	9.0	"	2.48	92	0.27	0.02	.013		wk	tr	wk		Sericitized & Kaolinized		Mz	Generally as above, but the Mz appears less siliceous. Mod. FeOx.

Final Depth 883.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-110
Sheet No. 6 of 8
Date Completed 9/25/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	~~Average~~ Mo.	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
585.3-595.2	9.9	NXWL	2.50	100	0.54	0.01	.011		wk	wk	wk-mod		Sericitized & Kaolinized		Gr, Mz	Mixed int. Mod. FeOx. Otherwise as above.
595.2-605.4	10.2	"	2.50	99	0.43	0.01	.009		wk-mod	tr	wk	tr. moly	do		Gr Micro-Gr?	Py, cc. vein @ 595.2'. Text. f.gr. to end of int. Micro-granite(?) WK-mod Fe Ox. Noted occ. small Mz inclusions within.
605.4-615.3	9.9	"	2.62	100	0.64	0.01	.013		wk-mod	tr	wk-mod		Sericitized		Micro-Gr Mz?	Overall aspect is a st. sericite development of ground-mass with local st. FeOx. Mixed sulph. along veinlets.
615.3-625.6	10.3	"	2.56	96	0.53	0.01			wk	tr	wk-mod		do		Sil. Mz or Gr?	Mod-st. hem. throughout. Some sections show good granitoid text. Alt. cont. st.
625.6-635.8	10.2	"	2.55	97	0.68	0.01			wk	tr	mod		Sericitized & Kaolinized		Gr, Mz	Mixed granite, monzonite - the latter predominates. WK-mod iron oxides. cc-cpy along veinlets.
635.8-645.2	9.4	"	2.58	97	0.71	0.01			wk	—	mod.		do		Gr.	Well developed granitoid text (v. coarse grained) locally v. st. FeOx along fract. Well dissem. cc.
645.2-655.7	10.5	"	2.57	96	1.52	0.01			v. wk	—	mod-st		do		Gr	As above. Noted sporadic 2nd biotite.
655.7-665.9	10.2	"	2.58	99	1.40	0.02			wk	—	mod-st		do		"	Do.
665.9-676.3	10.4	"	2.56	96	0.65	0.01			wk	tr	mod		do		"	Do.
676.3-686.5	10.2	"	2.55	95	0.43	Tr			wk	tr	mod		do		"	C. gr. granite. Diss. cc. throughout. Little py. No bi. noted.
686.5-696.8	10.3	"	2.61	94	2.28	0.03			v. wk	—	mod-st		do		"	Do. St. FeOx from 688.5-691.7'. Otherwise wk.
696.8-706.8	10.0	"	2.66	94	1.45	0.04		tr malachite	wk	—	mod-st		do		"	Do. 6" gouge to 701.8'. V. WK FeOx. Occ. 2nd bi.
706.8-717.0	10.2	"	2.57	97	0.80	Tr			wk	—	mod		do		"	Do. Text. somewhat variable from med to c.gr.
717.0-727.1	10.1	"	2.57	95	0.75	Tr			wk	tr	mod		Sericitized		"	Incr. in sericitization.
727.1-737.3	10.2	"	2.68	92	0.65	Tr			wk	tr	mod		do		"	St. ser. from 732.2 - 737.3, with "pods" of pyrite
737.3-749.6	12.3	"	2.65	95	1.26	0.01			wk	tr	mod-st		do		Gr. micro-Gr?	F. gr. gran. from 741.0 - 742.7'. WK silicif.

Final Depth 883.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-110
Sheet No. 7 of 8
Date Completed 9/25/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average Mod	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration	Rock Type	Remarks CORE SPLIT PRIOR TO LOG
749.6-757.0	7.4	NXWL	2.62	90	1.33	0.01			v.wk	tr	mod-st.		Sericitized & Kaolinized	Gr	Do. Mod. broken.
757.0-767.2	10.2	"	2.65	91	1.60	0.02			v.wk	–	mod-st		Sericitized	"	Do.
767.2-776.6	9.4	"	2.58	95	0.75	0.01			wk	–	mod		do	Gr	Sh'd and gouge from 767.2-769.5'. Otherwise as above.
776.6-786.7	10.1	"	2.59	92	1.30	0.01			tr		mod-st		do	"	Indig. Lm coating fracture surfaces.
786.7-796.2	9.5	"	2.55	89	0.68	0.01			wk	wk	mod		Sericitized & Kaolinized.	Gr, Mz	As above, but @ 790' abrupt change to Mz. with conspicuous feldspar phenocrysts. At 791.1, the rock becomes flooded with hematite. 790' appears to constitute the boundary with primary chalcopyrite.
796.2-806.7	10.5	"	2.56	96	0.77	Tr			v.wk	mod	tr		Kaolinized	Mz	Sharply delineated altered feldspar phenocrysts with sparse qtz. grains set in an FeOx stained matrix. Occ. biotite flakes. Cpy occurs as discreet disseminated grains or along fracture surfaces.
806.7-817.2	10.5	"	2.62	90	0.98	0.01			tr	wk	tr		Kaolinized & Sericitized	"	Noted primarily cpy. with just a trace of cc. Value of 0.98 % tot. Cu seems too high. Mod. sh'd with indig. lm coating fract. surf.
817.2-827.3	10.1	"	2.58	89	0.48	0.01			wk	wk	–		do	"	Indig. Lm coating fract. surf. WK. dissem cpy
827.3-837.4	10.1	"	2.54	95	0.47	0.01			wk	wk	–		Kaolinized	"	Mod-st. alt. Mod FeOx. last foot of int. sh'd. and bree.
837.4-848.1	10.7	"	2.56	90	0.85	0.01			mod	tr	–		Kaolinized & Sericitized	"	Do. St. sh'd, sericitized, from 847.8-848.1 with locally massive py. Mod-st. hematite stain.
848.1-858.1	10.0	"	2.56	99	1.21	0.01			wk-mod	tr	–		do	"	Do. Pronounced slickensides @ 852.8'.
858.1-868.4	10.3	"	2.58	88	0.49	0.01			wk-mod	wk	–		do	Mz, Gr	Mz to 862.0', thence st. alt. granite.
868.4-878.2	9.8	"	2.56	92	0.47	0.01			wk	wk	–		do	Gr, Mz	Gran. to 869.0', thence monzonite. Decrease in FeOx to mod.

Final Depth 883.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-110
Sheet No. 8 of 8
Date Completed 9/25/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average mo.	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
878.2-883.2	5.0	NXWL	2.48	96	0.54	0.01			wk	wk	-		Sericitized & Kaolinized		Mz	Mod alt. Cpy persists as wk. dissem & veinlets. Groundmass assumes a dk grey color. wk-mod FeOx.
	E.O.H.															

Final Depth 778.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SPRATON

J.H.C

DEC 2 – 1968

HOLE NO. S-109
Sheet No. 1 of 5
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
0-105	105	5⅞"RB														Alluvium and conglomerate.
106	–	–				START	OF	D.D.	CORE							BEDROCK PLACED AT 95'
113.0	7.0	HXWL	2.37	87	0.05	0.01		–	–	–	–	–	Sericitized		Gr, Mp?	St. alt, mod-st FeOx. Exhibits occ. porph. text. Bx'd in part. Illumin'd.
121.7	8.7	"	2.58	98	0.03	0.01		–	–	–	–	wk indig Lm	Qtz-Ser		Gr?	Exhibits locally granitoid text. Gen'lly st'ly Bx'd w/st FeOx.
131.8	10.1	"	2.56	99	0.04	0.01		–	–	–	–	$CaCO_3$	Kaolinized		Gr	St. hematized matrix. Case gr'd, quartzose. Some $CaCO_3$ x'tals lining fract. @ 131.4'
141.8	10.0	"	2.53	100	0.05	0.01		–	–	–	–	–	Qtz-Ser Kaolin		"	Principally as above.
150.8	9.0	"	2.52	94	0.05	0.01		–	–	–	–	–	do		"	Do.
160.6	9.8	"	2.58	98	0.06	0.02		–	–	–	–	wk. indig Lm	do		Gr?	Brec'd w/occ. porph. text.
169.3	8.7	"	2.46	93	0.11	0.01		–	–	–	–	mod indig Lm	do		Gr	Mod-st FeOx within matrix; st Bxcc Bx'd – wk FeOx from 169.8 to end of int.
179.8	10.5	"	2.66	99	0.09	0.01		–	–	–	–	tr. Jar.	do		Gr, Porph (Mp?)	Bx'd, FeOx st'd gran. From 175-177' a dk grey-green porph. w/micaceous matrix cont. wi and feldspar phenos.
189.0	9.2	"	2.53	92	0.06	0.01		–	–	–	–	wk. indig Lm	do		Gr. Porph.	St. Bx'd gran w/st. FeOx. At 185' about one foot of similar to above porph, but seems more alt.
199.1	10.1	"	2.65	95	0.07	0.01		–	–	–	–	do	do		Gr, Porph	An alternating sequence of porph and granite in approx. equal amounts. The latter st. Bx'd.
209.1	10.0	"	2.50	95	0.06	0.01		–	–	–	–	do	do		"	Mixed int. w/porph. predominating.
218.4	9.3	"	2.48	99	0.06	0.01		–	–	–	–	–	Qtz-Ser Kaolin		"	Do. St. Bx'd. FeOx. alt.

Final Depth 778.2'
Collar Elevation
Coordinates
Inclination -- 90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACHATON

HOLE NO. S-109
Sheet No. 2 of 5
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
227.1	8.7	NXWL	2.55	91	0.07	0.01		–	–	–	–	St. indig Lm w/Llm.	Qtz-Serricite	Kaolin	Porph, Gr.	Porph (Mp?) and subord. Gr. Lim after py, cc. Variably Bx'd.
237.4	10.3	"	2.56	98	0.07	0.01		–	–	–	–	Wk indig Lm w/Llm.	Qtz	Ser	Gr?	St. Bx'd, hem'd w/ser. granite? Locally coarse gr'd, but more often fine-to med. grayish groundmass – quartzose.
									SULPHIDES							
246.8	9.4	"	2.59	98	0.31	0.03		–	wk-mod	–	wk	St. indig Lm. w/Llm.	do		Gr.	Indig Lm & Llm to 238.5 within qtz-ser matrix, trace py with dissem cc to 239.9'. Leached, oxidized remainder of int.
256.5	9.7	"	2.51	91	0.06	0.01		–	–	–	–	Wk. indig Lm	do		Gr	St. alt. No Cu min. obs.
266.3	9.8	"	2.42	88	0.09	0.02		–	–	–	–	do	do		"	Do. loc. st. hem'd w/brecciation.
276.7	10.4	"	2.49	91	0.08	0.01		–	–	–	–	mod. indig Lm.	do		"	As above.
286.5	9.8	"	2.52	87	0.10	0.01		–	–	–	–	do	do		"	A variably Bx'd grano w/FeOx. Incr. ser. toward end of int.
293.9	7.4	"	2.66	73	0.10	0.01		–	–	–	–	tr. indig Lm.	do		"	St. Bx'd, sericitized int.
294.2	0.3	"	–	–	No	Recovery									–	–
									SULPHIDES							
301.2	7.0	"	2.54	99	0.31	0.01		–	tr	–	wk	mod. indig Lm + Llm	do		Mp? Gr	Predom'ly grano. w/short segment of Mp(?) at beginning of int. Gr. remainder. @ 300± cc noted to end of int.
311.3	10.1	"	2.56	96	1.10	0.03		–	wk	–	mod	Wk. indig Lm.	do		Gr. Porph (Mp?)	Int. st. alt and appears as a porphyry-soaked granite. Well min'd by cc to 307.4. Remainder leached and oxidized.
321.0	9.7	"	2.70	98	0.16	0.08		–	–	–	–	–	do		do Bx.	Appears a mixed int.-granitoid porphyry or Mp? (sil) Gen'ly fine to med gr'd groundmass. Bx'd, sericitized (intense along fract. near end of int) St. FeOx.
331.5	10.5	"	2.72	93	0.08	Tr		–	–	–	–	Wk. spec.	do		Porph, Gr.	Decidedly porph'ic, Bx'd and locally granitoid. Ser. coating fract.

Final Depth 7782'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SPCATON

HOLE NO. S-109
Sheet No. 3 of 5
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
341.7	10.2	NXWL	2.76	99	0.04	Tr		–	–	–	–		Qtz-	Ser	Gr, Porph. (Mp?)	Text. highly variable from granitoid to porphyritic, but main rock type is granite. Variably Bx'd. Hemin'd.
352.0	10.3	"	2.71	99	0.04	Tr		–	–	–	–	mod. intg. Lmn	do		do	St. Bx'd. throughout w/ass. FeOx, primary(?)
363.8	11.8	"	2.67	95	0.04	Tr		–	–	–	–	do			Bx.	spec. Few localized vugs. Quartzose (Gr?) mixed
374.3	10.5	"	2.66	97	0.05	Tr		–	–	–	–	mod. spec.	do			w/porph. (Mp?)
384.9	10.6	"	2.70	91	0.07	Tr		–	–	–	–	do	Sericitized		Porph	St. Bx'd quartzose Mp? Gen'ly f.gr,
392.8	7.9	"	2.61	90	0.06	0.01		–	–	–	–		Kaolinized		(Mp?)	dense groundmass cont. "fresh" bi and alt'd
															Bx.	feldspar phenos.
403.3	10.5	"	2.70	96	0.07	0.01		–	–	–	–	do	do		Porph, Gr	As above. St. Bx'd w/rock fragments ex-
															Bx.	hibiting porph. text, occ. granitic.
412.2	8.9	"	2.62	92	0.04	Tr		–	–	–	–	do	do		Porph,	A breccia containing variably mixed
421.7	9.5	"	2.66	100+	0.09	0.01		–	–	–	–	wk. spec.	↓		Gr	porphyry (Mp?) and granitic fragments
431.6	9.9	"	2.66	97	0.10	0.02		–	–	–	–	mod. spec.			Bx	healed by iron oxides. Spec. lining vugs
441.4	9.8	"	2.67	97	0.07	0.01		–	–	–	–		↓			and fract. Hemin'd.
451.6	10.2	"	2.59	93	0.07	0.02		–	–	–	–	wk. spec.	Kaolinized		do	Essentially as above to 447.0 Hence
460.0	8.4	"	2.54	100	0.05	0.01		–	–	–	–	do	Sericitized		Bx	Granite to 456.6', w/ly Bx'd. To end of int,
																incr. in brecciation.
470.4	10.4	"	2.66	94	0.08	0.01		–	–	–	–	do	do		Porph, Gr.	Similar to previous int's. Porphyry and
480.8	10.4	"	2.60	96	0.12	0.03		–	–	–	–	do	↓		Bx	granite as angular fragments set in a
491.1	10.3	"	2.67	94	0.09	0.02		–	–	–	–	do				hematized matrix. Some jarosite coating
501.3	10.2	"	2.64	93	0.09	0.03		–	–	–	–	–				fract. The more pronounced hematized fract.
511.7	10.4	"	2.65	95	0.07	0.02		–	–	–	–	–	↓			seem invariably steeply angled. Porph
																predominates gran. fragments.
521.1	9.4	"	2.65	97	0.06	0.02		–	–	–	–	tr. spec.	Qtz-	Ser	do	As above. Brecciation becomes intense
531.9	10.8	"	2.65	97	0.07	0.02		–	–	–	–	–	Kaolinized		Bx	from 545.0' to end of int. w/ass. FeOx,
540.5	8.6	"	2.66	94	0.08	0.02		–	–	–	–	tr. spec.	↓			where rock type is granite, cont. tr. cc.
550.8	10.3	"	2.64	96	0.25	0.07		–	–	–	tr	–	↓			
561.3	10.5	"	2.59	91	0.06	0.01		–	–	–	–	–	Qtz-	Kaolin.	Gr	St. Bx'd Granite, healed by iron oxides. No
571.2	9.9	"	2.46	97	0.06	0.03		–	–	–	–	–	↓		Bx.	Cu min. abs. Decrease in Bx. last part of int.
581.7	10.5	"	2.54	95	0.04	0.01		–	–	–	–	–	↓			(No porph. noted.)

Final Depth 778.2'
Collar Elevation
Coordinates
Inclination −90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-109
Sheet No. 4 of 5
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
592.0	10.3	NXWL	2.55	96	0.03	0.01		–	–	–	–	wk-mod indigo	Qtz-	Ser	Gr	Coarse grained granite w/variable brecciation
602.4	10.4	"	2.60	97	0.04	0.01		–	–	–	–	do				ass w/FeOx. Wk. jarosite: 607-612.' Incr.
612.7	10.3	"	2.62	95	0.04	0.01		–	–	–	–	tr Limn				in brecciation w/ last part of int.
622.8	10.1	"	2.55	97	0.04	0.01		–	–	–	–	–	↓			
633.0	10.2	"	2.56	92	0.04	0.02		–	–	–	–	–	do		"	Variably brecciated granite.
641.8	8.8	"	2.55	94	0.09	0.04		–	–	–	–	–	Qtz- Kaolinized	Ser	Gr, Mp	Do. – At 639.0' int. becomes porph w/conspic black biotite. Feldspars → clay.
652.3	10.5	"	2.52	93	0.88	0.77		mod	–	–	–	–	Kaolinized		Mp.	Porph (Mp?) w/Cu $CO_3^=$ and SiO_3 lining fract. and as veins.
662.7	10.4	"	2.54	86	0.17	0.10		tr	–	–	–	–	do		Mp	Gran'd, sh'd w/hem to 654.2' thence
673.2	10.5	"	2.47	94	0.16	0.07		wk	–	–	–	–	+ Qtz-	Ser.		monz. porphyry to end of int. w/mod-st. FeOx
															Gr	flooding of matrix. Mod. jarosite. Cu Ox (mala-
																chite @ 667.9'-670.5'. Thence gran. to
																673.2'.
								SULPHIDES								
683.7	10.5	"	2.60	93	2.59	0.13		–	wk	–	st	wk Limn	Qtz-	Ser	Gr	Steeply dipping (60-70°) cc, py structures
															Bx.	@ 675.0' cont. discon. to 678.0'. St.
																FeOx lining, 75-85° dipping, Bx shear to
																678.5'. St. Bx'd, FeOx + ser. to end of int.
693.3	9.6	"	2.63	97	0.23	0.19		wk	–	–	–	–	Qtz- Kaolinized	Ser	Gr, Mp	Mixed int. of porph (Mp?) and granite,
																latter predominating. Wk Cu Ox coating fract.
																No appreciable brecciation.
703.3	10.0	"	2.54	94	0.05	0.03		–	–	–	–	–	Qtz- Kaolinized	Ser	Gr	Variable brecciated w/sugg. of porph.
713.3	10.0	"	2.60	99	0.15	0.11		tr	–	–	–	–	do		Gr, Porph	Again mixed int, but becomes def'ly porph
723.6	10.3	"	2.48	99	0.20	0.13		wk	–	–	–	–	Kaolinized		Bx	(Mp?) @ 728.7'. w/st. Bx'ion. Main fract.
734.1	10.5	"	2.75	93	0.14	0.06		–	–	–	–	–	↓			parallel to core. Tr. jarosite. St. hem'd.
742.2	8.1	"	2.64	84	0.05	0.03		–	SULPHIDES			–	Qtz-	Ser	Porph (Mp?)	Do. cc, w/tr py encountered in highly
752.4	10.2	"	2.63	93	0.49	0.08		–	tr	–	wk	wk Limn	Kaolinized		Gr.	gran'd, sh'd rock from 748-749.0'.

Final Depth 778.2'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-109
Sheet No. 5 of 5
Date Completed
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG.
762.8	10.4	NXWL	?	94	0.13	0.07		tr	-	-	-	-	Kaolinized		Porph (Mp?)	Mp(?) to 762.0, trans. Gr. to end of int. v.kly Bx'd in places.
772.9	10.1	"	2.60	88	0.06	0.05		-	-	-	-	tr Spec.	Qtz-Ser		Gr.	C. gr'd rock but locally f.gr. (aplite or microgranite) friable hem. stain/Bx. Tr. jarosite.
778.2	5.3	"	2.58	94	0.07	0.06		-	-	-	-	-				
	E.O.H.															

Final Depth 1908.0'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

J.H.C.

NOV 1 1968

HOLE NO. S-108
Sheet No. 1 of
Date Completed 9/26/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
0-1457	1457.0	4 3/4" RB														Alluvium and conglomerate.
1462	5.0	NX													Cgl	Rotary core.
1528	66.0	4 3/4" RB														
1533	5.0	NX													Cgl	Rotary core BEDROCK REPORTED AT 1595'
1605	72.0	4 3/4" RB														
									SULPHIDES							
1610.2	5.2	NX	2.70	96	2.43	0.06		—	wk	—	st	mod Lim	Qtz-Ser		Gr.	St. dissem cc w/mod Lim within a qtz-ser groundmass. Mod FeOx along steeply dipping fract.
1615.0							START OF DIAMOND DRILL CORE									
1623.2	8.2	NXWL	2.66	91	2.37	0.22		tr	tr	—	st	wk-mod Lim	do		"	St. bleached aspect. Groundmass is massive sericite cont. qtz. phenos. Wk. FeOx. Well Cu min.
1628.5	5.3	"	2.56	89	1.38	0.05										
1636.7	8.2	"	2.63	71	2.23	0.07		—	wk	—	mod-st	—	do		"	As above.
1647.1	10.4	"	2.65	90	1.78	0.05										
1657.4	10.3	"	2.65	86	1.04	0.05										
1667.7	10.3	"	2.61	92	1.06	0.03		—	wk-mod	—	mod-st	—	do		"	St. FeOx cap. along sh'd surf. Min. cont. to be well dissem.
1677.8	10.1	"	2.42	94	1.58	0.03		—	wk-mod	—	st	—	do		"	WK FeOx in general, but st along shears showing pronounced polished surfaces. Well dissem cc, and vnlts of py coated by cc within qtz-ser groundmass.
1687.8	10.0	"	2.57	84	1.73	0.03						tr. moly				
1697.0	9.2	"	2.66	94	1.03	0.03										
1705.7	8.7	"	2.62	61	0.98	0.04		—	wk-mod	—	mod	—	do		"	St. hem smeared slickensides at 1700' to end of int.
1715.9	10.2	"	2.63	90	0.65	0.03		—	wk-mod	—	wk-mod					
1725.9	10.0	"	2.55	91	0.65	0.03						tr. moly	do		Gr	Tr. moly within qtz. veinlet @ 1719.' St. sericite remains the dominant characteristic.
1735.5	9.6	"	2.62	94	0.67	0.03		—	mod	—	wk-mod	tr. moly	do		"	As above.

Final Depth 1998.0'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-108
Sheet No. 2 of
Date Completed 9/26/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
1744.0	8.5	NXWL	2.62	74	0.99	0.06		–	wk-mod	–	mod	tr. moly	Qtz-Ser		Gr	St. sh'd and seritized int.
1752.4	8.4	"	2.58	99	1.05	0.05			mod	–	mod	tr. moly	do		"	Py vein at ⊥'s to core @ 1746.0'. Mod cc w/occ. blue cov.
1759.7	7.3	"	2.59	81	0.80	0.01			wk-mod	wk	wk-mod	–	Seritized Kaolinized (chlor)		Gr/Mp	A mixed int of Gr and Mp. Cpy noted within the Mp which has a dense, chlor. ground-mass w/occ. qtz. phenos. Feldspars → clay min.
1771.3	11.6	"	2.59	24	0.89	0.01			wk	wk	wk-mod	–	Seritized Kaolinized		"	As above, but Mp is st. Kaolinized instead; w/wk cpy.
1775.6	4.3	"	2.53	77	1.03	0.01			wk	tr	mod	–	Qtz-Ser		"	Uniformly distr. cc. throughout with widely disbersed cpy grains ass w/cc. At 1780.6 noted one core fragm of Mp.
1785.7	10.1		2.58	90	0.78	0.01										
1794.0	8.3		2.54	87	0.80	0.01										
1803.8	9.8	"	2.64	90	1.12	0.01			wk	–	mod-st	–	do		"	As above; an interfingering sequence of Gr with Mp with the former predominating.
1814.6	10.8	"	2.55	85	1.21	0.01			tr	–	mod-st	–	do		Gr	Well disem cc within qtz-ser gran.
1824.6	10.0	"	2.56	91	0.83	0.01			tr	tr	mod	–	do + chlor'd.		Gr/Mp	As above to 1819.5, thence Mp to end of int. and is st. chlor'd, tr. of cpy.
1835.6	10.0	"	2.60	91	0.86	0.01			wk	wk	wk	–	Kaolinized Chloritized		Mp.	Chlor. monz. porph. Cpy, cc. mainly along fract. surf.
1844.2	8.6	"	2.57	100	0.65	0.01			wk	wk-mod	mod	–	do + seritized		Mp/Gr	Do:- to 1740', thence a 6" sh'd zone mostly FeOx'd, followed by Gr. Disem cpy → cc (in part.)
1853.0	8.8	"	2.54	90	0.78	0.01			tr	wk	wk-mod	–	Qtz-Ser		Gr	A mixed 2nd and prim. Cu int. Gen'ly evenly distr. for ent. 4 int's.
1864.5	11.5		2.58	89	0.65	0.01						–				
1874.3	9.8		2.58	96	1.12	0.01			wk	wk-mod	mod-st	tr. moly	do		"	
1883.5	9.2		2.69	89	1.43	0.01										
1891.8	8.3	"	2.66	100	1.25	0.01			wk	wk-mod	mod-st	–	do		"	Do.
1899.8	7.0		2.66	76	0.93	0.01										

Final Depth 1998.0'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-108
Sheet No. 3 of
Date Completed 9/26/68
Logged By CHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1908.8	9.0	WXHL	2.60	87	2.48	0.01		–	tr-wk	wk	mod-st	tr moly	Qtz-	Ser	GP	St. bleached aspect of rock continues w/
1919.2	11.0	"	2.57	95	1.80	0.01										mod-st. dissem cc.
1929.5	10.3	"	2.61	95	1.71	0.01										
1938.9	9.4	"	2.75	98	1.63	0.01			wk	tr-wk	mod-st		do		"	Again as above with persistent mineral-
1948.4	9.5		2.63	96	1.29	Tr						tr moly				ization.
1957.7	9.3		2.60	95	1.15	0.01										
1967.7	10.0	"	2.55	77	1.10	0.01			tr	wk	mod		do		"	Do - to 1967.7, thence min. becomes quite
1977.7	10.0		2.59	99	0.55	0.01			wk-mod		wk-mod					pyritic w/scat. Cu sulfs.
1986.8	10.1		2.58	86	0.58	0.01										
1993.2	6.4	"	2.65	91	0.75	0.01			wk-mod	?	wk-mod		Sericitized		Mp	A highly sericitized Mp, occ quartzose
																and conspic biotite x'tals (secondary?)
1998.0	4.8	"	2.50	31	0.53	0.01			wk	tr	wk		do		"	As above.
	E.O.H															

Final Depth 888.4'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

J.M.C. DEC 26 1968

Property SACATON

HOLE NO. S-107
Sheet No. 1 OF 5
Date Completed 8-9-68
Logged By 8-21 To 9-4-68 NPW & RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	[redacted]	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
							Mo									CORE SPLIT PRIOR TO LOGGING
120	120	5 1/8" Ro BIT													ALLUVIUM & CGL	
																BED ROCK PLACED AT c. 120'.
128	8	5 1/8" Ro BIT													BR	
130																BEGINNING OF DD CORE.
138.1	8.1	NXWL		94	0.03	0.02		No Cu min obs					qtz	ser	MP Bx	Rk is lt gry, mg, & st'ly alt'ed. Bx'ion
148.5	10.4	"		97	0.11	0.02			wk-mod		wk-mod	mod ind lm	"	"		commonly extreme. Flooding by hm gen'ly
158.4	9.9	"		94	0.10	0.02			wk-mod		wk-mod	" "	"	"		mod-st. Diss & frac deposits of ind lm
168.2	9.8	"		92	0.13	0.02			mod		mod	" "	"	"		throughout. Streaking and struct elements
																gen'ly mod-high angle. Min as noted.
178.5	10.3	"		100	0.25	0.02	0.031		mod		mod	ind lm MoS2	"	"	MP-GR	A bx composed of both rk types (?). Alter-
186.9	8.4	"		86	0.63	0.02	0.030		mod		mod	" "	"	"	(?) Bx	nate possibility the qtz replacement in
197.1	10.2	"		97	0.69	0.02	0.015		mod		mod	" "	"	"		the MP -- creating a pseudo-granitoid
207.2	10.1	"		97	0.17	0.10		Tr $CuSiO_4$	wk		tr-wk	ind lm	"	"		Texture. Intercepts are alternately
																ox'ed, displaying wk-st ind lm & L.lm,
																or sul bearing. At least the upper sul
																bearing intervals contain blk, milled py,
																dk qtz & partially ox'ed cc -- creating
																a visual impression of high-grade ore.
																High-angle to vert vlts, strs, & struct elements
																Min as noted.
217.0	9.8	"		93	0.47	0.38		Tr-wk $CuSiO_4$				Tr Cu wad	"	"	MP Bx	MP gen'ly similar to above - locally qtzose
227.4	10.4	"		92	0.39	0.31		Tr-wk $CuSiO_4$				Tr Cu wad	"	"		- nearly granitoid. Appears to be completely
236.4	9.0	"		94	0.50	0.42		Tr $CuSiO_4$				wk Cu wad	"	"		ox'ed, w/ diss & frac deposits of ind lm.
																Mod'ly Fe ox stained - sat'ed jarosite &
																thin films $CuSiO_4$ (?). Min as noted

Final Depth 888.4'
Collar Elevation
Coordinates
Inclination −90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-107
Sheet No. 2 of 5
Date Completed 9/4/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Mo Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
248.4	10.0	NXWL	2.55	92	0.36	0.28		tr	–	–	–	wk-mod indig Lm	Kaolinized		Mixed	St. Bx'd hem'd, wk. jarosite. Tr. of Cu Ox. Rock
258.5	12.1	"	2.63	93	0.25	0.17		tr	–	–	–	do	Sericitized		Gr, Mp	appears as a mixed assemblage of Gr and
268.4	9.9	"	2.55	96	0.10	0.11		–	–	–	–	–	↓		Bx	Mp.
278.6	10.2	"	2.63	86	0.19	0.10		–	–	–	–	wk-mod indig Lm	do		"	As above. Mod. jarosite from 286-289'.
289.3	10.7	"	2.52	89	0.39	0.18		tr-wk	–	–	–	do	↓		Porph	Core becomes Porph (Mp?) at about 283' to
298.5	9.2	"	2.53	88	0.38	0.19		tr-wk	–	–	–	mod indig Lm	Kaolinized		(Mp?) Bx	298.5' and remains brecciated w/st. hem.
308.8	10.3	"	2.57	97	0.04	0.02		–	–	–	–	st Lm and indig Lm	Qtz-Ser. Kaolinized.		Porph (Mp?) Gr. Bx.	Core remains strongly brecciated. Pronounced Lim throughout int. Rock types appear essentially mixed as a quartzose porph (Mp?) and/or granite.
									SULPHIDES							
318.8	10.0	"	2.69	100	1.02	0.04		–	wk-mod	–	st	–	do		do	Similar to above as an interfingering or mixed granite/porph. Sulphides begin @ 311'. Core assumes granitoid characteristics beyond 318.8'.
329.2	10.4	"	2.69	96	1.14	0.04		–	wk-mod	–	st	–	do		Gr	Core now assumes typical blue-grey aspect
339.4	10.2	"	2.64	94	0.76	0.03		–	wk-mod	–	st (to 334.2)	mod-st indig Lm	↓		↓	of dissem cc, within a somewhat porph. granite. St. cc, py vein @ 330'. At 334.2 to 339.4' abrupt contact w/leached, oxidized brecciated granite.
349.3	9.9	"	2.81	100	0.63	0.04		–	wk-mod	–	mod	wk indig Lm	do		"	Similarly leached to 341.0', thence dissem.
359.7	10.4	"	2.44	94	0.42	0.02		–	wk-mod	tr	wk-mod	tr moly	Kaolinized (in part)		Porph	cc within granitoid ground mass. From 355'-
369.9	10.2	"	2.73	99	0.40	0.02		–	wk-mod	wk	wk	tr cov			355-357'	357'. a fine gr'd "bleached" porph (feldspars → clay min) wkly min'd and silicified.
380.4	10.5	"	2.57	89	0.53	0.04		–	wk	wk	tr-wk	wk cov.	Qtz-Ser		Gr	Conspicuous covellite and chalcopyrite. Similar
390.6	10.2	"	2.64	95	0.54	0.02		–	wk	wk	tr	tr moly (wk-mod cov)	↓		↓	Kaolinized porph noted as above from 374-376'.
399.8	9.2	"	2.62	98	0.18	Tr		–	wk-mod	–	–	tr-wk cov	do		do +	Granite to 395', thence f. gr'd qtzose
408.8	9.0	"	2.69	98	0.09	Tr		–	wk-mod	–	–	tr cov	↓		Micro-	micro-granite, pyritic. Beyond 413.8'
418.8	10.0	"	2.78	95	0.18	0.02		–	wk-mod	–	tr	tr-wk cov	↓		Granite	oxidized segments alt. w/sulphides.
428.1	10.3	"	2.51	95	0.36	0.04			tr-wk	–	tr-wk	–	do		Micro-Granite	Oxidized (FeOx) segments bx'd, alternate w/sul. Sulphides.

Final Depth 888.4'
Collar Elevation
Coordinates
Inclination – 90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-107
Sheet No. 3 of 5
Date Completed 9/4/63
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Mo Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
437.8	8.7	NxWL	2.48	93	0.78	0.01			wk	–	wk-mod	tr. cov	Qtz	Ser	Gr Bx	St. brec'd, ser'd. wk-mod cc. w/thin
448.6	10.8	"	2.56	90	0.80	0.02			wk	–	wk-mod	tr. cov	↓		↓	films of cov. tapering off to wk by 452.7'
																More uniform distr. Remainder of int.
458.5	9.9	"	2.58	96	0.64	0.01			wk	tr	wk	tr-wk cov	do		Gr. Mp.	As above with min as noted. At 465.5'
468.2	9.7	"	2.63	89	0.52	0.08			tr-wk	tr-wk	tr	wk cov	(Kaolinized		Bx	abrupt cont. w/Mp to 471.2' w/mod
478.6	10.4	"	2.54	94	0.38	0.01			wk-mod	tr-wk	–	tr indig	in part)			FeOx but tr. of sulph. Remainder
																granite w/short sections of porph.
488.6	10.0	"	2.62	82	0.42	0.02			wk	tr-wk	–	tr cov.	do		do	Granitoid fragments to 485', followed
497.3	8.7	"	2.60	92	0.60	0.02			wk	tr-wk	–	wk cov.	↓		↓	by St. brec'd, hem'd Mp to 492'. Gran.
506.0	8.7	"	2.50	99	0.59	0.02			wk-mod	tr	tr?	tr-wk cov.	↓		↓	to end of int. Variable cov. w/tr cc?
516.1	10.1	"	2.57	93	0.56	0.02			wk	wk	–	wk cov	Qtz	Ser	"	St. brec'd granite w/localized st.
525.5	9.4	"	2.61	97	0.22	0.03			wk-mod	tr	–	tr cov	↓		↓ +	Shearing and granulation. Widely silicif
525.3	9.8	"	2.61	98	0.42	0.01			wk-mod	tr-wk	–	tr cov	↓		Mp.	grav toned end of int. w/Mp.
545.5	10.2	"	2.56	90	0.40	0.01			wk	tr	–	tr-wk cov	do		Gr	Coarse grained st. ser'd granite w/scat'd
555.2	9.7	"	2.60	99	0.32	0.01			wk	tr	–	tr	↓		↓	cov. cpy throughout. At 560.7' int. becomes
563.9	8.7	"	2.58	93	0.31	0.02			tr-wk	tr	–	tr	↓		↓	oxidized, leached.
573.5	9.6	"	2.60	98	0.03	0.02			–	–	–	–	–		"	St. hem'd, brecc'd, competent rock. Devoid
583.3	9.8	"	2.57	78	0.04	0.02			–	–	–	–	–		↓	of Cu min.
592.5	9.2	"	2.55	75	0.81	0.04			–	–	mod	wk-mod cov	Qtz	Ser	Gr	As above to 588.6', thence disem cc,
																cov, vein @ 590'.
600.0	7.5	"	2.56	99	0.43	0.02			tr	tr	wk	tr-wk cov	do		"	Do.
606.9	6.9	"	2.55	94	0.38	0.01			tr	tr-wk	–	wk-mod indig Lim	Kaolinized		Mp Bx	St sh'd, fault breccia (±6") @ 602'. Mod
612.3	5.4	"	–	–	No	Recovery									FAULT	alt. Mp. Pronounced vert. struct. St. FeOx,
622.3	10.0	"	2.49	100+	0.34	0.01			wk	wk	–	do				decreasing abruptly @ 633.8'.
631.8	9.5	"	2.55	89	0.53	0.01			tr	wk-mod	–	wk. indig Lim				
639.0	7.2	"	2.60	100	0.39	0.02			tr-wk	wk	–	–				
648.2	9.2	"	2.50	98	0.72	0.01			wk-mod	wk-mod	–	–	do		"	Mod alt Mp w/scat'd but conspic black
657.8	9.6	"	2.56	97	0.50	0.01			tr-wk	wk	wk?	–	+Sericitized		"	biotite (x'tals). Int becomes incr. sh'd, ser'd
																beyond 653.0'. Finely scat'd cpy throughout
																core.

Final Depth 888.4'
Collar Elevation
Coordinates
Inclination — 90°

ASARCO

GEOLOGIC — ASSAY LOG

Property SACATON

HOLE NO. S-107
Sheet No. 4 of 5
Date Completed 9/4/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Mo Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration	Rock Type	Remarks CORE SPLIT PRIOR TO LOG
665.8	8.0	NXWL	2.64	91	0.75	0.02	0.298		wk	wk	wk-mod?	mod. moly	Sericitized	Mp. Bx.	Pronounced Mo along steeply dipping fract.
675.2	9.4	"	2.53	100	0.47	0.02			tr-wk	wk	—	—	chlor'd, ser'd		@ 660.8'. St. ser'd w/cc? along steeply
685.6	10.4	"	2.49	94	0.43	0.01			tr-wk	wk	—	—	kaolin'd.		angled struct. elements to 686'. At 687.6'
690.4	4.8	"	2.56	96	0.78	0.01			tr	tr	?	—	do		once again st. ser'd, somewhat chlor'd. mass,
695.2	4.8	"	—	—	0.65	0.02	(Assumed)			No	Recovery				w/finely disem. cc?
705.1	9.9	"	2.50	98	0.52	0.03	0.012		tr	wk	—	tr moly	Sericitized	Mp Bx	Similarly to above w/local but strong
715.5	10.4	"	2.57	96	0.42	0.02	0.016		tr	wk	—	tr moly	Kaolinized	+ Gr.	sericite. Mo along fract. @ 705.8'. Short
															int. of coarse gr'd gran. @ 710.9' to 713'
															displ. mod. analo. cont. w/Mp.
724.3	8.8	"	2.55	96	0.45	0.02	0.010		tr-wk	wk	—	tr moly	Kaolinized	Mp	Mod. alt. Mp w/scat'd cpy.
732.7	8.4	"	2.63	67	0.70	0.02			tr-wk	wk-mod	—	—			
743.4	10.7	"	2.56	100	0.40	0.02			tr-wk	wk	—	—	Kaolin'd +	Mp, Gr.	As above to 736.7' thence steeply
													Qtz-Ser		angled (70°) contact w/granite w/occ.
															brecciated portions.
752.1	8.7	"	2.53	91	0.57	0.01			tr	wk	—	—	Qtz-Ser	Granite	Do - to 748.7', thence decr. in
763.2	11.1	"	2.60	89	0.55	0.01	0.092		wk	wk	—	wk moly		Micro-	grainsize w/incr. in sericite. Fine gr'd,
770.1	6.9	"	2.58	88	0.58	0.02			tr	wk-mod	—	—		Granite,	qtz-ose. At 760.1' Mp. ser'd, wkly kaolin'd
														Mp	
780.4	10.3	"	2.54	92	0.46	0.02			tr	wk	—	—	Kaolinized	Mp	
787.2	6.8	"	2.57	88	0.57	0.02			tr-wk	wk-mod	—	—	Sericitized		Monz. porph w/scat'd fresh bi. Noted 1/6"
797.3	10.1	"	2.59	94	0.40	0.02			tr	wk	—	—	(in part)		of granite @ 775.2'. Occ. some indig. low
806.8	9.5	"	2.62	90	0.56	0.02			tr-wk	wk-mod	—	—			coating fract. Gen'ly mod. alt. Cpy as disem
816.9	10.1	"	2.50	99	0.33	0.02			tr	wk	—	—			and along fract.
826.6	9.7	"	2.56	94	0.45	0.01			tr	tr-wk	—	—	do	Mp, Gr.	Mod-st. alt. Local st. sericite w/steeply
837.0	10.4	"	2.48	93	0.30	0.01			tr-wk	tr-wk					dipping FeOx'd fract. w/tr. py. wkly
															chlor'd. esp. along shears. wkly silic'd.
															From 833.6 - 834.2' glen'd, ser'd and thence
															gran. to end of int.
848.6	11.6	"	2.60	97	0.37	Tr			wk	wk	—	tr moly	Qtz-Ser	Gr, Mp	Granite to 847', thence sequence be-
															comes porphyritic again.

Final Depth 888.4'
Collar Elevation
Coordinates
Inclination – 90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-107
Sheet No. 5 of 5
Date Completed 9/4/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Mo Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
958.7	10.1	NXWL	2.46	99	0.29	0.01			+r	+r	—	—	Sericitized		Mp	Mod-lt. alt. monz. porph. and very
868.0	9.3	"	2.46	89	0.39	Tr	0.050		+r wk	+r wk	—	+r moly	Kaolinized			similar to above porph. int's. Variably
878.2	10.2	"	2.58	95	0.24	0.01	0.040			+r	—	+r moly				chlor'd especially where rock has been sh'd.
888.4	10.2	"	2.50	96	0.20	0.01	0.004			+r	—	+r moly				Wkly silicified in places. Occ. smears of Mo
																along fract. Short int. of granite from
	E.O.H.															877.5' – 879.0'.

Final Depth 867.8'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

J.H.C.

DEC 17 1968

HOLE NO. S-106
Sheet No. 1 OF 4
Date Completed 8-3 To 2-20
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOGGING
214.0	214.0	4¾" Ro	BIT												ALLUVIUM & CGL	
																BEDROCK PLACED AT 214 FT.
215.2	1.2	4¾" Ro	BIT												BR	BEGINNING OF DD CORE
225.7	10.5	NXWL	2.50	95	0.30	0.23		No	Cu min obs			ind lm	qtz	ser	MP Bx	Rk basically gry, mg, and mod'ly to st'ly alt'ed. Gen'ly st bx'ion & hm flooding. Set'ed pats ind lm & lm. Min as noted.
236.2	10.5	"	2.51	100	0.19	0.13		"	"	" "		" "	"	"		
246.7	10.5	"	2.62	95	0.06	0.04		"	"	" "		" "	"	"		
257.2	10.5	"	2.55	97	0.54	0.48		wk-mod $CuSO_4$				" "	"	"		← Set'ed jarosite on fracs - v. st hm & ind lm.
266.0	8.8	"	2.56	100	0.31	0.26		wk-mod $CuSO_4$				" "	"	"		" " " " "
276.8	10.8	"	2.57	90	0.46	0.06		Cu wad?	wk	tr(?)	wk	" "	"	"		" " " " "
287.0	10.2	"	2.61	94	1.28	0.06			med	tr(?)	mod-st	" "	"	"		← Suls fg, w/much of py st'ly tarnished. The cc is difficult to est in matrix of st hm. A high percentage of the suls prob'ly cov and cpy w/films of cov.
296.8	9.8	"	2.66	99	1.35	0.07			mod	tr-wk	mod-st	ind lm Cov(?)	"	"		
307.2	10.4	"	2.65	82	0.71	0.02			mod-st	tr-wk	mod-st	" "	"	"		
316.2	9.0	"	2.70	96	0.70	0.01			mod-st	tr-wk	mod	" "	"	"		
327.7	11.5	"	2.65	99	0.63	0.01			mod-st	wk	mod	" "	"	"		← Highly crushed & granulated.
334.7	7.0	"	2.64	87	0.58	0.01			mod	wk-mod	mod	" "	"	"		
340.8	6.1	"	2.57	95	0.81	0.01			mod-st	wk-mod	wk	" "	"	"		
348.3	7.5	"	2.58	98	0.74	0.01			mod	mod	tr	" "	"	"		
358.0	9.7	"	2.58	95	0.57	0.01			mod	mod	tr(?)	" "	"	"		
368.2	10.2	"	2.56	93	0.79	0.01			mod	mod	(?)	" "	"	"		
378.4	10.2	"	2.61	100	1.37	0.02			mod	mod-st		" "	"	"		
388.6	10.2	"	2.70	98	0.88	0.03			mod	mod-st		" "	"	"		
396.8	8.2	"	2.56	95	0.79	0.02			mod	mod-st		" "	"	"		
406.8	10.0	"	2.63	94	0.86	0.01			mod	mod		" "	"	"	SILIF MP	As above to c. 402 ft. Below this pt rk is gry, more sil or silif, and is texturally close to a granite in many respects. St bx'ion, granulation, & low-angle slip & qz zns common. Wk Fe ox along fracs. Suls diss and on frac surfaces. Min as noted.
418.8	12.0	"	2.57	88	0.52	0.01			mod	mod			"	"	Bx(?) or	
428.2	9.4	"	2.57	80	0.56	0.01			st	wk-mod			"	"	GR Bx(?)	
438.6	10.4	"	2.62	96	0.71	0.01			mod	mod-st		mod-st ind lm	"	"	MP Bx	Rk similar to upper portions of hole. Porph'ic, w/mod-st hm flooding. Suls in v'lts, diss, & on frac faces. Min as noted.
447.4	8.8	"	2.60	93	0.44	Tr.			wk-mod	wk-mod		" "	"	"		
457.6	10.2	"	2.58	100	0.51	0.01			mod	st		" "	"	"		

Final Depth 867.8'
Collar Elevation
Coordinates
Inclination - 90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-106
Sheet No. 2 of 4
Date Completed 8/20/68
Logged By RHL, NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
467.9	10.3	NXWL	2.61	99	0.64	0.01			wk-mod	wk-mod		mod-st ind lm	qtz-	ser	Mp Bx.	Rk as described above.
478.2	10.3	"	2.57	99	0.45	0.01			mod	mod		" "	"	"		
488.0	9.8	"	2.64	94	0.48	Tr			wk-mod	wk-mod		—	do		"	As above to 480.3', thence granite to end
498.0	10.0	"	2.60	95	0.52	Tr			wk	wk-mod		—	↓		Gr.	of run. Mod-st hem sloading at matrix.
509.7	11.7	"	2.58	94	0.37	Tr			wk	wk		—	↓		Bx.	Cpy as dissem or vnlts. Wk dissem py.
519.9	10.2	"	2.61	92	0.35	Tr			wk	wk		mod ind lm	do		Gr. Bx.	St. Bx'd, more so than above. Otherwise
527.8	7.9	"	2.57	94	0.54	0.01			wk	wk-mod		mod-st indicator	↓		"	similar.
538.7	10.9	"	2.60	96	0.48	Tr			wk	wk		—	do		Mp Gr	Granite to 530.3±, thence extr. Bx'd, gran'd
													+ chlor.		Bx	cont. porph (Mp?) and granite fragments.
															FAULT-	From 535.5 - 538.7' st. sh'd, chlor'd w/fault
																breccia.
548.9	10.2	"	2.59	95	0.67	0.01			tr	wk-mod		wk-mod ind lm	Sericitized		Mp	Mod. alt. monz. porph. Variably sh'd throughout, st. FeOx along fract. Cpy as dissem and
558.5	9.6	"	2.57	98	0.87	0.03			tr-wk	mod		↓	Kaolinized		↓	discreet veinlets. Wkly silicif'd.
568.7	10.2	"	2.58	96	0.43	0.02			wk	wk		+ sbec.	↓			
580.5	11.8	"	2.61	92	0.42	0.02			tr-wk	wk		—	Qtz-	Kaolin	"	Similar to above except that groundmass
590.5	10.0	"	2.56	100	0.49	0.02			tr-wk	wk-mod		—	chlor'd.		↓	has become chlor'd (pale green w/loc.
																velvet appearance).
600.8	10.3	"	2.62	89	0.91	0.04			mod	mod		—	Qtz-	Kaolin	"	Silicified monzonite porphyry. Distinct py-cpy
612.2	11.4	"	2.60	98	0.50	0.02			wk-mod	wk-mod		—	chlor'd.		↓	veins. Otherwise as above.
622.6	10.4	"	2.54	96	0.50	0.02			wk-mod	wk-mod		—	↓		↓	
631.4	8.8	"	2.58	93	1.28	0.02			wk-mod	mod-SE		—	Qtz-	Ser	Mp	Incr. in sericite. Well min'd by cpy.
													chlor'd			Fault gouge, breccia @ 634.4'.
642.0	10.6	"	2.61	93	0.41	0.02			wk-mod	wk		—	do		"	Variably sh'd, chlor'd. Last 3' appears as
																porphyry-soaked sericite.
653.0	11.0	"	2.62	100	0.39	0.02			wk	wk		—	Qtz-	Ser	Gr	Appears only wkly brecc'd. Wk-mod silicif.
663.4	10.4	"	2.57	97	0.42	0.02			wk	wk			Kaolinized		"	
672.2	8.8	"	2.54	100	0.63	0.02			wk	wk-mod		—	Qtz-	Ser	"	Do.
683.2	11.0	"	2.56	88	0.28	0.02			wk	tr-wk		—	Kaolinized		Mp.	Wkly silicif'd Mp.

Final Depth 867.8'
Collar Elevation
Coordinates
Inclination −90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-106
Sheet No. 3 of 4
Date Completed 8/20/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Mo Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration	Rock Type	Remarks CORE SPLIT PRIOR TO LOG.
693.8	10.6	NXWL	2.59	94	0.33	0.02			wk	wk	–		Qtz-Ser	Gr	Coarse g'd granite constitutes rock type.
703.0	9.2	"	2.55	92	0.46	0.01			wk-mod	wk-mod	–		↓	↓	Wkly Bx'd, but at 705.2' int. becomes
714.1	11.1	"	2.56	98	0.57	0.01			wk	wk-mod	–				st. fract. w/sericite.
723.8	9.7	"	2.59	61	0.59	Tr			wk	wk	tr-moly		do	"	St. sericite, brecciation to 732.8'. Gen'ly wkly
732.9	9.1	"	2.60	89	0.32	Tr			tr-wk	tr-wk	–		↓	↓	disseml cpy, but ¼" rein noted @ 734'.
742.1	9.2	"	2.59	78	0.56	Tr			tr-wk	wk-mod	–				
751.8	9.7	"	2.58	77	0.33	Tr			wk-mod	wk	–				
755.4	3.6	"	–	80	0.52	Tr			wk	wk	tr-moly		do	"	Strongly pyritized from 756-757'. Otherwise
755.8	0.4	"	–	–	No	Recovery									as above.
756.0	0.2	"	–	–	No	Recovery									
765.7	9.7	"	2.61	84	0.55	Tr			wk-mod	wk-mod	–		do	"	
775.9	10.2	"	2.60	61	0.38	Tr			wk	wk	–		do (Kaolinized in part)	Mixed Gr, Mp	Granite to 769' ±, thence int. becomes mixed w/porph. (Mz). Granite predominating
786.5	10.6	"	2.52	74	0.29	0.01			wk-mod	tr-wk	–		Kaolinized Sericitized.	"	Similar to above, but major rock type is monzonite porph. wk-mod alt.
796.0	9.5	"	2.52	93	0.36	0.01			wk	tr-wk	–		do	" Bx	Do, but main rock type is granite. Gen'ly st. sh'd w/st. sericite.
803.5	7.5	"	2.60	94	0.65	0.02			mod-st	mod?	–		Sericite, Gouge.	FAULT BRECCIA, GOUGE	St. fract, brecciated w/st. sericite. From 801.3-803.5' mainly fault breccia.
804.8	1.3	"	–	–	No	Recovery									
813.1	8.3	"	2.59	82	0.79	0.02			wk-mod	wk-mod	–		Gouge Qtz-Ser	do, Granite	DK. green fault gouge w/scat'd cpy. to 806.8', thence ± 1' of altered fragments followed by Granite.
823.1	10.0	"	2.60	25	0.37	0.01			wk	wk	–		Qtz-Ser	Gr	C. g'd granite w/scat'd silicif. At 829.2'
833.7	10.6	"	2.58	76	0.36	0.01	0.026		wk	wk	tr-moly		↓	↓	pebble-like fragments of diabase? w/disseml cpy, cpy
844.2	10.5	"	2.49	66	0.56	0.03			wk-mod	wk-mod	–		do + chlor'd	Gr, Mp	Granite to 834', thence Mp to 838.5'. Min. as noted.

Final Depth 867.8'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATAN

HOLE NO. S-106
Sheet No. 4 of 4
Date Completed 8/20/68
Logged By BHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG.
854.7	10.5	NWL	2.58	83	0.31	0.03			wk	wk	—	—	Qtz-	Ser	Gr	Coarse grd granite: wk-mod silicif.
862.2	7.5	"	2.58	76	0.34	0.01			wk	wk	—	—	↓		↓	Scat'd wk. cpy.
867.8	5.6	"	—	—	No	Recovery										
	E.O.H.															

Final Depth 2024.7
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SPECTOR

H.C.
DEC 17 1968

HOLE NO. S-105
Sheet No. 1 of 3
Date Completed 9/13/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Mo Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
0-1510	1510	4 3/4" RB														Alluvium and conglomerate.
																BEDROCK REPORTED AT 1513'.
1513.0	–	NXWL						START OF DD CORE								
1529.0	11.0	"	2.45	91	0.14	0.06		–	–	–	–	wk. indg Lm	Qtz-Ser (Kaolinized porph)		FAULT ZONE BRECCIA	First 3-4' of int. st. sug. of prob. (Dacite?). Thence st. bx'd, gran'd granitoid fragments.
1539.4	10.4	"	2.55	88	0.11	0.04		–	–	–	–	–	do		do	Extreme fragmentation w/extreme sericite;
1549.8	10.4	"	2.64	61	0.13	0.05		–	–	–	–	–	+ Kaolinite			Variable FeOx staining. Mod. jarosite. Ind.
1557.3	7.5	"	2.68	100	0.19	0.07		–	–	–	–	–				grains gen'ly qtzose, rounded to sub-
1566.8	9.5	"	2.51	92	0.10	0.06		–	–	–	–	–				angular. No Cu min. recognised.
1568.5	1.7	"	–	–	No	Recovery										
1579.4	10.9	"	2.55	88	0.36	0.35		wk	–	–	–	wk. indg Lm + L/m	Qtz-Ser		Micro-Granite	Int. now is a competent rock fine to med. gr'd with a ser'd groundmass containing a high prop. of qtz. May locally be quite siliceous.
									SULPHIDES							
1589.7	10.3	"	2.59	95	0.66	0.13		tr	–	–	wk-mod	mod. indg L/m + L/m	do		"	Cc @ 1587.5' w/CuOx. The cc appears as a "coating" and the limonite.
1600.0	10.3	"	2.65	96	3.05	0.13	0.017	–	wk	–	st	wk-mod indg L/m	do		Micro-Granite + Gr.	Very well min'd by cc. which is locally
1610.2	10.2	"	2.65	80	1.36	0.05		–	tr	–	mod-st	tr indg Lm				conc as "pods". Grainsize variable but
1620.5	10.3	"	2.61	86	1.75	0.06	0.016	–	–	–	mod-st	do				becomes coarse gr'd towards 1610.2'. Thence
1630.5	10.0	"	2.60	92	1.40	0.07		–	–	–	mod-st	do				variably grained, st. ser'd. Tr. FeOx only.
1640.0	9.5	"	2.58	100	1.73	0.10		tr	–	–	st	do				
1650.0	10.0	"	2.61	87	0.32	0.03		–	–	–	wk	–	do		Micro-Granite	st. ser'd constitutes the dominant charac-
1659.8	9.8	"	2.67	93	2.54	0.13		–	–	–	st	–				teristic of the core. Gen'ly f. gr'd, qtzose
1670.3	10.4	"	2.63	78	1.16	0.06		–	–	–	mod	–				groundmass, but w/local silicif'd portions.
1680.7	10.5	"	2.61	96	1.85	0.16		–	–	–	mod-st	tr. mly				Variably bx'd throughout w/wk. FeOx.
1691.1	10.4	"	2.71	96	1.98	0.07		–	–	–	mod-st	–				
1701.8	10.7	"	2.51	93	1.74	0.07	0.018	–	–	–	mod-st	tr. mly	do		"	As above.
1711.7	9.9	"	2.55	88	1.75	0.08		–	–	–	mod-st	–				

Final Depth 2024.7
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SACHTON

HOLE NO. S-105
Sheet No. 2 of 3
Date Completed 9/13/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Mo Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
1721.9	10.2	NXWL	2.65	98	1.33	0.06	0.031		tr	—	mod-st	mod indigum	Qtz-	Ser	Micro-	Scat'd FeOx throughout varying in
1732.2	10.3	"	2.57	92	0.74	0.03	0.028		tr	—	wk-mod	tr. moly			Granite	intensity. Grainsize appears to become
1741.4	9.2	"	2.53	98	1.35	0.05	0.020		—	—	mod	—	↓		→ Gr.	progressively coarser toward 1741.4'. Steeply
																angled hem'd structures.
1751.7	10.3	"	2.54	92	1.68	0.04	0.025		tr-wk	—	mod-st	—	do		Gr	Coarse gr'd granite w/disseminated cc but @
															Fault	1748.6, there is 6" section of rounded to
															breccia	subangular qtzose grains and fragments,
															@1748.6	dipping at mod. angle.
1761.8	10.1	"	2.72	99	1.85	0.04	0.027		tr-wk	—	mod-st	—	do		Gr	Similar short section to above @ 1751.7'.
															↓	Num. sh'd short segments of mylonite within
																int. Wkly silicif. as qtz. veinlets.
1772.2	10.4	"	2.42	87	1.64	0.04	0.020						do		Gr. Bx.	Int. becomes incr. sh'd w/kt. FeOx, Bx'd
													Kaolinized.		Mp. Bx.	gran'd. At 1767.2' int. becomes porph
																remaining sh'd, hem'd to end of int. Bi → ser.
1781.8	9.6	"	2.48	89	0.50	0.03			tr	—	tr-wk	—	Sericitized		Mp	Pronounced FeOx along fract. Wkly
1790.6	8.8	"	2.52	100	1.04	0.07			tr	—	mod	—	Kaolinized		↓	silicif'd.
1800.0	9.4	"	2.51	89	0.93	0.05			wk	—	mod	wk cov	Qtz-	Ser	Mp/Gr	Incr in hbearing w/ass. hem; becoming
																gran @ 1793' (coarse gr'd).
1808.8	8.8	"	2.54	78	0.83	0.04			wk	—	mod	—	do		Gr	St. ser'd granite w/wk-mod FeOx
1818.7	9.9	"	2.55	94	1.61	0.02			tr-wk	—	mod-st	—				along fract.
1829.0	10.3	"	2.68	34	1.39	0.02			wk		mod	—	↓		↓	
1839.2	10.2	"	2.46	78	1.48	0.03			tr	—	mod	—	do		Gr, Bx	St. ser'd, Bx'd granite.
1850.8	11.6	"	2.66	85	2.18	0.02			tr	—	mod-st		↓		↓	
1860.9	10.1	"	2.54	97	1.78	0.04			tr	—	mod	—	Kaolinized		Mp	St sh'd @ 1860' to 1860.3' thence
1871.4	10.5	"	2.52	91	0.98	0.03			tr	—	wk-mod	—				porph w/conspic. black bi. cc tends
1881.6	10.2	"	2.54	95	0.89	0.03			tr	—	wk-mod	—				to blend in w/grey groundmass and is
1892.1	10.5	"	2.50	91	0.60	0.02			tr	—	wk-mod	—				hard to detect. Mod FeOx throughout.
1902.6	10.5	"	2.57	86	1.45	0.04			—	—	mod	—	↓		↓	Variable brecciation.
1912.9	10.3	"	2.58	92	1.16	0.03			—	—	mod	—	Qtz-	Ser	Mp/Gr	As above to 1903.8, thence gran. to end
																of int.
1922.8	9.9	"	2.52	82	1.21	0.02			tr	—	mod	—	do		Gr/Mp	Gran. to 1915.0, Thence Mp. Bx., st. sericite.
													+ Kaolinized		Bx.	

Final Depth 2024.7'
Collar Elevation
Coordinates
Inclination – 90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SAMPSON

HOLE NO. S-105
Sheet No. 3 of 3
Date Completed 9/13/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks (CORE SPLIT PRIOR TO LOG)
1930.9	8.1	NXWL	2.57	75	1.15	0.02			wk	tr	wk-mod	tr cov	Qtz	Ser	Mixed.	Essentially a mixed monzonite-granite
													Kaolin		Mp, Gr	int, the latter predominating.
1937.2	6.3	"	2.57	70	1.00	0.02			tr	tr	wk	–	Kaolinized		Mp	A dark grey medium gr'd porph; mod alt. w/dissem bi.
1937.7	0.5	"	–	–	1.16	0.02	(assumed)		No	Recovery						
1947.3	9.6	"	2.56	66	1.33	0.03			tr wk	–	wk-mod	–	Kaolinized Sericitized		Mp/Gr	As above, but w/incr sh'd portions throughout. At 1941.6' becomes granitoid, st. fractured, sericitized.
1954.5	7.2	"	2.65	68	2.20	0.03			–	–	mod-st	–	Qtz	Ser	Gr	St. gran'd to 1950.5' thence st. fract. to end of int. (well min'd.
1964.4	9.9	"	2.36	83	0.17	0.03			–	–	–	–	Fault gouge		BASE-MENT FAULT	Mixed Gr, Porp to 1955.6', thence massive reddish-brown gouge cont'g sh'd, crushed rock fragments to ± 1960'. A highly porth. (feldspars → clay min) granitoid rock.
													Kaolinized		Meta-Granite	to end of int.
1973.5	9.1	"	2.54	84	0.04	0.03			tr	–	–	–	Kaolinized		do	Porphyritic metagranite, st. sh'd and gran'd
1981.3	7.8	"	2.46	78	0.02	Tr			–	–	–	–	Chloritized		↓	latter int. Bi → chl.
1991.3	10.0	"	2.41	88	0.03	0.01			–	–	–	–	Chlor'd		And,	At 1981.5', dense, f.gr'd light greyish-brown
2001.6	10.3	"	2.45	92	0.02	0.01			–	–	–	–	Kaolin'd		Meta-Granite	vole. rock w/bi → chl. extending to 1995'; thence metagranite to 2000'. Last 1.6' occupied by And. w/scat'd flesh. bi.
2010.3	8.7	"	2.36	69	0.02	0.01			–	–	–	–	do		do	Interfingering segments of andesite (chlor'd and w/conspic feldspar laths → clay within groundmass) and metagranite. At 2014' to end of int. metagran.
2024.7	13.1	"	2.57	94	0.02	0.01			–	–	–	–				
	E.O.H.															

Final Depth 2100.1'
Collar Elevation
Coordinates
Inclination VERT

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-104
Sheet No. 1 of 4
Date Completed 7-11 to 7-25-[illegible] 8-2 to 8-27-[illegible]
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1355	1355	5 1/8" & 4 3/4" Ro Bit													Alluvium & CGL	
																Bed rock placed at 1355 ft.
1365		5 1/8" & 4 3/4" Ro Bit														Rept'ed depth of rotary hole
1360.0		NXWL														Beginning of DD core
1370.6	10.6	"	2.64	96	0.55	0.26		wk CuSO4?	wk		wk	st, ind lm & Llm	qtz	+ scr	GR	Rk is mg, lt gry, st'ly alt'ed. Core almost
1379.2	8.6	"	2.56	99	0.84	0.69		mod-st CuSO4?	wk		wk	" "	"	"		immediately exhibits alternate zones of
1389.6	10.4	"	2.64	99	2.75	0.61		mod-st CuSO4?	st		v. st	mod, ind lm & Llm	"	"		Ox Cu (CuSO4?), ind lm, & Llm and suls
1400.2	10.6	"	2.60	96	0.92	0.68		mod-st CuSO4?	wk-mod		mod-st	" "	"	"		w/py-cc in diss, blebs, and high angle
1410.5	10.3	"	2.70	99	3.04	0.12			mod-st		st-v.st	" "	"	"		vlts. See individual intercepts for mater
1420.7	10.2	"	2.58	100	4.23	0.14			mod-st		v.st	" "	"	"		& degree of Cu min.
1431.0	10.3	"	2.60	95	3.46	0.09			mod-st		st-v.st	wk, ind lm & Llm	"	"		
1441.4	10.4	"	2.46	96	2.49	0.08			mod		st	mod-st Llm	"	"		
1450.8	9.4	"	2.50	96	3.90	0.09			mod		st	st, ind lm & Llm	"	"		
1462.2	11.4	"	2.46	89	1.00	0.08		tr CuSO4?	mod		st	mod-st Llm	"	"		
1472.5	10.3	"	2.54	97	2.95	0.08		wk-mod CuSO4	mod		st	" "	"	"		
1483.0	10.5	"	2.56	95	1.08	0.05		wk CuSO4	mod		st	" "	"	"		
1493.0	10.0	"	2.54	97	1.05	0.03		tr CuSO4	mod		st	" "	"	"	GR & GR Bx	← Rk becomes more crushed, clay-like.
1502.4	9.4	"	2.60	100	1.75	0.03			mod		st	" "	"	"		This disrupted state, with associated ox of
1512.7	10.3	"	2.52	98	1.93	0.03			mod		st	" "	"	"		sulfides, is characteristic of the assay
1523.0	10.3	"	2.53	94	1.60	0.02			mod		st	" "	"	"		intervals listed below.
1533.1	10.1	"	2.54	50	2.15	0.02			mod		mod-st	" "	"	"		← Fresh py, w/out associated cc, becomes
1543.8	10.7	"	2.55	85	1.39	0.02			mod		mod-st	" "	"	"		more common.
1554.2	10.4	"	2.59	82	1.73	0.02			mod		mod-st		"	"		
1564.4	10.2	"	2.52	100	1.73	0.02			mod		st		"	"		
1574.5	10.1	"	2.60	95	2.10	0.02			mod		st		"	"		
1584.4	9.9	"	2.58	100	1.93	0.02			mod		st		"	"		
1594.3	9.9	"	2.55	100	2.11	0.02			mod		st		"	"		
1605.1	10.8	"	2.53	94	3.10	0.03			mod		st		"	"		← Ox along prominent, high-angle structures
1614.5	9.4	"	2.57	100	1.09	0.02			mod		mod-st		"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-104
Sheet No. 2 of 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOGGING
1622.5	8.0	NXWL	2.58	98	3.30	0.05			mod		mod-st		qtz	- ser	MP(?) & MP SOAKED GR BX	First three ft of interval a dk gry, typica MP (?) displaying the same min as the above GR. Balance of run a gen'ly fg phase of GR (?) Bx. This is st'ly alt'ed, bleached, & bx'ed. Entire interval displays diss, fg py-cc. Min as noted.
1632.9	10.4	"	2.61	97	3.45	0.04			mod		mod-st		"	"	GR BX	Similar to basal portion of above interva Distortion, slip zns, & gg common along variable trends.
1643.0	10.1	"	2.56	93	4.39	0.04			mod		mod-st	cov	"	"		
1653.1	10.1	"	2.58	98	1.20	0.02			mod		mod-st	cov	"	"	GR-MP	Rk is gry to lt gry, and gen'ly finer grained
1663.4	10.3	"	2.47	92	1.11	0.01			mod	tr(?)	mod-st	cov	"	"	(?) BX	than above. St alteration makes I.D. uncertain -
1674.8	11.4	"	2.50	87	1.06	0.03			mod		mod-st	cov	"	"	IN FLT ZN	offering alternatives of MICRO-GR or MP.
1685.1	10.3	"	2.51	89	1.06	0.02				tr-wk						Few frags have typical granitoid texture - others, well developed porph'ic textures. V. wk brn & limited, diss, ind lm. Diss, fg py-cc. Min as noted.
																Porph prob'ly intrusive into GR.
1694.6	9.5	"	2.54	99	0.83	0.03			mod	wk(?)	mod	cov	"	"	GR BX	Texturally similar to coarser-grained, upper
1705.0	10.4	"	2.58	92	1.01	0.03			mod	tr(?)	mod-st		"	"		GR. Difficult to separate cpy and/or
1715.1	10.1	"	2.60	97	1.02	0.03			mod	?	mod-st	cov	"	"		tarnished py. Intensity of orig min about
1725.5	10.4	"	2.59	92	0.92	0.03			mod	?	mod-st	cov	"	"		the same -- oxidation appears to be lower
1735.7	10.2	"	2.55	93	1.11	0.04			mod	?	mod-st		"	"	← FLT ZN	ing expressed degree. Min as noted
1746.0	10.3	"	2.54	90	0.72	0.03			wk-mod	?	mod	cov	"	"	← FLT ZN	
																NOTE: THE INDICATED PRESENSE OF cpy-cov COULD REFLECT A VISUAL INTERPRETATION OF TARNISH ON py-cc. SULS TOO FINE GRAINED TO WORK WITH UNDER RAPID LOGGING.
1757.5	11.5	"	2.53	56	0.46	0.03			wk-mod		mod		"	"	FLT ZN OF MIXED GR & MP FRAGS	Rk type column title is fairly descriptive
1764.7	7.2	"	2.59	75	0.63	0.04			wk-mod		mod		"	"		The MP is described below.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-104
Sheet No. 3 OF 4
Date Completed
Logged By RW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOGGING
1775.0	10.3	NXWL	2.58	100	0.38	0.04			wk	wk	tr(?)		qtz-	ser-	BX'ED MP	A fg groundmass hosting 2 mm – 5 mm wh
1785.0	10.0	"	2.52	98	0.38	0.02			wk	wk			kaol	in		kaolinized, anhedral to subhedral feld
																phenocrysts. Rk well br, but healed. Mod-
																hm along fracs & flooding groundmass. Loca
																ly qtzose. Wk, diss py. Some, gen'ly wk cpy o
																frac surfaces & in set'ed diss. Min as noted.
1795.0	10.0	"	2.50	89	0.26	0.01			tr-wk	tr-wk		spec	"	"	GR BX IN FLT ZN	GR as above – zn completely br & granulate Mod-st hm.
1803.8	8.8	"	2.48	100	0.23	0.02			tr-wk	tr-wk		"	"	"	GR-MP BX	Mixture of two above types. High angle-ve slips & shrs w/st hm.
1812.7	8.9	"	2.50	99	0.24	0.04			tr-wk	tr-wk			"	"	MP(?) BX	Rk fg, st'ly alt'ed & distorted. Struct trends v. high angle to vert. Texture only wk'ly porph'ic -- suggestive of either MP subject to previous silif or a MICRO GR. Min as noted.
1822.8	10.1	"	2.49	94	0.29	0.04			wk	wk-mod	tr(?)	MoS_2^{Tr}	"	"	GR-MICRO	Overall text suggestive of GR -- closer insp
1833.2	10.4	"	2.51	96	0.49	0.01			wk-mod	wk-mod	tr(?)	MoS_2^{Tr}	"	"	GR BX	ion reveals a fg, aplitic or "MICRO GR" texture. Marked decrease in hm. Min as noted.
1842.4	9.2	"	2.56	91	0.36	0.01			wk-mod	wk-mod			"	"	GR-MP BX	Frags of both rk types again mixed in this bx. Min as noted.
1852.5	10.1	"	2.56	100	0.35	0.01			wk-mod	wk-mod			"	"	MP BX	Texturally similar to above, but more gry
1863.0	10.5	"	2.57	92	0.28	0.01			wk-mod	wk-mod			"	"		nearly free of hm. Min as noted.
1873.5	10.5	"	2.46	87	0.26	0.01			wk-mod	wk-mod			"	"		
1882.2	8.7	"	2.63	98	0.39	0.03			mod-st	wk-mod			"	"	← FLT ZN	St'ly br, w/ numerous zns of gg & groun
1889.8	7.6	"	2.59	99	0.29	0.01			mod	wk			"	"	" "	py.
1899.7	9.9	"	2.61	93	0.29	0.01			mod-st	wk			"	"	" "	
1909.6	9.9	"	2.58	95	0.31	0.02			mod-st	wk			"	"	" "	
1918.8	9.2	"	2.59	100	0.29	0.01			mod-st	wk			"	"	" "	
1929.1	10.3	"	2.62	88	0.33	0.03			mod-st	wk			"	"	" "	
1939.1	10.0	"	2.59	99	0.30	0.02			mod-st	wk			"	"	" "	

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-104
Sheet No. 4 of 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	[redacted]	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
							Mo									
1949.2	10.1	NXWL	2.51	84	0.33	0.02			mod-st	wk			qtz	-ser-	MP(?)BX	Rk as above but becoming progressively
1960.2	11.0	"	2.55	87	0.69	0.02	.059		mod-st	wk			Kaolin-		IN FLT ZN	more chlor'ic. Intensity of flt'ing appears
1970.6	10.4	"	2.59	87	0.36	0.02			mod	tr-wk			Chlorite.			to increase w/depth... distorted zns of
1978.5	7.9	"	2.58	85	0.40	0.02			mod	tr-wk			"	"		py & gen struct trends exhibit variable
1987.5	9.0	"	2.66	90	0.64	0.02							"	"		dips. Min as noted.
1998.2	10.7	"	2.56	77	0.33	0.02			mod	tr-wk			chlor-	kaolin	FLT ZN	Rk appears to be essentially the same
													-ser		IN PORPH	as that above, but is almost completely
																crushed & shr'ed ... to a product of chlor,
																clay, & ground py. Struct trends again
																variable. Min as noted.
2006.8	8.6	"	2.46	91	0.03	0.01			tr			Set mag	kaolin	-serp-	FLT ZN IN	Run a mass of lt grn'ish-gry clay & serp(?)
2017.2	10.4	"	2.53	89	0.03	0.01			tr			" "	ser(?)		PORPH'IC	which is v. st'ly shr'ed & granulated. Few
															META-GR	sections or frmgs which are less disturbed
															(?)	exhibit the texture of the porph'ic phase
																of the basement META-GR. Trs of set'ed
																py.
2028.3	11.1	"	2.62	77	0.03	0.03			tr(?)			" "	"	"	META-GR	Rk as above but becoming more com-
2037.0	8.7	"	2.61	90	0.02	0.02			tr(?)			" "	"	"		petent. Flt'ing still common, but zns
2037.3	0.3	"	No	REC	—	—			—			—	—	—		more localized. Distortion & alt still
																v. high.
2047.4	10.1	"	2.61	96	0.01	0.01						" "	Kaolin-	ser(?)	META-GR	Rk as above - less alt'ed w/depth - until
2059.7	12.3	"	2.67	96	0.02	0.02						" "	chlor			final runs are essentially fresh rk. Few
2069.8	10.1	"	2.61	91	0.01	0.01						" "	"	"		set'ed frac deposits of ind lm after py.
2079.9	10.1	"	2.66	95	0.02	0.02						" "	"	"		Gen'ly qtzose & somewhat chlor'ic.
2091.0	11.1	"	2.70	65	0.02	0.02			tr			" "	"	"		Textures locally porph'ic. No Cu min
2100.1	9.1	"	2.66	94	0.03	0.02						" "	"	"		obs.
BOTTOM																

Final Depth 709.3'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

S-103

HOLE NO. S-103
Sheet No. 1 of 2
Date Completed 7-5 to 7-6 / 7-26 to 8-2
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
																CORE SPLIT PRIOR TO LOGGING
254	254	5" Ro BIT													ALLUVIUM & CGL	
																BED ROCK PLACED AT 254 FT.
256	2	5" Ro BIT													BR	
256.0		NXWL														BEGINNING OF DD CORE.
266.3	10.3	"	2.55	49	0.09	0.05		Tr Cu wad					qtz	ser	MP Bx	St'ly alt'ed, lt gry, mg, typical MP
276.0	9.7	"	2.69	75	0.10	0.06							"	"		w/sct'ed fresh biot. Appears to have
286.6	10.6	"	2.54	93	0.10	0.05							"	"		been well bx'ed and is mod'ly-st'ly
296.4	9.8	"	2.55	100	0.06	0.02						St ind lm	"	"		hm flooded. Sct'ed spec & ind lm. Cu
307.0	10.6	"	2.47	98	0.06	0.02							"	"		min as noted.
317.0	10.0	"	2.66	96	0.89	0.83		Mod-st $CuSiO_4$ &	$CuCO_3$ (?)			Ind lm Lim	"	"		← Cu min assoc w/silif
326.7	9.7	"	2.52	99	0.86	0.78		"	"			"	"	"		← Bleached, w/sct'ed jarosite (?).
336.7	10.0	"	2.56	100	0.26	0.22		"	"				"	"		
347.0	10.3	"	2.58	96	0.88	0.81		"	"				"	"		← Much of rk dense, gry, silif, & hm flooded
356.7	9.7	"	2.49	100	0.78	0.71		"	"		Tr (?)	"	"	"		← One ox'ed vn could have been cc.
366.7	10.0	"	2.44	97	0.56	0.46		"	"			"	"	"		
376.7	10.0	"	2.57	95	0.05	0.02							"	"		← St hm flooding.
381.8	5.1	"	2.63	96	0.06	0.01						"	"	"		← Well developed porph'ic textures.
391.8	10.0	"	2.61	100	0.04	0.04						"	"	"		" " " " "
402.1	10.3	"	2.56	98	0.04	0.04						"	"	"		" " " " "
412.5	10.4	"	2.56	95	0.05	0.03							"	"		" " " " "
422.9	10.4	"	2.44	98	0.05	0.03							"	"		" " " " "
433.0	10.1	"	2.67	96	0.04	0.02						"	"	"		" " " " "
443.4	10.4	"	2.51	97	0.14	0.09						Sct'ed Jarosite	"	"		" " " " "
453.8	10.4	"	2.43	97	0.31	0.30		wk-mod $CuSO_4$ (?)			Tr (?)		"	"		" " " " "
464.1	10.3	"	2.59	98	0.50	0.41		$CuSiO_4$ &	$CuCO_3$ (?)				"	"		" " " " "
474.5	10.4	"	2.48	94	0.39	0.28		Cu wad	& $CuSO_4$ (?)				"	"		" " " " "
484.7	10.2	"	2.63	98	1.20	0.40		Tr $CuSO_4$ (?)			wk-mod		"	"		Still porph'ic. Few partially ox'ed vlts cc.
495.1	10.4	"	2.55	98	0.28	0.13		Tr $CuSiO_4$				Tr Nat Cu	"	"		
505.6	10.5	"	2.56	95	0.49	0.14			wk		wk	Sct ind lm	"	"		St'ly porph'ic. Textures mg-cg.
515.9	10.3	"	2.58	97	0.61	0.03			wk	Tr (?)	wk	wk-mod cov	"	"		
526.3	10.4	"	2.54	96	0.58	0.01			mod-st	wk-mod	wk-mod	"	"	"		Much of py on frac faces
536.9	10.6	"	2.50	94	0.64	0.04			wk-mod	wk-mod	wk	wk cov	"	"		
545.3	8.4	"	2.68	100	0.46	TR.			mod-st	wk	wk	wk cov	"	"		" " " " "

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-103
Sheet No. 2 of 2
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
555.8	10.5	NXWL	2.60	96	0.50	0.02			st	wk	tr-wk	wk cov	qtz	-ser	MP Bx	Rk as described above -- gry, mg to local
566.0	10.2	"	2.76	100	0.79	0.12			mod	mod	?	wk-mod cov	"	"		ly cg, porph'ic, and gen'ly mod'ly-st'ly
576.3	10.3	"	2.58	93	0.49	TR.			mod	wk		wk cov Ind Im	"	"		hm flooded. Sct'ed sil pats & ind Im & Lim
586.5	10.2	"	2.50	87	0.57	0.02			wk	tr-wk	tr(?)	" "	"	"	← FLT ZN	Cu min as noted. Most struct elements
593.8	7.3	"	2.53	93	0.44	0.02			wk	wk		" "	"	"		mod - high angle.
603.9	10.1	"	2.46	99	0.33	0.01			wk	wk-mod		Tr Cov Ind Im	"	"		← Min principally in, or associated w/ frac
613.3	9.4	"	2.60	100	0.56	0.01			wk	wk-mod		" "	"	"		& qtz vlts.
623.5	10.2	"	2.57	98	0.50	TR.			wk	wk	tr	Ind Im	"	"		← St'ly shr'ed, w/some gg.
633.8	10.3	"	2.50	80	0.72	0.02			wk	wk-mod		" "	"	"		" " " " "
643.4	9.6	"	2.48	89	0.35	0.01			wk-mod	wk-mod		" "	"	"		← Feld phenocrysts prominent & grn stained.
653.9	10.5	"	2.54	90	0.35	0.02			wk-mod	wk-mod		" "	"	"		
663.4	9.5	"	2.55	79	0.30	TR.			mod-st				"	"		
674.4	11.0	"	2.67	90	0.34	0.10			st	wk-mod			"	"	MP Bx	← St'ly shr'ed and granulated. Mod develo
685.5	11.1	"	2.62	88	0.58	0.16			wk	wk		" "	"	"	IN FLT ZN	ment chlor. Generally st py-hm. Struc trends
695.5	10.0	"	2.52	35	0.51	0.01			mod	wk-mod		" "	"	"		v. high angle.
709.3	13.8	"	2.67	64	0.55	0.01			mod	wk-mod		" "	"	"		← Pats st'ly qtzose
BOTTOM																

Final Depth 1079.0'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-102
Sheet No. 1 OF 4
Date Completed 7-3 TO 7-5-6 / 7-20 TO 8-2-6
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu: Total	Non-S	Average	Mineralization: Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
																RoBit DRILLING DONE w/FOAM
170	170	5" RoBit														
															Alluvium & CGL	- Chips of grn Ox Cu fr c. 165'.
																BEDROCK PLACED AT 170 FT.
171	1	5" RoBit														
															Bx'ed Mp	Chips of grn Ox Cu in cuttings
175.0																START OF DD CORE – DEPTH OF 171' FOR ROTARY ≈ 175' FOR DD.
184.8	9.8	NXWL	2.52	100	0.06	0.06		Tr $CuSiO_4$								
196.0	11.2	"	2.58	100	0.03	0.02		No Cu min obs.					qtz – ser		Bx'ed Mp	A mg., qtzose, mod'ly-st'ly alt'ed Mp. Except
205.4	9.4	"	2.49	100	0.05	0.03		"	"	"			"	"		for first run, rk unusually intact. Diss biot
215.5	10.1	"	2.57	99	0.07	0.03		"	"	"			"	"		throughout. Mod hm throughout – st in matrix
226.0	10.5	"	2.60	91	0.05	0.02		"	"	"			"	"		of bx zones. Struct trends gen'ly high angle.
																Set'ed wk-mod, diss ind lm. Tr diss spec. Tr
																$CuSiO_4$ in first run, no other Cu min obs.
																CORE BELOW SPLIT PRIOR TO LOGGING.
236.1	10.1	"	2.51	100	0.06	0.02		"	"	"			"	"	Mp-Gr(?) Bx	As above, but containing short intercepts
246.5	10.4	"	2.43	97	0.08	0.03		"	"	"			"	"		w/a granitoid texture ... possibly only
256.7	10.2	"	2.52	98	0.08	0.02		"	"	"			"	"		qtzose. Mp.
267.0	10.3	"	2.54	99	0.07	0.06		"	"	"			"	"		← Rk displays well developed granitoid textures
277.3	10.3	"	2.55	98	0.06	0.03		"	"	"		st ind lm	"	"		
287.8	10.5	"	2.56	97	0.05	0.01		"	"	"		" " "	"	"		" " " " " "
298.1	10.3	"	2.56	100	0.07	0.07		"	"	"			"	"		Textures more perph'ic.
308.4	10.3	"	2.53	92	0.07	0.06		"	"	"			"	"		" " "
318.8	10.4	"	2.54	95	0.06	0.02		"	"	"			"	"		" " "
328.4	9.6	"	2.59	100	0.07	0.02		"	"	"			"	"		" " "
																" " " , Set'ed jarosite(?)
338.6	10.2	"	2.60	97	0.05	0.02		"	"	"			"	"		
349.0	10.4	"	2.56	100	0.05	0.03		"	"	"			"	"	Gr(?) Bx w/some Mp(?)	Rk reddish tan, mg, & qtzose. Textures
359.3	10.3	"	2.58	100	0.05	0.03		"	"	"			"	"		mostly granitoid, w/short intercepts of
369.5	10.2	"	2.58	98	0.62	0.02		Tr Cu wad	mod		st		"	"		dense, gry. Micro. Gr(?) or Silic Porph(?).
379.9	10.4	"	2.50	96	0.04	0.01		No Cu min obs.					"	"		Set'ed, fg, ind lm. Wk to st hm. Cu min
390.3	10.4	"	2.55	97	0.05	0.01		"	"	"			"	"		noted opposite individual interval. In gen, the
399.4	9.1	"	2.60	98	0.03	0.01		Tr Cu wad					"	"		py-cc associated w/zns where mod-high
410.0	10.6	"	2.58	95	0.03	0.02		No Cu min obs.					"	"		angle vns cut core: Massive, w/bordering
416.8	6.8	"	2.58	84	0.04	0.02		"	"	"			"	"		zns of diss.
427.1	10.3	"	2.63	100	0.10	0.02			Tr-wk		wk		"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-102
Sheet No. 2 of 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOGGING.
437.5	10.4	NXWL	2.68	97	0.13	0.02			Tr-wk		mod-st	Diss Lim	qtz.-	ser	GR(?)Bx	Rk as described above.
447.8	10.3	"	2.57	95	0.05	0.03		No Cu	min	obs		"	"	"	w/some	
458.0	10.2	"	2.56	99	0.03	0.02		"	"	"		"	"	"	MP(?)	Leached, vert, open v/lts. All rk st'ly qtzose.
468.8	10.8	"	2.57	94	0.13	0.02			wk		med	"	"	"		All of py-cc in basal portion of run.
477.6	8.8	"	2.44	97	0.95	0.03			wk-mod		st	"	"	"	MP-GR	Textures become principally porph'ic. Struc
488.0	10.4	"	2.50	96	0.37	0.25		Mod-ST $CuSO_4$				"	"	"	Bx	high-angle trend form ct w/above GR. Rk
498.2	10.2	"	2.50	100	0.46	0.34		Mod-ST $CuSO_4$	& $CuSiO_4$			"	"	"	MP Bx	below c. 480' is dk, gry, st'ly porph'ic.
508.5	10.3	"	2.59	95	0.43	0.36		wk $CuSiO_4$					"	"		
519.0	10.5	"	2.56	90	0.62	0.49		wk-mod $CuSiO_4$	& $CuSO_4$				"	"		
529.0	10.0	"	2.54	99	1.44	0.11		TR $CuSiO_4$	wk-mod		Mod-st	"	"	"	MP Bx-FLT ZN, & GR	As above to c. 525.5'. Below this pt is a. 3' flt-zn of gg--Struct trends, mod-high angle. Basal portion of run is a mg, mod'ly-st'ly alt'ed GR which displa diss, str's, & high-angle frac surface crusts of py-cc.
539.4	10.4	"	2.54	95	0.81	0.02			wk-mod		st		"	"	GR &	Gen'ly lt gry, & essentially free of hm
549.7	10.3	"	2.49	96	1.53	0.07			mod		st		"	"	GR Bx	stain. Diss, small pods, & frac-slip smears
559.8	10.1	"	2.52	99	1.78	0.02			mod		mod-st		"	"		of py-cc.
570.3	10.5	"	2.54	95	1.95	0.03			wk-mod		mod-st		"	"	GR-MP	GR as above. Appears to be an intrusi
580.7	10.4	"	2.47	98	1.64	0.02			wk		wk-mod		"	"	Bx	intercept of MP
590.6	9.9	"	2.49	96	2.20	0.03			mod		mod-st	cov (?)	"	"	GR Bx & FLT ZONE	RK as above, but displaying intense gran ulation & distortion. Struct trends variable
600.7	10.1	"	2.45	97	1.26	0.02			wk-mod		mod-st	"	"	"		
611.3	10.6	"	2.50	97	0.63	0.02							"	"		Ct. w/lower MP prob'ly c. 607'-608'.
618.4	7.1	"	2.48	59	0.66	0.01			tr	wk-mod	tr-wk	cov (?) bn (?)	"	"	MP Bx &	Typical MP-gry to hm red, br, distorted, &
629.0	.6		2.45	97	0.65	0.01			wk-mod	wk-mod	tr(?)		"	"	FLT Zone	granulated. Diss py & cpy (?). Few f. v/ts of cpy &/or bn. Tr cc.
639.7	10.7	"	2.53	96	0.59	0.01			mod	wk-mod	tr (?)		"	"	MP-GR	Above MP to c. 630'-631'... GR below. Sti
650.0	10.3	"	2.51	97	0.59	TR.			mod	mod-st			"	"	Bx-FLT zone	in a flt zn. Both rk types display some ox, w/ind lm on fracs. More MP 643'-647'.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-102
Sheet No. 3 of 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	[redacted]	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOGGING
							Mo									
660.2	10.2	NXWL	2.53	100	0.44	TR.			mod	mod-st			qtz	ser	GR Bx	Rk as above... St'ly distorted, shr'ed, &
670.8	10.6	"	2.57	97	0.49	TR			mod	wk-mod			"	"		often soft. Wk-mod hm throughout - Localize
																zns of gg.
680.6	9.8	"	2.50	97	0.30	TR.			mod	wk-mod			"	"	GR-MP Bx	Again both rk types, w/ the basal portio
																MP. In general shr'ed, rotten, and contain
																ing intercepts of gg.
691.0	10.4	"	2.48	92	0.39	0.01		Tr $CuCO_3$(?)	wk-mod	wk-mod	wk-mod		"	"	MP Bx	Similar to above rk. Vts cc. Crusts $CuCO_3$(
701.4	10.4	"	2.48	96	0.15	0.01		Tr $CuSiO_4$	wk	tr-wk	tr(?)		"	"		Rather st chlor(?) or serp(?)
711.8	10.4	"	2.56	95	0.15	0.01		Tr $CuSiO_4$	wk	tr-wk	tr-wk		"	"		" " " " "
721.8	10.0	"	2.48	97	0.29	0.01			wk	tr-wk			"	"		" " " " "
732.2	10.4	"	2.53	100	0.16	0.01			mod	tr-wk			"	"	MP-GR Bx & Flt Zone	As above -- Displaying mixed rk types.
742.6	10.4	"	2.50	96	0.12	0.01			mod	tr-wk			"	"		
752.8	10.2	"	2.50	96	0.21	TR.			mod	wk-mod			"	"		← Principally GR
763.2	10.4	"	2.52	97	0.29	0.01			wk-mod	wk-mod			"	"		" " "
773.5	10.3	"	2.58	98	0.31	0.01			wk-mod	wk-mod		Ind lm	"	"	MP Bx	As above - rk gen'ly fg-mg, differentially
784.0	10.5	"	2.53	94	0.43	0.01			wk-mod	wk-mod		Ind lm	"	"		flooded w/ hm. Set'ed zns of st serp(?) &
794.0	10.0	"	2.50	100	0.25	0.01			wk-mod	mod-st		" "	"	"		or chlor(?). Mod-st ind lm where noted.
801.7	7.7	"	2.56	96	0.21	TR.			wk-mod	wk-mod		Ind lm, Lim(?)	"	"		Diss fg py & cpy. Few thin vlts containing
812.2	10.5	"	2.55	92	0.23	0.02			mod-st	wk-mod	St vn cc	" "	"	"		both sulf.
822.3	10.1	"	2.50	98	0.24	TR.			mod-st	wk-mod		" "	"	"		
832.4	10.1	"	2.52	97	0.26	0.01	0.028		mod	st	Tr-wk vn cc	Ind lm, Lim & MoS_2	"	"		
842.9	10.5	"	2.50	98	0.27	0.01	0.020		mod	wk-mod		" "	"	"		
852.4	9.5	"	2.48	100	0.28	TR.			wk-mod	wk-mod		Tr MoS_2	" chlor	"	MP Bx &	Ct between rk change is a flt zn c. 846'-852
858.5	6.1	"	2.52	97	0.19	TR.						spec	"	"	Silic MP	Rk is dense, lt gry-red tan, & qtzose.
867.0	8.5	"	2.49	76	0.19	0.01			wk-mod	wk-mod		" "	"	"	or GR(?)	← Granitoid textures
876.5	9.5	"	2.54	96	0.21	0.02			mod	wk-mod			"	"	GR Bx &	Granitoid textures as above. Rk st'ly disto
886.6	10.1	"	2.50	90	0.18	0.02			wk-mod	wk			"	"	Flt(?) zn	ed, shr'ed, & granulated below c. 873.5'. Fair
896.8	10.2	"	2.51	92	0.23	0.02			wk-mod	wk			"	"		amount chlor & gg.
907.2	10.4	"	2.47	88	0.35	TR.			wk-mod	wk			"	"		
918.0	10.8	"	2.45	74	0.27	TR.			wk-mod	wk-mod			"	"	GR Bx	Rk as above but more intact.
928.2	10.2	"	2.51	100	0.19	0.04			wk-mod	wk-mod		Tr MoS_2	"	"		
938.2	10.0	"	2.52	100	0.19	0.03			wk-mod	wk-mod		Tr MoS_2	"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-102
Sheet No. 4 of 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
945.2	7.0	NXWL	2.56	97	0.21	0.08			wk-mod	wk-mod			qtz-ser & chlor		GR Bx	Rk is gen'ly mg, mod'ly-st'ly alt'ed, qtzose, & wk'ly chlor'ic. Distortion, shr'i and breakage common. Local, wk hm. Diss, fg sul throughout.
954.8	9.6	"	2.57	95	0.52	0.09			wk-mod	wk			"	"	GR Bx & AN(?) or DB(?)	As above, but containing a short intercep dk grn-blk AN (?) or DB(?) w/a felty texture. Chlor (?) & serp (?) w/hm v. st in this rk.
964.2	9.4	"	2.67	100	0.48	0.12			wk-mod	wk-mod			Serp-chlor		AN(?) or DB(?)	As above. A very st'ly br & serpentinized(? and/or chloritized Rk. Texture residual, fg, & felty. Diss & fine vlts py-cpy. Local, wk mod hm.
972.5	8.3	"	2.60	100+	0.63	0.08			mod	wk-mod			"	"		
979.6	7.1	"	2.55	100	0.57	0.04			mod	wk-mod			"	"		
984.2	4.6	"	No	REC	—	—			—	—			—	—		
990.2	6.0	"	2.62	95	0.84	0.01			mod	mod-st			"	"		
1000.0	9.8	"	2.68	98	0.30	0.04			mod	mod-st		Tr MoS_2	"	"	AN(?) or DB(?) & GR Bx	As above to c.992'. Below this is a mg qtzose GR similar to that above -- prob'l more sil. Wk-mod hm on fracs. Diss & vlts py-cpy. Tr MoS_2
													qtz-ser			
1009.7	9.7	"	2.63	90	0.88	0.02			mod	st			"	"	GR Bx	Similar to above in all respects.
1019.8	10.1	"	2.58	96	0.42	0.01			mod	mod-st			"	"		
1030.2	10.4	"	2.49	95	0.38	TR.			mod-st	wk-mod			"	"		
1035.8	5.6	"	No	REC	—	—			—	—			—	—		
1043.2	7.4	"	2.45	96	0.33	TR.			mod	wk		Tr MoS_2	"	"		
1053.8	10.6	"	2.58	99	0.41	0.01			mod	wk-mod		"	"	"		
1064.4	10.6	"	2.53	96	0.25	0.01			mod	mod		"	"	"		
1073.7	9.3	"	2.50	86	0.23	TR.			mod	wk-mod		"	"	"		
1079.0	5.3	"	2.56	87	0.24	TR.			wk	wk		"	"	"		
BOTTOM																

Final Depth 889.2'
Collar Elevation
Coordinates
Inclination VERT

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-101
Sheet No. 1 OF 3
Date Completed 7-3-68 AND 7-15-68 to 7-26-
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
																CORE SPLIT PRIOR TO LOGGING
90	90	5" Ro	BIT												ALLUVIUM & CGL	
																BEDROCK PLACED AT 90 FT.
106.3	16	5" Ro	BIT													
107.5																START OF DD CORE
117.2	9.7	NXWL	2.51	87	0.11	0.05						Ind Im & Llm	qtz	ser	MP Bx	Rk gen'ly reddish brn w/mod hm flooding.
127.8	10.6	"	2.41	92	0.15	0.01						"	"	"	(w/SOME	Textures variable fr/fg, typical MP to mg
138.3	10.5	"	2.48	88	0.03	0.01						"	"	"	GR?)	qtzose resembling the GR. Totally leached
149.2	10.9	"	2.51	92	0.04	0.01						"	"	"		& FE ox stained w/diss, vlts, & str's of ind
158.9	9.7	"	2.49	100	0.11	0.05						"	"	"		Im & Llm. No Cu min obs unless indicated
168.0	9.1	"	2.52	90	0.09	0.04						"	"	"		opposite run.
176.7	8.7	"	2.53	75	0.05	0.01						"	"	"		Rk becomes st'ly bx'ed
187.4	10.7	"	2.54	94	0.06	0.01						"	"	"		Much of MP appears silif. St'ly bx'ed
197.5	10.1	"	2.49	94	0.45	0.40		ST $CuSO_4$? & $CuSiO_4$				"	"	"		$CuSO_4$(?) in small vugs, vlts, & on open fracs.
204.1	6.6	"	2.60	98	0.07	0.02		Tr $CuSiO_4$ & $CuSO_4$(?)				"	"	"		Diss Ind Im.
214.5	10.4	"	2.52	95	0.40	0.34		ST $CuSO_4$(?) & $CuSiO_4$				"	"	"	MP Bx	
224.9	10.4	"	2.56	97	0.80	0.75		Mod-ST $CuSiO_4$				"	"	"		
235.2	10.3	"	2.52	96	0.03	0.02						Ind Im	"	"		
244.9	9.7	"	2.54	89	0.03	0.01						" "	"	"		
255.1	10.2	"	2.53	93	0.38	0.01						Ind LM & Llm	"	"	MP-GR(?) Bx	
266.1	11.0	"	2.54	90	0.08	0.03						Ind Im	"	"	MP Bx	
276.8	10.7	"	2.67	93	0.22	0.16		Mod $CuSO_4$ & $CuSiO_4$				"	"	"		
288.2	11.4	"	2.75	91	2.18	2.08		St $CuSO_4$(?) & $CuSiO_4$				Tr cup	"	"	MP Bx	Rk st'ly qtzose & hm flooded throughout upper z
298.0	9.8	"	2.74	91	0.19	0.10		Tr-wk $CuSiO_4$				spec	"	"	MP-GR(?)	
308.3	10.3	"	2.68	85	0.94	0.80		Mod-St $CuSiO_4$ & $CuSO_4$(?)				spec	"	"	Bx	
315.0	6.7	"	2.58	71	0.11	0.05		Tr-wk $CuSiO_4$				Ind Im spec	"	"	MP Bx	Ox Cu only on fracs
324.6	9.6	"	2.53	91	0.07	0.03						"	"	"		St bx'ion & hm flooding common.
331.6	7.0	"	2.54	99	0.13	0.04						"	"	"	MP-GR(?)	
342.2	10.6	"	2.65	86	0.10	0.05		Tr-wk $CuSiO_4$ & $CuSO_4$(?)				"	"	"	Bx	
352.1	9.9	"	2.58	96	0.06	0.02		Tr-wk $CuSiO_4$ & $CuSO_4$(?)				St Ind Im	"	"		
362.2	10.1	"	2.54	89	0.05	0.01		Tr-wk $CuSiO_4$ & $CuSO_4$(?)				"	"	"		Most of rk exhibits a granitoid texture.
370.8	8.6	"	2.68	100	0.04	0.01						Ind Im spec	"	"		Rk more gray, displaying less bx & hm. Spec st
380.9	10.1	"	2.67	95	0.15	0.08		Tr-wk $CuSiO_4$ & blk CuO				"	"	"		
381.0	0.1	"	No	Rec	—	—		—	—	—	—	—	—	—		
391.2	10.2	"	2.61	96	0.10	0.10						Ind Im spec	"	"		Vlts & frac. deposits of jarosite (?)

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-10
Sheet No. 2 of 3
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	[redacted] Mo	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
401.4	10.2	NXWL	2.66	91	0.18	0.13		Tr-wk $CuSiO_4$	(?)			st spec	qtz	ser	MP-GR(?)	As above. Texture variable, fr/dense,
410.9	9.5	"	2.66	98	0.06	0.02						" "	"	"	Bx	gry, and sil to qtzose, granitoid. Loc
421.5	10.6	"	2.65	94	0.07	0.07						" "	"	"		ized hm flooding, gen'ly most st when
432.0	10.5	"	2.72	95	0.07	0.02						" "	"	"		associated w/bx'ion. Strs & small pods of
442.9	10.9	"	2.52	99	0.07	0.02						" "	"	"		spec. Numerous open high angle to vert
453.6	10.7	"	2.60	92	0.06	0.02						" "	"	"		fracs. Set'ed ox Cu where noted opposit
463.3	9.7	"	2.52	96	0.10	0.03						" "	"	"		run. Only set'ed, diss ind lm.
473.2	9.9	"	2.50	99	0.17	0.03							"	"		← Well developed porph'ic textures. St hm
481.2	8.0	"	2.64	89	0.06	0.01						" "	"	"		" " " " " "
491.6	10.4	"	2.68	99	0.06	0.01						" "	"	"		
502.7	11.1	"	2.63	98	0.06	0.02						" "	"	"		Very st'ly bx'ed.
512.9	10.2	"	2.53	98	0.07	0.02						" "	"	"		" " "
523.3	10.4	"	2.68	94	0.06	0.02						" "	"	"		" " "
533.8	10.5	"	2.70	94	0.06	0.01						" "	"	"		" " " . Open vert. fra
544.5	10.7	"	2.75	93	0.04	0.03						" "	"	"		Some textures granitoid. Open vert. fra
555.4	10.9	"	2.61	95	0.05	0.01					mod(?)	" "	"	"		Textures Micro-Gr(?) or Silif Porph. CC in Llm (?)
566.6	11.2	"	2.68	90	0.05	0.02						" "	"	"		
576.5	9.9	"	2.53	94	0.70	0.08			tr-wk		wk-mod	" "	"	"		Min localized in basal portion of run.
587.1	10.6	"	2.58	99	2.81	0.13	0.011		tr-wk		mod-st	" "	"	"		Few high-angle vlts & associated diss cc.
597.7	10.6	"	2.56	93	3.30	0.20			tr		st	" "	"	"		
607.4	9.7	"	2.55	100	2.79	0.25	0.012		tr		mod-st	" "	"	"		High-angle struct trends. Diss cc & spec. MoS_2
617.8	10.4	"	2.62	99	3.61	0.17			tr		v. st		"	"		cc diss throughout & in a massive, high angle
628.1	10.3	"	2.63	99	2.18	0.13			tr		st		"	"		Rk gen'ly more granitoid in texture, gry,
638.5	10.4	"	2.55	97	1.74	0.19			tr-wk		st		"	"		and displaying only localized hm in bx zns
648.0	9.5	"	2.65	94	2.74	0.20			wk		v. st		"	"	Bx'ed Gr	← Rk essentially intact, lt reddish tan, w/a
658.3	10.3	"	2.55	98	1.37	0.07			wk		st		"	"		chlor'ic undertone. Locally ox'ed. $CuSiO_4$ on fra
668.0	9.7	"	2.69	95	0.90	0.19		wk-mod $CuSiO_4$	tr-wk		mod	Ind lm & Llm	"	"		
678.0	10.0	"	2.63	100	0.65	0.25		Tr-wk $CuSiO_4$	tr		tr-wk	Set'ed ind lm	"	"		
688.0	10.0	"	2.61	100	0.07	0.06					tr(?)	" "	"	"		St'ly silif -- mod hm w/bx
697.3	9.3	"	2.67	100	0.37	0.27		wk-mod $CuSiO_4$ &	$CuCO_3$			" "	"	"		" " " " " "
704.5	7.2	"	2.58	96	0.05	0.05						" "	"	"		" " . No Cu min obs.
715.0	10.5	"	2.54	95	0.05	0.05						Ind lm & Llm	"	"		" " " " " "
725.2	10.2	"	2.59	96	0.08	0.02						" "	"	"		" " " " " "
735.2	10.0	"	2.57	100	1.38	0.04			wk		st		"	"		Rk gry to reddish-tan, chloric -- less silif.
745.1	9.9	"	2.54	94	0.21	0.05			tr-wk		wk-mod	" "	"	"		All min in upper 45' of run. Bal is bx'ed & ox'e
755.2	10.1	"	2.79	96	0.31	0.25		wk $CuSiO_4$			tr?wk	" "	"	"		
764.1	8.9	"	2.66	99	1.26	0.66		wk-mod $CuSiO_4$	& $CuSO_4$	(?)	mod	" "	"	"	MP Bx	Very st qtz & hm. Localized pod of py-cc.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-101
Sheet No. 3 OF 3
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec. %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
775.2	11.1	NXWL	2.50	94	1.89	0.08			wk		st	Ind Im & Lim	qtz	ser	MP Bx	Rk as above. Bears fg, diss cc w/some py.
782.9	7.7	"	2.55	99	1.83	0.16			wk-mod		v. st	" "	"	"		Diss, fg, py-cc. High angle vn of massive cc
791.8	8.9	"	2.54	91	1.19	0.07			wk		mod-st	" "	"	"		Alternate diss suls & oxidation w/st hm.
801.8	10.0	"	2.38	91	3.65	0.09			wk-mod		mod-st	" "	"	"		
809.9	8.1	"	2.71	90	3.65	0.06			mod		v.st	" "	"	"	SILIF MP	Py-cc diss & in high-angle vns.
820.2	10.3	"	2.65	94	2.14	0.06			mod		v.st	" "	"	"	& MP Bx	Values in unox'ed, upper half of run.
830.9	10.7	"	2.59	94	0.06	0.02						" "	"	"	SILIF MP(?)	Appears totally ox'ed.
840.6	9.7	"	2.52	99	0.03	0.01				tr(?)		" "	"	"	OR GR(?) Bx	" " " " " "
850.6	10.0	"	2.57	99	0.03	0.01						" "	"	"		" " " " " "
860.9	10.3	"	2.59	94	0.03	0.03						" "	"	"	MP Bx	Ct w/above rk c. 856'.
870.4	9.5	"	2.59	99	0.77	0.05					st	" "	"	"		One vn (low angle) of massive cc. Bal ox
881.2	10.8	"	2.52	93	0.04	0.03						" "	"	"		Appears totally ox'ed.
889.2	8.0	"	2.65	96	4.48	1.79			wk-mod		st-v.st	" "	"	"		Basal portion of run a high angle, bx'ed unox'ed flt zn w/vns of py-cc.
BOTTOM																

Final Depth 1919.0'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-100
Sheet No. 1 of 5
Date Completed 5-2-68 to 5-8-68 / 6-4-68 to 6-20-68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
228	228	4¾" RoBit													Alluvium & CGL	
233	5	NX		62											CGL	
362	129	4¾" RoBit														
367	5	NX		40											CGL	
548	181	4¾" RoBit														
553	5	NX		32											CGL	
713	160	4¾" RoBit														
718	5	NX		66											CGL	
883	165	4¾" RoBit														
888	5	NX		20											CGL	
1101	213	4¾" RoBit														
1106	5	NX		08											CGL	
1262	156	4¾" RoBit														Bedrock placed at 1220'±.
1267	5	NX		46	Not	Assayed							qtz	ser	Gr-Dp Bx	Granulated-milled chunks of Gr-Dp(?). No Cu min obs.
1336	69	4¾" RoBit														
1341	5	NX		72	Not	Assayed							"	"	Gr-Dp Bx	Similar, st'ly alt'ed & mod'ly hm stained. No Cu min obs.
1343.5		NXWL		—												Beginning of D.D. core

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-100
Sheet No. 2 OF 5
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1353.6	10.1	NXWL	2.45	75	0.02	0.02							qtz	ser	GR BX	Rk is lt gray and st'ly alt'ed. Present texture
1363.6	10.0	"	2.49	96	0.03	0.02							"	"		is variable -- ranging fr/dense-sil to one
1374.0	10.4	"	2.54	90	0.02	0.02							"	"		of fine granules (orig micro-granite?), to a
1382.6	8.6	"	2.47	95	0.03	0.02							"	"		cg typically granitic one. Distortion, obvious
1392.6	10.0	"	2.48	90	0.02	0.01							"	"		granulation, and gg common throughout the
1403.0	10.4	"	2.51	92	0.01	0.01							"	"		st bx'ion. Wk-st hm in matrix - some frags
1412.6	9.6	"	2.46	85	0.02	0.01		EXTREME		GRANULATION			"	"		flooded by Fe ox. Only sct'ed tr ind lm, most
1422.2	9.6	"	2.46	97	0.02	0.01		"	"	"	"		"	"		of this in vlts. No Cu min obs.
1431.2	9.0	"	2.42	89	0.01	0.01		"	"	"	"		"	"		
1441.4	10.2	"	2.43	59	0.02	0.01							"	"		Mod-high angle structural elements.
1451.8	10.4	"	2.44	92	0.01	0.01		EXTREME		GRANULATION			"	"		
1462.0	10.2	"	2.39	89	0.01	0.01		"	"	"	"		"	"		
1472.0	10.0	"	2.38	95	0.02	0.01							"	"		
1481.7	9.7	"	2.50	93	0.02	0.01							"	"		
1492.4	10.7	"	2.48	89	0.02	0.01							"	"		
1502.7	10.3	"	2.54	82	0.02	0.01							"	"		GR displays prominent porphic textures
1513.2	10.5	"	2.53	92	0.02	0.01							"	"		" " " " " " " " "
1522.6	9.4	"	2.50	87	0.03	0.02							"	"		" " " " " " " " "
1531.0	8.4	"	2.49	83	0.03	0.01							"	"		" " " " " " " " "
1542.2	11.2	"	2.46	72	0.02	0.01							"	"		" " " " " " " " "
1551.8	9.6	"	2.48	70	0.01	0.01							"	"		" " " " " " " " "
1563.0	11.2	"	2.50	72	0.02	0.01		OCHER-YEL		FE OX	STAIN		"	"		" " " " " " " " "
1572.2	9.2	"	2.52	94	0.02	0.02		"	"	" "	"	"	"	"		" " " " " " " " "
1583.2	11.0	"	2.50	84	0.03	0.02		"	"	" "	"	"	"	"		" " " " " " " " "
1592.4	9.2	"	2.46	78	0.07	0.03		"	"	" "	"	"	"	"		" " " " " " " " "
1605.0	12.6	"	2.50	82	0.05	0.02		ST OCHER-YEL		FE OX	STAIN		"	"		" " " " " " " " "
1615.0	10.0	"	2.50	68	0.05	0.02		" "	"	" "	" "		"	"		" " " " " " " " "
1624.2	9.2	"	2.43	74	0.03	0.02							"	"		Few intercepts of Dp.(?).
1634.7	10.5	"	2.55	75	0.11	0.04		Fe ox	RANGES	BRN-hm	RED		"	"		GR displays prominent porph'ic textures
1644.5	9.8	"	2.55	75	0.02	0.01		" "	" "	"	"	"	"	"		" " " " " " " " "
1653.4	8.9	"	2.56	89	0.05	0.04		" "	" "	"	"	"	"	"		" " " " " " " " "
1663.0	9.6	"	2.56	92	0.03	0.02		" "	" "	"	"	"	"	"		Do - Longer intact intercepts display vfg ind lm.
1671.2	8.2	"	2.55	78	0.04	0.02		" "	" "	"	"	"	"	"		Intercept again more crushed & bx'ed.
1681.1	9.9	"	2.57	85	0.05	0.03		" "	" "	"	"	"	"	"		" " " " " " "
1692.0	10.9	"	2.56	91	0.56	0.52		$CuCO_3$ $CuSO_4$(?)					"	"	GR BX	Rk as above but more intact. Gen'ly vfg ind lm
																diss throughout. Basal portion exhibits crusts and
																soaking of $CuSO_4$(?) and $CuCO_3$. Cu min. wk-

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-100
Sheet No. 3 of 5
Date Completed
Logged By NWO

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1701.4	9.4	NXWL	2.54	100+	1.13	1.04		$CuCO_3$ $CuSO_4$(?)					qtz	ser	GR & GR Bx	As above, but almost entirely intact. Rk has a mg, hypidiomorphic-granular to porph'ic texture, is qtzose, st'ly alt'ed, and displays high angle to vert structural elements. Wk'ly Fe ox stained in frac'ed zones. Rather st $CuCO_3$ (malachite) & $CuSO_4$(?) along fracs, staining felds, and as inter-granular crusts. Diss ind lm. Cu min st.
1712.1	10.7	"	2.54	88	0.80	0.66		$CuCO_3$ $CuSO_4$(?)					"	"	GR & GR Bx	Similar, but more st'ly frac'ed and Fe ox stained. Pale grn $CuCO_3$ & $CuSO_4$(?) in a few vert vlts, along slip surfaces, and as intergranular crusts. Set'ed, vfg, ind lm. Cu min mod-st.
1717.7	5.6	"	2.48	86	0.42	0.37		$CuCO_3$ $CuSO_4$(?)					"	"	GR & Bx'ED GR	Similar, but less subject to structure. Finely frac'ed, healed, and displaying diss, vfg ind lm. Pale grn crusts of $CuCO_3$ & $CuSO_4$(?) set'ed throughout. Cu min mod-st.
1726.3	8.6	"	2.46	96	0.20	0.15		"					"	"		
1736.4	10.1	"	2.60	92	1.10	0.23		$CuCO_3$ $CuSO_4$(?)	mod		mod-st		"	"	GR & GR Bx	Similar to above to zone of st bx & hm at c. 1728'. Below this pt rk is st'ly bx'ed and granulated, but contains zones of unoxidized material with st, diss vfg py-cc alternating w/ hm flooded bx. Cts 45°-55°. Cu min mod-st
1747.0	10.6	"	2.58	94	0.55	0.09			mod		mod-st		"	"		
1757.4	10.4	"	2.57	90	0.40	0.10			wk		wk-mod		"	"	Bx'ED GR-PORPH WEDGES	GR as above, but displaying low angle struct elements and containing two v. short wedges of a dk gray porph w/ 3 mm ± anhedral phenocrysts of kaolinized feld. PORPH texturally most resembles the MP, and is not min. GR hosts partially ox'ed py-cc, w/ cc much wk'er than above. Cu min wk-med.
1762.5	5.1	"	2.57	100	0.49	0.10			tr-wk		tr-wk		qtz	ser kaolin	GR-PORPH Bx	GR is mg, gen'ly gray to reddish-tan, and mod'ly to st'ly alt'ed. Porph has a fg, dk gray groundmass w/ 1-2 mm phenocrysts of anhedral to euhedral white feld. Set'ed flakes of biot (chloritized?) ... CON'T NEXT PG.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-100
Sheet No. 4 of 5
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1762.5	(CON'T.)	NXWL							tr-wk		tr-wk		qtz –	ser	GR-PORPH	(CON'T.)... and mod-st alt. PORPH prob'ly
1771.7	9.2	"	2.50	80	0.32	0.05			wk-mod		wk-mod			kaolin	BX	intrusive into the GR... and both subsequently bx'ed. Wk hm veining to complete flooding Set'ed, generally ox'ed py-cc. Cu min wk.
1779.5	7.8	"	2.52	92	0.50	0.07			wk	tr-wk	wk		qtz –	ser	GR. BX.	As above, but entirely GR. Rk displays a few pots which appear to be soaked w/ PORPH - locally somewhat grn'ish gray and chlor'ic. Diss & vlts of partially ox'ed py w/ wk cc. Set'ed, diss cpy (?). Cu min wk-mod.
1789.3	9.8	"	2.54	94	0.42	0.03			wk-mod	tr (?)	wk.	tr MoS_2	"	"	GR-PORPH	As above, but again exhibiting both rk
1797.8	8.5	"	2.54	89	0.43	0.01			wk-mod	wk	wk	tr MoS_2 cov (?)	"	"	BX.	types. GR silif'ed. Some cts r. high angle
1799.0	1.2	No	REC	—	—	—			—	—	—	—				with fg py vns, partially milled, along the slip surfaces. Wk py-cc diss in GR. The PORPH displays some set'ed, fg diss py & possible tr cpy. Cu min wk.
1803.5	4.5	"	2.54	94	0.30	0.01			wk-mod	wk-mod	wk-mod	tr MoS_2 cov (?)	"	"	GR	As above - gray'ish org, w/prob'le lower
1813.9	10.4	"	2.52	69	0.36	0.01			wk-mod	wk-mod	wk-mod		"	"		qtz content. Wk diffused chlor throughout. Diss py-cc & cpy. tr MoS_2 & cov(?). Cu min mod.
1821.8	7.9	"	2.54	93	0.65	0.01			wk-mod	mod	wk-mod	cov (?)	"	"	GR-PORPH	As above, but again including both rk types
1832.0	10.2	"	2.57	63	0.46	0.01			"	"	"	"	"	"	BX	Mostly GR w/only one intrusive intercep of PORPH. Diss py w/wk cc and fg diss cpy, seemingly associated w/cov coated cc or cov. Cu min mod.
1841.6	9.6	"	2.55	69	0.64	0.01			wk	wk	(?)	MoS_2 cov (?)	"	"	GR	Similar to above, but becoming more gray, sil, and br toward end of run. Wk, diss py, cc(?), cpy, and MoS_2. Cu min wk.
1851.6	10.0	"	2.56	40	0.55	0.01			wk-mod	tr-wk	(?)	MoS_2	"	"	FLT ZONE BETWEEN GR-PORPH	Mass of sil granules, gg and shr'ed dk grn'ish gray PORPH similar to above. Structures 50°±. GR w/wk py, cc(?), cpy, & MoS_2. PORPH w/milled py & tr (?) of cpy. Cu min wk.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-100
Sheet No. 5 OF 5
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1860.0	8.4	NXWL	2.60	93	0.50	0.03			wk	tr(?)			Kaolin	chlor	PORPH	A dk gray-grn rk w/ a fg, chlor'ized(groundmass and 1-3 mm, gen'ly anhedra phenocrysts. Set'ed biot. Slip surfaces and zones of shr'ing at low-mod angle Gen'ly wk diss, fg py. Possible tr cpy. Cu min tr.
1870.0	10.0	"	2.60	94	0.02	0.01			tr				"	"	FLT ZONE BETWEEN PORPH & AN.	Shr'ed, distorted zone where orig textures are mostly lacking. Rather st'l chloric & wk'ly calc. Some vn'ing by white calcite-dolomite. Basal portion a f dk gray-grn AN(?) with a distinctive, felt texture and similar alt & vn'ing. Only set'ed tr py diss in shr zns. No Cu min obs.
1879.6	9.6	"	2.68	92	0.02	0.01							"	"	AN	Similar to basal portion of above run. Los ly displays chloritized, diss biot, pods and vns of white calcite, and zns of shr' No min obs.
1889.1	9.5	"	2.72	88	0.02	0.01							"	"	AN & pЄ META-GR	As above to c. 1887'. Below this pt the is a st'ly distorted, shr'ed, and granulate zn of pЄ META-GR. This also chlor'i and somewhat kaolinized. No Cu min obs
1899.1	10.0	"	2.70	95	0.03	0.01							kaolin	chlor	pЄ META GR	Rk in a shr'ed, somewhat granulated flt
1910.5	11.4	"	2.68	56	0.01	0.01							–	qtz		zn. Actually, now resembles a gneiss. Few
1915.6	5.1	"	2.65	94	0.01	0.01							"	"		vns & pods of qtz. Localized, v. wk hm – prob'ly fr breakdown of mafics. No min. obs.
1919.0	3.4	"	2.70	88	NOT ASSAYED								"	"	pЄ META GR & AN(?)	META-GR similar to above. Last 2 FT. + is a flt'ed in wedge of vfg dk gray-grn AN(?), w/ vlts and bx matrix of white calcite. Entire run displays a high chlor content. No min obs.
BOTTOM																

Final Depth 1883.0'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-99
Sheet No. 1 OF 10
Date Completed 4-26-68 To 5-2-
5-15-68 To 6-13-
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
214	214	4 3/4" Ro	BIT												ALLUVIUM & CGL	
219	5	NX		50											CGL	ROTARY CORE
305	86	4 3/4" Ro	BIT													
310	5	NX		36											CGL	ROTARY CORE
549	239	4 3/4" Ro	BIT													
554	5	NX		30											CGL	ROTARY CORE
661	107	4 3/4" Ro	BIT													
666	5	NX		54											CGL	ROTARY CORE
794	128	4 3/4" Ro	BIT													
800	6	NX		60											CGL	ROTARY CORE
914	114	4 3/4" Ro	BIT													
919	5	NX		89											CGL	ROTARY CORE
1050	131	4 3/4" Ro	BIT													
															CGL & GR	BEDROCK PLACED AT 1014 FT. ±
1056	6	NX		48											GR	ROTARY CORE - Core is pale grn'ish gray to deep red brn fr/hm flooding. Completely weathered (?) & st'ly alt'ed, crushed, and granulated w/a high percentage of clay throughout. Some ocher-yel Fe ox. Difficult to I.D. as BR. No Cu min obs.
1083	27	4 3/4" Ro	BIT													

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. 5-99
Sheet No. 2 OF 10
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1087.0																BEGINNING OF DD CORE
1094.2	7.2	NXWL	2.51	7	0.01	0.01							qtz-	ser-clay	GR (FLT ZONE)	Nothing but a few small frags of st'ly alt'ed, lt gray to reddish tan, mg GR w/wk to mod Fe ox stain on fracs. Wk, diss, fg ind lm. No Cu min obs.
1096.6	2.4	"	—	0	—	—										No RECOVERY
1106.4	9.8	"	—	64	0.03	0.02							"	"	GR (FLT ZONE)	Rk as above -- core a mass of rk frags in a distorted, granulated material composed of clay, gg, and mod-st Fe ox. Numerous slickensided and hm coated surfaces w/structural trend of 30° to vert. No Cu min obs.
1114.2	7.8	"	—	23	0.02	0.02							"	"	GR (FLT ZONE)	As above -- rk st'ly alt'ed, w/ser creating a pale grn'ish cast. Fe ox somewhat stronger. No Cu min obs.
1123.1	8.9	"	—	62	0.01	0.01							"	"	GR (FLT ZONE)	As above in all respects
1127.4	4.3	"		28	0.02	0.02							"	"		
1137.0	9.6	"		0	—	—										No RECOVERY
1147.2	10.2	"	2.58	68	0.02	0.02							"	"	GR (FLT OR BX ZONE)	As above, but containing a higher percentage of intact rk -- this exhibiting typical bx-type shattering. Mod-st hm in matrix. No Cu min obs.
1152.8	5.6	"	—	0	—	—										No RECOVERY
1161.4	8.6	"	—	45	0.03	0.03							"	"	GR (FLT OR BX ZONE)	As above - Almost total, coarse granulation of intercept. Mod-st Fe ox. High angle structural trends. No Cu min obs.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-99
Sheet No. 3 OF 10
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1171.2	9.8	NXWL	2.56	75	0.02	0.02							qtz -	ser clay	GR (FLT OR Bx ZONE)	As above -- Intact chunks display a coarse grained, less alt'ed texture. Fe ox flooding st in matrix portion and along fracs. No Cu min obs.
1175.1	3.9	"	—	0	—	—										No RECOVERY
1185.1	10.0	"	2.30	20	0.01	0.01							"	"	GR (FLT OR Bx ZONE)	As above in all respects.
1195.1	10.0	"	2.46	62	0.01	0.01							"	"	GR Bx	As above - Alternate chunks of frac'ed but intact, mg-cg GR and zones of localized bx w/a st hm flooding of matrix. All compl ly ox'ed and leached. No Cu min obs.
1205.9	10.8	"	2.47	82	0.01	0.01							"	"	GR Bx	Similar in all respects. Bx & struct elements gen'ly 40°-60° ±. No Cu min obs.
1216.2	10.3	"	2.48	89	0.01	0.01							"	"	GR Bx	Similar -- Intact, but frac'ed and granulated throughout. Mod-st hm and complete ox. No Cu min obs.
1225.2	9.0	"	2.48	89	0.01	0.01							"	"	GR Bx	As above in all respects. No Cu min obs.
1235.1	9.9	"	2.32	70	0.01	0.01							"	"	GR Bx	As above, but more st'ly bx'ed and granulated -- w/even the intact chunks highly distorted. No Cu min obs.
1244.4	9.3	"	2.46	92	0.01	0.01							"	"	GR Bx	As above - So crushed & distorted I.D. of ind lm uncertain. Some yel-ocher Fe ox. No Cu min obs.
1253.0	8.6	"	2.46	92	0.02	0.02							"	"	GR Bx & DP(?)	As above, but hosting some frags resembling the med gray DP. Generally much more intact -- st hm in matrix. No Cu min obs.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-99
Sheet No. 4 OF 10
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1262.3	9.3	NXWL	2.50	94	0.01	0.01							qtz-	ser kaolin	GR-DP(?) Bx	Difficult to determine whether intercepts w/ porph'ic texture are DP or GR w/local phenocryst developments. Groundmass st'ly suggests the DP in some frags - but frags obvious GR display transitional textures. Local high percentage of matrix material w/ st hm. No obvious ind lm. No Cu min obs.
1271.0	8.7	"	2.50	82	0.01	0.01							"	"	GR-DP(?) Bx	As above - w/ the DP(?) constituting a higher percentage of the rk than it had above. No Cu min obs.
1281.0	10.0	"	2.51	86	0.03	0.01							"	"	DP(?)-GR Bx	Similar - highly bx'ed zones alternate w/intact sections, most of which are a mod gray rk w/3-5 mm anhedral to subhedral feld phenocrysts. Much of texture suggests an assimilation of one rock type by the other. Completely ox'ed w/st hm in matrix. No ind lm or Cu min obs.
1291.0	10.0	"	2.50	80	0.04	0.02							"	"	DP(?) Bx	A more pronounced porph'ic texture throughout. Phenocrysts often 5 mm ± and commonly v. pale grn. -- in a fg mod gray groundmass. Bleached, irregular pats, breakage, & hm flooded gg- & bx'ion common. No Cu min obs.
																TYPE SPECIMEN FR/1288'±
1301.0	10.0	"	2.44	95	0.06	0.03							"	"	DP(?) Bx	As above to c. 1290'-1291'. Below this pt there is a zone of extreme bx'ion composed of principally hm flooded clay & gg hosting isolated frags of the porph. Struct element at 60° ±. No Cu min obs.
1309.4	8.4	"	2.46	86	0.09	0.06							"	"	DP(?) Bx	As above, but displaying a higher percentage of rock. Still st'ly br, shr'ed, and bx'ed. Localized hm flooding or bleaching. No ind lm or Cu min obs.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-99
Sheet No. 5 OF 10
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1318.2	8.8	NXWL	2.46	82	0.13	0.08							qtz	ser kaolin	DP(?) Bx	As above in all respects. No Cu min obs.
1328.5	10.3	"	2.48	95	0.44	0.36							"	"	DP(?) Bx	As above -- matrix now exhibits a mixture of Fe ox. Rk frags dk'er gray, w/fine diss spec & biotite. Numerous kaolinized felds are pale grn. Struct elements 60°-70°. No Cu min. obs.
1339.0	10.5	"	2.46	90	0.40	0.32		$CuCO_3$ $CuSO_4$(?)					"	"	DP(?) Bx & GR Bx	As above to c. 1330'. Below this pt the physical character remains unchanged, but the rock type changes. Frags are now GR to microgranite -- mod gray, and silif'ed. Set'd wk-mod, fg, diss ind lm. Interval fr/1330'-1334' displays wk-mod intergranular fillings of grn $CuCO_3$ & possible $CuSO_4$. Cu min wk
1346.0	7.0	"	2.48	95	0.31	0.27		$CuCO_3$ $CuSO_4$(?)					"	"	GR Bx	Similar to basal portion of above run. Frag st'ly alt'ed & displaying fg, ind hm. Matrix v. st in hm. Structural elements gen'ly high angle. Tr $CuCO_3$ & $CuSO_4$(?). Cu min tr.
1357.5	11.5	BXWL	2.48	64	2.07	1.81		$CuCO_3$ $CuSO_4$(?)					"	"	GR & GR Bx	As above -- thin intergranular film & crusts of $CuCO_3$ & $CuSO_4$(?). Basal portion of run displays diss blebs of ind lm -- much of it LLm. Cu min mod.
1367.3	9.8	"	2.54	91	0.19	0.14		$CuCO_3$ $CuSO_4$(?)					"	"	GR & GR Bx	As above. More hm along frac & slip faces & mod-st, fg, ind lm. Set'd tr $CuCO_3$ & $CuSO_4$ (?). Cu min tr-wk.
1377.1	9.8	"	2.58	86	0.14	0.09							"	"	GR & GR Bx	As above. Distorted, granulated & v. st'ly alt'd. Most hm streaking at 45°+. St, vfg, diss ind lm, much of it LLm. No Cu min obs.
1387.0	9.9	"	2.36	100	0.04	0.02							"	"	GR Bx or DP(?)	Prob'ly GR w/faint residual porph'ic textures -- st'ly alt'ed and qtzose. St diss & blebs LLm. No Cu min. obs.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-99
Sheet No. 6 OF 10
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	[redacted] Mo	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1397.4	10.4	BXWL	2.51	94	0.04	0.02							qtz	ser	GR &	As above -- distorted, granulated, & v. st'ly
1407.7	10.3	"	2.31	100	0.60	0.05							"	"	GR BX	alt'ed. Some hm on fracs & st, diss LLm.
																No Cu min obs.
1418.2	10.5	"	2.63	97	0.54	0.16			wk-mod		mod		"	"	GR	Similar to above. Gen'ly lt gray to white --
																qtzose, and mg. Few zones of finer-grained
																aplitic phases. Mod-st, diss & blebs of ind
																lm & LLm. Basal portion of run displays st,
																partially ox'ed py-cc. Overall Cu min mod.
1429.0	10.8	"	2.59	96	0.78	0.15			wk-mod		mod		"	"	GR	As above -- much of texture aplitic. All v.st
																alt'ed. Approx half suls & half ox'ion.
																Basal portion displays mod-st Fe ox. Cu
																min mod.
1439.3	10.3	"	2.56	97	0.03	0.01							"	"	GR	As above, but appears to be completely ox'ed
																leached. Localized frac zones w/ Fe ox.
																No Cu min obs.
1449.9	10.6	"	2.73	96	2.40	0.17	.035		mod-st		st		"	"	GR	Similar to above -- very st'ly alt'ed -- much of
																the texture aplitic. Lower two-thirds of run
																displays st suls in vert vns & fg diss. Cu min
																st.
1460.6	10.7	"	2.78	98	4.00	0.28	.017		mod-st		st		"	"	GR	As above -- st'ly alt'ed, qtzose, & ser'ic. Min
																as above. Possible flakes of diss MoS_2. Cu
																min st.
1471.2	10.6	"	2.56	89	0.02	0.02			tr-wk		wk		"	"	GR	As above -- going into a st'ly shr'ed flt(?)
																zone c. 1462'. Ox'ion appears almost
																complete throughout. Basal portion displays low
																angle slips, gen distortion, & mod-st hm. Mod
																st ind lm - smeared or streaked out in lower
																portions of run. Cu min wk.
1482.0	10.8	"	2.37	81	0.02	0.02			tr-wk		tr-wk		"	"	GR &	Similar to basal portion of above run. Almost
1491.8	9.8	"	2.54	82	0.01	0.01			"		"				GR BX	completely bx'ed and/or granulated. Suls nearly
1501.7	9.9	"	2.49	92	0.03	0.03			"		"					totally ox'ed. Cu min tr-wk.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-99
Sheet No. 7 OF 10
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1512.2	10.5	BXWL	2.59	94	0.02	0.02							qtz	ser	GR &	Similar to above. Very st'ly shr'ed and dis-
1522.8	10.6	"	2.53	91	0.06	0.04							"	"	GR Bx	torted, gen'ly along low angle planes. Very st
1533.5	10.7	"	2.47	92	0.07	0.05							"	"		alt'ed and hm flooded. Diss vfg ind lm & ll
1544.0	10.5	"	2.44	91	0.08	0.06							"	"		Rk appears completely ox'ed & leached. Cu min tr-wk.
1554.3	10.3	"	2.49	92	0.10	0.06		$CuCO_3$ $CuSO_4$(?)					"	"	GR Bx	Similar to above, but displays high angle structural elements (hm vlts, shr's, etc). Thoroughly bx'ed & granulated w/ mod-st Fe ox. Sct'ed blebs of $CuCO_3$ & $CuSO_4$. Cu min tr-wk.
1564.8	10.5	"	2.45	99	0.87	0.81		$CuSO_4$					"	"	GR Bx	As above, but displaying an increase in
1575.4	10.6	"	2.37	97	1.11	1.02		$CuCO_3$(?)					"	"		$CuSO_4$ & $CuCO_3$(?) mineralization--occurs
1585.7	10.3	"	2.56	100	0.55	0.51		"					"	"		in small vlts, blebs, & intergranular films.
1596.2	10.5	"	2.50	92	0.47	0.42		"					"	"		Alternate intercepts are more st'ly bx'ed &
1606.7	10.5	"	2.52	91	0.71	0.68		"	Sct'ed ind		lm		"	"		ox'ed and display mod-st Fe ox. Cu min wk-st.
1617.1	10.4	"	2.49	90	0.84	0.76		$CuSO_4$ $CuCO_3$(?)					"	"	GR-MP(?) Bx	Physically similar to above, but containing frags resembling MP(?). Sct'ed ind lm and blebs, vlts, and intergranular crusts of $CuSO_4$ & $CuCO_3$(?). Cu min wk-mod.
1627.1	10.0	"	2.52	94	0.43	0.38		$CuSO_4$ $CuCO_3$(?)	tr		tr		"	"	GR-MP(?) Bx	Similar - rock resembles a micro-granite w/
1637.7	10.6	"	2.42	89	0.27	0.21		"					"	"		localized porph'ic textures. Few small frags are
1648.3	10.6	"	2.52	86	0.30	0.25		"					"	"		not ox'ed and display fg py-cc in sct'ed diss. Same ox Cu min as above. Rather st ocher yel Fe ox w/hm in shr'ed zones. Cu min wk-st(?).
1658.4	10.1	"	2.54	93	0.26	0.23		$CuSO_4$ $CuCO_3$(?)					"	"	GR Bx	As above but w/ only wk red-brn to yel
1668.8	10.4	"	2.54	87	0.21	0.16		"					"	"		Fe ox. Qtzose, and displaying same ox Cu
1679.3	10.5	"	2.48	49	0.19	0.15		NONE OBS					"	"		min. Cu min tr-mod.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-99
Sheet No. 8 of 10
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1685.7	6.4	BXWL	2.48	27	1.23	1.19		$CuSO_4$ $CuCO_3$					qtz –	ser	GR Bx & GR	Similar to above to prob'ly c. 1684 ft. – a bx of micro-granite w/ wk Fe ox stain and no obs Cu min. Below this pt. rk is a lt gray, st'ly alt'ed, med grained GR w/ mod-st $CuSO_4$ & $CuCO_3$ throughout. Sct'ed wk ind lm. Cu min st.
1691.2	5.5	"	2.65	73	2.56	2.45		"					"	"	GR	Similar to basal portion of above run. Lower portion of this interval exhibits a marked decrease in Ox Cu. Cu min wk-st.
1701.6	10.4	"	2.64	97	2.83	2.50		"					"	"		
1712.1	10.5	"	2.56	95	0.50	0.41		"					"	"		
1722.1	10.0	"	2.52	96	1.06	0.21							qtz –	ser kaolin	GR Bx & PORPH'IC AN(?)	GR st'ly bx'ed and completely healed -- similar to above. Few pats of dk mafics precede the actual intrusive ct of a dk gr porph'ic andesite (?) which bears sct'ed diss biot & mag. Ct occurs c. 1718 ft. No Cu min. obs.
1732.4	10.3	"	2.58	93	0.78	0.16		Azurite	tr-wk	tr(?)	Tr		"	"	GR Bx & PORPH'IC AN (?)	Similar to above -- GR Bx w/ intervals of PORPH'IC AN bounded by intrusive cts. Mixing by assimilation & soaking common. Both rk types display structure. GR exhibits diss, vfg py-cc & tr cpy (?); PORPHIC AN diss, vfg py-cc. A tr of azurite on one frac. Cu min wk.
1742.6	10.2	"	2.60	71	0.58	0.09			wk		tr-wk		"	"	GR Bx	Rk & bx'ion similar to above. Reflects the proximity of the PORPH'IC AN by being some what dk'er & wk'ly chlor'ic. Diss, gen'ly tr-mod py-cc. Cu min tr-wk.
1753.0	10.4	"	2.61	89	0.46	0.09			wk-mod		mod		"	"		
1763.3	10.3	"	2.55	92	0.89	0.09			mod		mod		"	"	GR Bx	Similar to above -- st'ly shr'ed & distorted. An increase in mineralization is accompanied by an increase in oxidation. Few partially ox'ed vns of py. Cu min mod.
1768.6	5.3	"	2.52	90	0.73	0.01			mod	wk	wk-mod		"	"	GR Bx	Similar - mylonite and a mass of granules. Mod-high angle structural elements. Diss py-cc and cpy along w/ wk Fe ox. Cu min mod-st.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-99
Sheet No. 9 OF 10
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1778.6	10.0	BXWL	2.66	91	0.61	0.02			wk-mod	st	wk-mod		Kaolin-ser	qtz-	GR Bx, Porphic An Bx, & Meta GR (?)	As above to c. 1780.5' where a thin wedg of Meta-Gr (?) precedes an intercept of mixe Porph'ic An w/ mottling by hm, silif'ed Gr (p frags, and Porph'ic An soaked Meta-Gr. Some p w/ wk cc in upper portions of run. Diss cpy in the An, and massive blebs cpy in the lowe Gr bx. Cu min st.
1789.1	10.5	"	2.49	91	0.54	0.01			mod	mod-st	mod		"	"	Meta-Gr (?) & Porph'ic An	A lt tan, distorted, crushed & shr'ed Gr w/ narro str's of chlor occurs below a short zone of Porph'ic An & bx. Between c. 1786 - 1787 i a zone of dk grn to blk mylonite w/ hori to low angle shr planes. Balance of run the distorted, shr'ed, chlor'ic Meta-Gr. Diss of vfg py-cc and small blebs of cpy through out. Cu min mod-st.
1799.5	10.4	"	2.58	68	0.47	0.01			mod	mod	mod-st		"	"	Meta-Gr (?) & Mixed Bx	As above -- crumpled, granulated, and locall shr'ed along low angle planes. An intercept of bx contains frags resembling the silif'e portions of the Gr higher in the hole and some frags resembling the Porph'ic An. Entire intercept bears diss py-cc & cpy. Cu min mod-st.
1809.1	9.6	"	2.59	60	0.53	0.01			mod	wk	wk-mod		"	"	Meta-Gr (?) & Mixed Bx	Physically as above -- the growing amount o blk gg makes grade est difficult. Milled py (and other sols?) mixed w/ diss py-cc of fra Cu min prob'ly mod.
1819.0	9.9	"	2.61	22	0.45	0.01			wk-mod	wk	wk		Kaolin,	qtz,	Mixed Bx & Flt GG	Hard, sil frags of what resembles the Gr
1827.9	8.9	"	2.63	38	0.57	0.01			mod	wk-mod	wk		chlor,	& ser		higher in the hole and the Porphic An. Gr
1839.5	11.6	"	2.57	44	0.69	0.01			mod	wk-mod	wk		"	"		wk'ly chlor'ic. Diss py-cc & cpy. Cu min mod Basal portion principally a dk porph (DP?).
1849.6	10.1	"	2.58	66	0.30	0.01			wk-mod				"	"	Mixed Bx & Flt GG Porph'ic An	As above - principally granules & gg. - the Porphic An making up almost all of the frags. Chlor'ic and serp'ized. Set'ed py in matrix & gg. No Cu min obs.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-99
Sheet No. 10 OF 10
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1859.6	10.0	BXWL	2.66	80	0.12	0.01							Kaolin-	chlor serp	FLT ZN W/FRAGS PORPH'IC AN & AN (?)	As above to c. 1852'. Below this pt is a zone of thinly laminated, shr'ed, fg, chlor'ic AN(?). Mass of material is calcareous, w/ fair hm & serp along shr faces. No min obs.
1870.6	11.0	"	2.66	84	0.01	0.01							"	"	AN(?)	Similar to basal portion of above -- progressively less shr'ed & distorted. Where intact, texture is fg & locally trachitic or felty. Color mod gray-grn. Laced w/ vlts of white calcite. No min obs.
1883.0	12.4	"	2.67	98	0.01	0.01							"	"	AN(?)	As above. Rk becomes somewhat dk'r in color and displays small segregations of chloritized biot (?) - creating a synneusis texture. Still laced w/ vlts of white calcite. No min obs.
BOTTOM																

Final Depth 1865.9'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-98
Sheet No. 1 of 7
Date Completed 4-18-68 TO 4-26-68 AND 5-16-68 TO 6-4-68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
327	327	4¾" Ro Bit													Alluvium & CGL	
331	4	NX		73											CGL	Rotary Core
432	101	4¾" Ro Bit													CGL	
436	4	NX		88											CGL	" "
570	134	4¾" Ro Bit		RECOVERY											CGL	
574	4	NX		73											CGL	" "
715	141	4¾" Ro Bit													CGL	
720	5	NX		64											CGL	" "
883	163	4¾" Ro Bit		LINEAR											CGL	
888	5	NX		86											CGL	" "
1146	258	4¾" Ro Bit													CGL	
1151	5	NX		54											CGL	" "
1261	110	4¾" Ro Bit													CGL	
1266	5	NX		78											CGL	" "
1394	128	4¾" Ro Bit													CGL & GR	Bedrock placed at 1350 ft.+.
1395	1	NX		80	Not	Assayed							qtz-	ser	GR	Rk is med grained, mod'ly to st'ly alt'ed, gen'ly lt gray to lt reddish tan. Pale rose to wk hm-red Fe ox on fmc faces. Localized, mod to st, fg, diss ind. lm. No Cu min obs. Rotary Core.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-98
Sheet No. 2 OF 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
																DEPTH DIFFERENCE OF 1 FT BETWEEN MEAS. OF ROTARY RIG AND DIAMOND DRILL.
1396.0																BEGINNING OF DD CORE.
1397.8	1.8	NXWL	2.54	61	0.42	0.39		$CuSO_4$(?) $CuSiO_4$					qtz	– ser	GR	Rk as above -- Displaying low to mod angle fracs w/ ind lm on surfaces, gen'ly mod, fg, ind lm, and inter-granular fillings and high angle vlts of $CuSO_4$ (?) & $CuSiO_4$. Cu min st.
1408.7	10.9	"	2.56	93	0.75	0.71		$CuSO_4$(?) $CuSiO_4$ $CuCO_3$					"	"	GR	As above -- wk to mod hm stain in matrix of narrow, high angle, healed bx zones. Sct'ed blebs, diss, & gen'ly high angle vns of ind lm. Superimposed, intergranular fillings & high angle vlts of $CuSO_4$(?), $CuSiO_4$, and $CuCO_3$. Cu min st.
1417.5	8.8	"	2.52	64	0.79	0.78		$CuCO_3$					"	"	GR	As above -- Rk lt gray, st'ly alt'ed and bleach w/ localized zones hm flooded along high angle structures. Mod, diss, fg ind lm throughout. Sct'ed blebs, frac fillings, & vlts of malachite. Cu min mod.
1428.0	10.5	"	2.42	45	0.11	0.07		$CuCO_3$					"	"	GR	As above -- Overall texture suggests st granulation. Color pale gray to reddish tan to purple. Completely ox'ed & leached w/ sct fg, diss, ind lm and a few blebs of malachite. Cu min tr-wk.
1439.0	11.0	"	2.38	62	0.03	0.02							"	"	GR	As above, but more highly br & granulated -- locally vuggy - mod hm stain in granulate intercepts. Wk - mod diss ind lm. No Cu min obs.
1446.3	7.3	"	2.36	80	0.03	0.02							"	"	GR	As above - qtzose & granulated. Sct'ed fg, ind lm. No Cu min obs.
1455.7	9.4	"	2.54	69	0.03	0.02							"	"	GR	Similar all respects - few high angle hm vns. No Cu min obs.

RECOVERY

LINEAR

Final Depth
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-98
Sheet No. 3 OF 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1463.3	7.6	NXWL	2.46	95	0.04	0.01			wk		wk-mod		qtz	-ser	GR	Rk is pale grayish purple to reddish tan, mg, & st'ly alt'ed and qtzose. Mod-st, vfg diss and high angle vns of ind lm. Basal portion of run exhibits some partial ox'ed diss py-cc. Cu min wk-mod.
1471.6	8.3	"	2.68	95	6.44	0.46			mod	?	st		"	"	GR	Rk as above, but not ox'ed and leached. Vlts & vfg diss of py-cc & possible tr of cpy (?). Cu min st.
1481.7	10.1	"	2.56	93	0.04	0.01			Tr(?)		tr-wk		"	"	GR	Similar to above, but again almost completel ox'ed and leached. St ind lm. One can only guess at remaining tr-wk py-cc. Cu min tr wk unless limonites host Cu.
1489.7	8.0	"	2.38	80	0.04	0.01			wk-mod		mod		"	"	GR	As above -- st'ly qtzose and locally vuggy. Appears to be ox'ed & leached except for localiz pats. Cu min mod.
1498.5	8.8	"	2.56	91	2.57	0.19			mod		st		"	"	GR	As above to c. 1491 ft. Below this pt rk is lt gray, qtzose, ser'ic and exhibits small blebs, vlts, & fg diss of py-cc. Sct'ed, v. wk ox'ion restricted to a few frac zones & faces. Cu min st.
1507.6	9.1	"	2.58	92	0.41	0.21			mod		st		"	"	GR	Similar to basal portion of above run. Rk is
1518.1	10.5	"	2.46	84	3.29	0.10			mod		st		"	"		lt gray, mg, and exhibits v. st qtz-ser alt. Some
1528.7	10.6	"	2.56	80	3.39	0.07			mod		st		"	"		py & st cc in vlts, blebs, & fg diss throughou Cu min st.
1539.7	11.0	"	2.49	94	3.09	0.08			mod-st		st		"	"	GR	As above -- qtz-cc appear to be associated
1548.5	8.8		2.53	93	2.88	0.15			mod		st		"	"		w/cc actually xline in the more sil areas. Much
1558.3	9.8	"	2.50	95	3.28	0.22			mod		st		"	"		of the cc appears to be primary. Very restrict ed ox'ion along a few slip faces. Cu min st.
1568.3	10.0	"	2.58	96	2.59	0.21			mod		st		"	"	GR	As above -- some vert. qtz vn'ing and narrow bands of wk ox'ion. Cu min st.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-98
Sheet No. 4 of 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	[redacted]	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
							Mo									
1578.3	10.0	NXWL	2.54	100	2.67	0.09			mod		st		qtz	ser	GR	As above -- somewhat more clearly displays the localized pats and zones of a semi-porph'ic texture and sct'ed, diffuse, flesh-colored feldspathic development. Min as above Cu min. st.
1588.6	10.3	"	2.54	97	3.54	0.09	0.033		mod		st	MoS_2(?)	"	"	GR	As above in all respects.
1598.1	9.5	"	2.63	100+	3.80	0.08			mod-st		st	MoS_2(?)	"	"	GR	As above in all respects.
1607.7	9.6	"	2.56	98	2.81	0.12	0.017		mod-st		st	MoS_2(?)	"	"	GR	As above in all respects.
1617.8	10.1	"	2.61	100+	2.45	0.20			mod-st		st	MoS_2(?)	"	"	GR & BX'ED GR	As above, but prob'ly containing a higher py to cc ratio. Basal 2 ft of run bx'ed and ox'ed. Fe ox in the matrix. Cu min mod-st.
1627.5	9.7	"	2.60	91	3.12	0.18	0.043		mod-st		st	MoS_2(?)	"	"	GR & BX'ED GR	As above -- sct'ed ox'ion in upper portion of run. Orig textures nearly completely obl'ered, w/much of rock now dense & pale gray to v. pale grn'ish gray. Py-cc diss and in vlts. Cu min mod-st.
1637.4	9.9	"	2.62	95	3.60	0.12			mod-st		st	MoS_2(?)	"	"	GR & BX'ED GR	As above, but somewhat more qtzose, granulated, and shr'ed along 40°-45° trends. Same diss py-cc. Cu min st.
1647.6	10.2	"	2.59	87	2.89	0.12	0.016		mod-st		st	MoS_2(?)	"	"	GR & BX'ED GR	As above -- lt gray, w/ oblitered textures and dk segregations. The cc appears to be st'er in diss than the vlts -- many of which are solely py. Few dk pats and very localized ox' zones. Cu min mod-st.
1657.0	9.4	"	2.64	92	3.05	0.10			mod		st.	MoS_2(?)	"	"	GR & BX'ED GR	As above -- even more granulated & distorted. Few bx frags resemble a dk porph. St, fg suls. Nomer offsets in vlts. Cu min st.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-98
Sheet No. 5 OF 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	[redacted]	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
							Mo									
1666.7	9.7	NXWL	2.74	97	2.11	0.07	0.018		mod		mod-st	MoS_2(?)	qtz-	ser	GR	Similar to above - textures gen'ly oblitered. Core cut by numerous v.f fracs & vlts -- gray qtzose, or dense, w/ basal portion displaying a number of small open vugs. Cu min mod-st.
1674.1	7.4	"	2.67	94	1.99	0.07			mod-st		mod-st	MoS_2(?)	"	"	GR	As above in all respects. MoS_2 streaked on some slip faces. Cu min mod-st.
1683.3	9.2	"	2.73	92	2.05	0.08	0.019		mod-st		mod-st	MoS_2(?) cov(?)	"	"	GR	As above -- texture obliterated or a fg aplitic one. Fracturing & shr'ing common. Diss & vlts of py-cc. Some MoS_2 & cov(?). Cu min mod-st.
1693.6	10.3	"	2.61	89	2.39	0.08			mod-st		mod-st	cov(?)	"	"	GR	As above -- mod gray, silif'ed, and st'ly distorted and granulated. Locally ox'ed along slips and fracs. Minor feldspathic pats. Greater py:cc ratio. Cu min mod-st.
1703.4	9.8	"	2.54	94	2.56	0.09	0.038		mod		mod-st	MoS_2(?)	"	"	GR	As above, but coarser grained and partially ox'ed -- displaying good ind lm & LLm in these
1713.5	10.1	"	2.56	97	2.50	0.24			wk-mod		mod-st	cov(?)	"	"		ox zones. Distortion & granulation common
1724.8	11.3	"	2.50	27	0.84	0.07			wk-mod		mod-st	cov(?)	"	"		Cu min mod-st.
1733.6	8.8	"	2.55	89	0.74	0.07			wk-mod		mod-st	MoS_2(?) cov(?)	"	"	GR	Similar to above -- many phases of texture
1743.6	10.0	"	2.56	91	0.99	0.06			wk-mod		mod-st	cov(?)	"	"		are porph'ic. Basal portion of run st'ly br and distorted. Somewhat greater ox'ion o suls than above, but still displaying blebs & fg diss of py-cc-cov(?) Cu min mod-st.
1753.2	9.6	"	2.54	98	1.10	0.11			wk		mod	cov(?)	"	"	GR & Mp(?)	Similar to above to c. 1748.6'. Below this pt
													kaolin-	chlor(?)		texture is more integrated -- reflecting an increase in introduced silica and an under tone of chlor(?). Ox'ion much st'ler. Cu min mod.
1763.2	10.0	"	2.61	95	0.69	0.17	0.022		wk-mod		wk-mod	MoS_2(?) cov(?)	"	"	GR(?) & Mp(?)	Continuation of the basal portion of above run. Somewhat fused texture intermediate between a silif'ed GR and the less porph'ic phases of the Mp. Sct'ed diss py-cc. & tr MoS_2(?).

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-98
Sheet No. 6 OF 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1771.2	8.0	NXWL	2.65	88	2.63	0.45			mod	tr(?)	wk-mod	MoS_2(?) cov(?)	qtz	kaolin chlor(?)	GR(?) & MP	Similar to above. Few granulated slip zone w/ 550-60° trends. Localized pats of mod to dk gray-grn porph'ic texture. Some vert, slickensided surfaces exhibit streaked-out MoS_2. Gen'ly fg py-cc diss throughout. Cu min mod
1781.0	9.8	"	2.56	92	0.81	0.32	0.029		wk-mod	tr(?)	tr-wk	MoS_2	qtz	kaolin chlor(?)	MP	As above -- variable textures - fr/a fused dense, sil one to a dk'er gray-grn porph one. The latter displays 1-2 mm subhedral to euhedral feld phenocrysts in a matrix w/ st, fg chloritized mica. Frac face depos and v'lts of hm, MoS_2 streaked on some slip faces. Diss, vfg py & tr-wk cc. Cu min tr wk.
1791.0	10.0	"	2.58	71	0.64	0.23			wk-mod	tr-wk	tr(?)	MoS_2(?)	"	"	MP	As above -- same variable textures. When broken, rk exhibits an exceptional amount of shr'ing an st evidence of the META-GR textures w/ superimposed hydrothermal (?) alt Diss vfg py & tr cc. Possible wk cpy. Cu min tr-wk.
1796.2	5.2	"	2.50	88	0.90	0.08			wk-mod	wk	tr(?)	MoS_2	"	"	MP IN FLT ZN	As above - dk gray to gray grn. Rk displays much fg micaceous material, evidence of numerous shrs, and mod-st Fe ox on fracs & slips. Diss fg py & vfg cpy. Sct'ed flakes of MoS_2 and tr(?) cc. Cu min wk. Beginning of an intense flt zone in basal portion of intercept.
1806.3	10.1	"	2.65	67	1.17	0.15			wk-mod	wk		MoS_2	"	"		
1815.7	9.4	"	2.47	73	0.49	0.02			mod	wk-mod	wk		"	"	MP IN FLT ZN	Rk prob'ly similar to above, but reduced to a mass of sil granules and gg. Gen'ly vfg, diss py-cc & cpy. Cu min wk-mod.
1825.4	9.7	"	2.48	87	0.24	0.05			tr-wk	mod		MoS_2	"	"	MP	Similar to rk above flt, but exhibiting ox'ed micaceous matrix w/ diss, fresh biot & gen'ly mod-st hm flooding. Numerous slickensided slip surfaces w/ crusts of ind lm. Diss, vfg cpy throughout. MoS_2 smeared of some of the slip surfaces. Cu min mod-st.
1835.4	10.0	"	2.52	95	0.26	0.03			tr-wk	mod		MoS_2	"	"		
1845.8	10.4	"	2.56	96	0.30	0.07			wk	mod-st	tr(?)	cov(?)	"	"		
1856.3	10.5	"	2.54	93	0.33	0.04			wk	mod-st			"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-98
Sheet No. 7 of 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu			Mineralization					Alteration		Rock Type	Remarks
					Total	Non-S	Average	Oxides	Pyrite	Cpy	Cc	Other				
1865.9	9.6	NXWL	2.48	75	0.34	0.03			wk	wk	tr(?)		qtz – kaolin in Mp and qtz – ser in GR(?)		Mp & GR(?)	Initial rk similar to above. Below c. 1858' it becomes st'ly shr'ed, crushed, and finally granulated. Balance of run represents a flt. zone with frags of possible GR. This rk has a fused texture, bears vfg cpy, and displays wk-mod hm along fracs & slips. Cu min wk.
BOTTOM																

Final Depth 610.5'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-97
Sheet No. 1 OF 4
Date Completed 4-12-68 TO 4-13-68 / 5-9-68 TO 5-15-
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
																CORE SPLIT PRIOR TO LOGGING.
294	294	ROBIT													OVERBURDEN	Composed of alluvium & wk'ly consolidated cgl.
																BEDROCK PLACED AT 294 FT.
304	10	ROBIT													BR(?)	
305.2	1.2	DEPTH DIFFERENCE -- ROTARY TO DIAMOND DRILL														BEGINNING OF CORE
315.7	10.5	NXWL	2.58	68	0.13	0.05							qtz - ser w/some	kaolin	GRANITE & GR BX	Med to coarse grain'd. St'ly alt'ed, shr'e and crushed. Bx matrix flooded w/hm -- a are most of the frags. Gen'ly mod-st vfg ind lm. Few zones appear to be flt'ed-in sliver of MONZONITE PORPH. Sct'ed intervals of hm flooded gg. No Cu min obs.
326.4	10.7	"	2.54	87	0.08	0.04							"	"	GRANITE & GR BX	Similar to above - somewhat more competent. Fair amt of ind lm is LLm. Pale grn undertone to alt'ed felds. No Cu min obs.
331.7	5.3	"	2.50	93	0.15	0.09		$CuSiO_4$ CuO(?)					"	"	GRANITE & GR BX	Similar -- less hm stain and granulation. Thin crusts of $CuSiO_4$ and a few localized spots of black CuO (?) on a number of frac faces. Cu min wk.
342.0	10.3	"	2.46	81	0.13	0.09		$CuSiO_4$ CuO(?)					"	"	GRANITE & GR BX	Similar - Somewhat more br & granulated, w/zones of nothing but qtz granules & ser. Thin crusts & a few sct'ed spots of $CuSiO$ and CuO(?). Cu min wk.
351.2	9.2	"	2.54	84	0.07	0.04							"	"	MP(?) BX & GR BX	Similar, but so alt'ed, bx'ed and hm flooded that I.D. is uncertain -- Most of core prob'ly MP. Some ocher lm along fracs. No Cu min obs.

Final Depth
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-97
Sheet No. 2 OF 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
361.2	10.0	NXWL	2.62	95	0.53	0.48		$CuSiO_4$					qtz-	ser	Bx'ed GR & MP(?) Bx -BA DIKE	Gr less bx'ed than MP(?). The latter displays fg diss biotite -- both are leached and hm flooded. Intrusive cts bound a BA dike which extends fr 356.4' to 358.7'. Dike exhibits vlts & frac fillings of $CuSiO_4$. Overall Cu min is wk.
371.3	10.1	"	2.60	97	0.10	0.08							"	"	Bx'ED GR	As above - somewhat wk'er hm flooding. Rk is well alt'ed and completely leached -- displaying mod-st, vfg diss ind lm. No Cu min obs.
379.8	8.5	"	2.60	85	0.15	0.10							"	"	Bx'ED GR w/DIAB DIKE	GR similar -- distorted, locally bx'ed and perhaps incorporating some MP in the bx. Diabase could be either intrusive or struct. This rk is fg, dk gray-grn, and exhibits a great deal of struct. Mod ind lm in GR. Some possible jarosite in diab. No Cu min obs.
390.0	10.2	"	2.53	100	0.10	0.07							"	"	Bx'ED GR	Similar to above GR. Mod'ly-st'ly alt'ed & displaying only wk-mod hm flooding. Gen'ly mod, vfg, diss ind lm. Completely leached & alt'ed. Few small spots of possible CuO on one frac in basal portion of intercept.
400.5	10.5	"	2.56	97	0.06	0.04							"	"		
410.7	10.2	"	2.52	98	0.08	0.06		CuO(?)					"	"		
421.0	10.3	"	2.50	97	0.06	0.05							"	"	Bx'ED GR	As above, but gen'ly more st'ly alt'ed and qtzose -- more bx'ed and hm flooded. Variable ind lm (wk-st). No Cu min obs.
431.0	10.0	"	2.52	100	0.04	0.03							"	"	Bx'ED GR	As above except for sct'ed occurances of jarosite (?). No Cu min obs.
441.0	10.0	"	2.67	93	0.06	0.05							"	"	Bx'ED GR & MP(?) Bx	Mostly GR -- leached, qtzose, & partially hm flooded. St'ly bx'ed zones exhibit sections of MP (?) with diss biotite. GR displays mod vfg, diss ind lm. No Cu min obs.

Final Depth
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-97
Sheet No. 3 of 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
451.1	10.1	NXWL	2.72	94	0.04	0.03							qtz-	ser	GR Bx	As above -- completed healed, but st'ly bx'ed, distorted, and partially hm flooded. Completely ox'ed and leached. No Cu min obs.
461.1	10.0	"	2.50	94	0.04	0.03							"	"	GR Bx & MP(?)	As above to approx. 453'. Below this is a zone of bleached, st'ly alt'ed, and locally hm flooded MP(?) -- crushed, distorted, and healed w/local pats diss biotite. Color fr/buff-to dk gray-to hm red. Completely ox'ed and leached. No Cu min. obs.
469.0	7.9	"	2.58	93	0.07	0.05					tr(?)		"	" serp	MP(?) Bx & GR	Run gen'ly all MP(?) w/a few slivers of GR. Destruction of textures & high degree of hm flooding make positive I.D. difficult. Mostly qtzose -- w/a few blebs of serp. Possible tr vfg cc. Cu min tr.
479.3	10.3	"	2.50	85	0.08	0.07		$CuSiO_4$					"	"	Bx'ED GR & MP(?)	St'ly qtzose -- destroying most textures, locally open fracs. Marbled w/hm and displaying a few pats w/some jarosite(?). Completely ox'ed and leached. Tr $CuSiO_4$. Cu min tr
489.6	10.3	"	2.52	91	0.11	0.08		$CuSO_4$(?)					qtz-	ser kaolin	Bx'ED MP & GR(?)	As above, but principally the biotite bearing MP -- ox'ed, leached, & mod'ly hm flooded. Few sct'ed tr $CuSO_4$(?). Cu min tr-wk
499.9	10.3	"	2.74	90	0.33	0.26		$CuCO_3$					"	"	Bx'ED MP	As above -- silif'ed pats display wk films of $CuCO_3$ & $CuSO_4$(?). Cu min tr-wk.
509.0	9.1	"	2.46	91	0.22	0.21		$CuSO_4$(?)					"	"		
520.0	11.0	"	2.54	88	0.55	0.53							"	"		
530.2	10.2	"	2.55	97	0.14	0.13							"	"		
540.5	10.3	"	2.50	99	0.09	0.07		$CuCO_3$					"	"	Bx'ED MP	As above -- Color ranges fr/lt gray to purple, to hm red. St'ly alt'ed, locally silif'ed, and displaying distortion and/or healed bx'ion throughout. Sct'ed tr-wk $CuCO_3$ & $CuSO_4$(?), gen'ly associated w/the more sil zones. Locally exhibits fg, diss and lm. Cu min tr-wk.
550.7	10.2	"	2.52	89	0.11	0.09		$CuSO_4$(?)					"	"		
559.7	9.0	"	2.48	98	0.08	0.05							"	"		
570.0	10.3	"	2.48	85	0.17	0.15							"	"		
580.0	10.0	"	2.52	88	0.18	0.17							"	"		
590.3	10.3	"	2.58	90	0.25	0.23							"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-97
Sheet No. 4 of 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
600.5	10.2	NXWL	2.50	97	0.06	0.05							qtz-ser	Kaolin	Bx'ed Mp	Similar to above in all respects. Few localized blebs of ind 1m. No Cu min obs.
610.5	10.0	"	2.64	94	0.11	0.09		$CuSO_4$(?)					"	"	Bx'ed Mp & GR	Similar to above but displaying a few bx frag of mod'ly-st'ly alt'ed cg GR w/vfg diss in 1m. Basal portion of run again in Mp. Few tr $CuSO_4$(?) in Mp. Cu min tr-wk.
BOTTOM																

Final Depth 1779.4'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-96
Sheet No. 1 of 4
Date Completed 4·12·68 To 4·18·68 / 6·13·68 To 7·3·68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1060	1060	4 3/4" RoBit													Alluvium & Cgl	
																Bedrock Placed At 1060 Ft.
1134	74	4 3/4" RoBit														
1138.0																Start of DD Core
1149.0	11.0	NXWL	2.46	78	0.04	0.03							qtz –	ser	Gr Bx	A mg, st'ly alt'ed lt gray to reddish-tan
1161.6	12.6	"	2.44	79	0.03	0.02							"	kaolin	with pats	Gr exhibiting some zones of porph'ic texture
1173.0	11.4	"	2.46	81	0.04	0.02							"	"	Dp(?)	These zones usually host diss bks of fresh
																biot. Entire rock st br, granulated, or
																reduced to gg. Gen'ly mod-st Fe ox stain
																throughout. No ind lm or Cu min obs.
1183.0	10.0	"	2.40	75	0.04	0.03							"	"	Dp(?)	Prob'ly the mg, light gray to gray Dp, St'ly
1192.2	9.2	"	2.38	76	0.06	0.03							"	"	Bx	alt'ed and milled, crushed, & granulated
1201.7	9.5	"	2.30	86	0.03	0.03							"	"		until only sct'ed, isolated frags of the
1209.4	7.7	"	2.38	64	0.04	0.04							"	"		original textures are found. Mod-st ocher yel
1215.6	6.2	"	2.45	81	0.07	0.06							"	"		to brn to hm-red Fe ox stain and flooding.
													tr	chlor		Few frags could be Gr. Sct'ed tr ind lm.
																No Cu min obs.
1224.0	8.4	"	2.45	100	0.16	0.12							qtz –	ser	Dp(?)	Do – orig porph'ic textures more obvious.
														kaolin	Bx	Prob'ly some Dp soaked Gr in this interval
													Some	chlor		No Cu min obs.
1234.2	10.2	"	2.52	83	1.45	1.33		$CuCO_3$ $CuSO_4$(?)					"	"	Dp(?) Bx & Gr Bx	Dp(?) as above to c. 1227'. At this pt a
																high angle flt zn separates the upper
																Dp(?) fr a Gr similar to that comprising
																the bx in the first runs of core in this
																hole. Gr is distorted, bx'ed, and healed. It
																displays pale grn, diffused $CuCO_3$ & $CuSO_4$
																(?). Sct'ed vfg diss ind lm. Cu min wk -
																mod.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-96
Sheet No. 2 OF 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1245.8	11.6	NXWL	2.52	34	0.11	0.09		$CuCO_3$ $CuSO_4$(?)					qtz-ser		BX'ED GR & DP(?)	As above, but st'ly br & displaying hm along frac surfaces. Much of interval dense, bleached, and difficult to I.D. It could be either DP or a phase of the MICRO-GR. Wk crust of the grn ox Cu in upper portion of run. Lower portion displays vfg ind lm. Cu min tr-wk.
1256.1	10.3	"	2.50	80	0.07	0.07							"	"	BX'ED GR	Rk is lt gray to reddish gray, mg, and st'ly alt'ed. Intact, distorted intercepts alternate w/ br, bx'ed, or granulated zones. Gen'ly mod-st hm within these zones. Sct'ed crusts of $CuCO_3$ & $CuSO_4$(?). Variable, but gen'ly wk diss ind lm. Some felds pale grn. Cu min ranges tr-st.
1266.5	10.4	"	2.44	86	0.15	0.14							"	"		
1275.1	8.6	"	2.47	93	0.16	0.16							"	"		
1285.3	10.2	"	2.49	95	0.50	0.49		$CuSiO_4$	IN VERT VLTS				"	"		
1295.8	10.5	"	2.54	97	2.67	2.50		$CuCO_3$ $CuSO_4$	ST & DIFFUSED			Less hm	Do + ST QTZ			
1306.0	10.2	"	2.51	94	1.06	0.93		$CuSO_4$(?) $CuCO_3$					qtz-ser and st qtz w/ser		BX'ED GR OR DP(?)	The above more obvious GR is terminated by a mod-high angle flt in the upper portions of the interval. Below the flt zn is a mg to cg rk w/ 2-5 mm, anhedral felds which create a "porphyritic" texture. Diss fg ind lm throughout. St, diffused $CuSO_4$(?) and $CuCO_3$.
1316.7	10.7	"	2.44	89	0.85	0.81		$CuSO_4$(?) $CuCO_3$					"	"	BX'ED GR OR DP(?)	As above, in all probability the GR, but displaying less min toward lower end of interval. Diss & vlts of ind lm & LLm. Basal 2 ft+ st'ly br & hm stained. Cu min mod-st.
1321.7	5.0	"	2.56	100	0.79	0.71		$CuSO_4$(?) $CuCO_3$					"	"	GR & BX'ED GR	Rk as above, but more obviously GR. Localized zones of bx & hm flooding. St qtz & fair amt of ind lm & LLm. Diffused, grn ox Cu. Cu min mod-st.
1330.0	8.3	"	2.52	54	2.86	2.37		"					"	"		
1340.0	10.0	"	2.51	96	1.06	0.91		"					"	"		
1350.3	10.3	"	2.52	90	0.54	0.07			mod		mod-st	ind lm LLm	"	"	GR & BX'ED GR	Rk as above. Mineralization undergoes the transition fr ox to sul. Diss & vlts py-cc. Some intervals display partial ox. Cu min mod-st.
1360.4	10.1	"	2.64	100	3.56	0.38			mod-st		st		"	"		
1370.7	10.3	"	2.61	100	1.94	0.16			mod-st	?	st	ind lm LLm	"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-96
Sheet No. 3 OF 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1381.0	10.3	NXWL	2.65	96	0.30	0.06			mod	?	mod-st		qtz-ser &		GR &	Rk as above. Local oxidation, w/or w/out
1391.4	10.4	"	2.57	95	0.06	0.03			wk		tr-wk		st qtz	w/ser	BX'ED GR	bx, is greater. Some zns st'ly sil. Large
1401.7	10.3	"	2.59	52	0.04	0.02							"	"		anhedral felds throughout. Diss & vlts
1412.2	10.5	"	2.50	90	0.03	0.02					tr(?)		"	"		py-cc, ind lm, & Lbm. Basal intervals
1422.4	10.2	"	2.46	93	0.05	0.02							"	"		essentially totally ox'ed. Cu min ranges
																wk-st(?).
1432.5	10.1	"	2.71	100	4.72	0.24			st		st		"	"	GR &	As above, but essentially unoxidized.
															BX'ED GR	Rk gen'ly lt gray and displaying large
																anhedral felds. St'ly alt'ed, w/diss,
																vlts, and blebs of py-cc. Cu min st.
1443.1	10.6	"	2.72	96	0.37	0.03			st		wk		"	"	GR &	Similar -- displaying st py in fg diss, vlts,
															BX'ED GR	and blebs. In general, cc appears rather
																wk
1453.8	10.7	"	2.62	88	1.46	0.09			mod-st		mod-st		"	"	GR &	Rk as above, but locally ox'ed - particularly
1459.3	5.5	"	2.67	87	0.36	0.03			st		mod		"	"	BX'ED GR	along vlts. Py somewhat wk'er, but cc
1470.1	10.8	"	2.58	92	1.04	0.05			mod-st		mod-st		"	"		showing an increase. Still only minor hm.
1480.3	10.2	"	2.52	98	0.89	0.04			mod-st		st		"	"		Locally exhibits a wk chlor'ic undertone.
1490.3	10.0	"	2.61	91	1.13	0.04			mod-st		st		"	"		Cu min mod-st.
1500.8	10.5	"	2.61	98	1.40	0.04			mod-st		st		"	"		
1511.4	10.6	"	2.56	98	1.23	0.04			mod-st		mod-st		"	"		
1522.0	10.6	"	2.66	92	0.91	0.05			mod-st	?	st		"	"	BX'ED GR	Completely gray, locally st'ly bx'ed & granulated
1533.1	11.1	"	2.60	45	1.31	0.06			mod-st		mod-st		"	"		Sil, w/mod angle struct elements. Diss
1544.1	11.0	"	2.64	86	1.35	0.04										suls vfg. Basal portion of last interval
																displays open, vert vlts and partial ox.
1554.4	10.3	"	2.50	95	0.73	0.03			mod-st		st		"	"	BX'ED GR	Similar to basal portion of above run.
1561.4	7.0	"	2.66	77	0.81	0.04			mod-st		st		"	"		Some local ox along partially open fracs
1571.8	10.4	"	2.50	95	0.79	0.03			mod-st		st		"	"		Vlts & vfg diss py-cc throughout balance
1581.1	9.3	"	2.70	88	1.33	0.04			mod-st		st		"	"		of run. Cu min mod-st.
1591.8	10.7	"	2.65	76	1.04	0.03			mod-st		mod-st		"	"		
1601.3	9.5	"	2.66	93	1.14	0.05			st		st		"	"		
1608.0	6.7	"	2.60	100+	0.78	0.06			st		mod-st		"	"		
1618.4	10.4	"	2.61	92	0.62	0.14			st		mod-st		"	"		
1629.0	10.6	"	2.61	90	0.49	0.04			mod-st		mod		"	"		
1639.8	10.8	"	2.61	95	0.74	0.07			mod-st		mod-st		"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-96
Sheet No. 4 OF 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1649.0	9.2	NXWL	2.57	96	0.60	0.04			mod-st		st		qtz	ser	BX'ED GR	Rk as described above - gray, v. st'ly alt'ed,
1659.0	10.0	"	2.55	72	0.57	0.04			mod-st		mod-st		"	"		bx'ed & granulated. Diss & sct'ed vlts of
1669.0	10.0	"	2.52	76	0.45	0.03			mod		mod-st		"	"		py-cc. Cu min
1678.1	9.1	"	2.52	72	0.47	0.04			mod-st		mod-st		"	"		
1688.0	9.9	"	2.51	91	0.26	0.05			mod-st		wk-mod	TR COV(?)	qtz	ser	BX'ED GR	Similar to c. 1679-1680 ft. where a high
1698.8	10.8	"	2.60	92	0.55	0.04			mod-st		tr		"	"		angle slip or flt zn precedes an equally br
																& bx'ed, dense, silif phase of the GR. Min
																consists of primarily fg-mg diss & frac
																fillings of py and only sct'ed grains of
																cov (?). Cu min wk-mod.
1709.0	10.2	"	2.58	90	0.28	0.03			wk-mod	tr (?)	wk		"	"	BX'ED GR	Core displays both of the above phases in
																a mixed bx. Cu min mod.
1714.1	5.1	"	2.55	100	0.30	0.03			mod	wk-mod	wk	MoS_2	"	"	BX'ED GR	The coarser grained phase of the GR similar
1719.1	5.0	No	REC	—	—	—			—	—	—	—				that above 1680'. Diss and fine strs of
1725.5	6.4	NXWL	2.55	75	0.31	0.04			mod	tr	wk-mod	OX'ED VLTS	"	"		py, cpy (w/some cc), & sct'ed flakes of
1736.3	10.8	"	2.50	100	0.52	0.05			wk		wk-mod	"	"	"		MoS_2. Cu min mod-st
1746.5	10.2	"	2.50	86	0.38	0.05			wk	wk	wk-mod	"	"	"	←	Pale undertone of chlor
1757.0	10.5	"	2.50	90	0.30	0.04			wk	tr (?)	wk	"	"	"		
1767.1	10.1	"	2.49	89	0.36	0.04			mod-st	tr (?)	wk	"	"	"		
1778.3	11.2	"	2.50	72	0.50	0.04			mod	tr (?)	wk-mod	"	"	"		
1779.4	1.1	No REC		—	—	—			—	—	—	—	—	—	—	
BOTTOM																

Final Depth 901.5'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-95
Sheet No. 1 of 5
Date Completed 4-11-68 to 4-12-68, 6-20-68 to 7-3-68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	[redacted]	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
							Mo									
190	190	4¾" Ro BIT													ALLUVIUM & CGL	
190																BEGINNING OF DD CORE
193.2	3.2	NXWL		59	NOT	SPLIT									CGL (?) & MP	CGL has gen'ly fg, light brn (5YR 6/6) matrix w/ang to subang frags ranging 2-33 mm in diam. At least some of these frags are unmineralized cg GR. BEDROC ct c. 193 ft. St'ly suggests a flt zone w/ 10°-15° struct elements. Rk below this is a st'ly granulated Mp w/ mod-st hm stain.
195.3	2.1	"	2.56	95	0.07	0.02							qtz – ser		MP BX	Rk is a dk gray, gen'ly highly sil, st'ly alt'ed MP w/ localized zones of healed bx w/ st hm flooding. Dip of bx zns variable, some local, partial opening of 30° to vert fracs. Rather st spec in vlts and blebs throughout. No Cu min obs.
206.3	11.0	"	2.58	91	0.02	0.01							"	"		
216.4	10.1	"	2.68	95	0.03	0.02							"	"		
225.9	9.5	"	2.68	83	0.04	0.03							"	"		
235.5	9.6	"	2.67	89	0.08	0.02							"	"		
243.2	7.7	"	2.68	94	0.26	0.14	0.018						qtz – ser (st silif)		MP BX	As above – st sil all but obliterates porph'ic textures. Rk med-dk gray w/ mod-st hm associated w/ healed bx. Spec common Some open vugs & vlts. Fair amt of jarosite (?) in crusts & vlts. No Cu min obs
253.3	10.1	"	2.68	100	0.08	0.04										
264.0	10.7	"	2.70	90	0.07	0.01		ST SPEC & SILIF					"	"		
274.4	10.4	"	2.69	93	0.05	0.02		"	"	"	"	"	"	"		
284.4	10.0	"	2.62	96	0.08	0.01		"	"	"	"	"	TR DISS IND LM	"	"	
292.2	7.8	"	2.57	91	0.07	0.01		TR $CuSiO_4$					" "	"	"	MP BX Rk as above – still exhibiting st spec, hm and silif. TR of thin crusts of $CuSiO_4$. Set'ed, diss vfg ind lm. Cu min tr-wk.
302.4	10.2	"	2.72	98	0.33	0.21		TR-WK $CuSiO_4$					" "	"	"	
312.4	10.0	"	2.60	99	0.20	0.10		TR $CuSiO_4$					" "	"	"	
322.7	10.3	"	2.65	97	0.09	0.02							WK-MOD IND LM	"	"	
333.0	10.3	"	2.48	98	0.07	0.01							" "	"	"	BX'ED St. spec.
343.7	10.7	"	2.48	94	0.48	0.04							ST IND LM	"	"	MP & GR(?) Mod'ly – st'ly hm stained
354.1	10.4	"	2.56	97	0.05	0.01							"	"	"	Rk v. st'ly silif. & displaying st hm. Set'ed bio
364.5	10.4	"	2.56	98	0.06	0.01										

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-95
Sheet No. 2 of 5
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
375.5	11.0	NXWL	2.45	96	0.10	0.01						MOD-ST IND LM	qtz – ser		BX'ED	As described above – v. st'ly silif &
385.7	10.2	"	2.57	96	0.13	0.01							(st silif)		MP & GR	gen'ly st'ly hm stained. Completely
395.9	10.2	"	2.64	100	3.70	0.18			mod		mod-st	"	"	"	(?)	ox'ed and leached to c. 386.5' – w/no
405.9	10.0	"	2.60	93	3.94	0.23			mod		st	"	qtz – ser			Cu min obs. Below this pt are sct'ed
416.1	10.2	"	2.70	93	0.88	0.04			wk-mod		mod	ST IND LM	"	"		unoxidized intercepts exhibiting diss, vlts,
																and blabs of fg-vfg py-cc. Cu min mod-
425.6	9.5	"	2.65	94	1.13	0.03			mod		st		qtz – ser		BX'ED GR	Rk gen'ly lt gray except where smearing
436.1	10.5	"	—	81	0.51	0.03			mod-st		st		"	"	(?)	or milling of suls creates blk accents. St'ly
445.1	9.0	"	2.45	93	1.65	0.02			mod-st		st		"	"		alt'ed, silif, and highly br and milled. Diss
454.0	8.9	"	2.61	94	1.05	0.01			st		st					fine str's, and blabs of py-cc throughout. No
462.9	8.9	"	2.61	93	0.79	TR.			st		st					hm stain or flooding. Cu min st.
																DIFFICULT TO I.D. ROCK TYPE(S) IN ABOVE
																INTERVALS W/CERTAINTY. ORIGINAL TEXTURES
																ARE LARGELY MASKED BY SILICIFICATION,
																BRECCIATION, AND HEMATITE FLOODING FROM
																190 – 416.1 FT. RK IS PROBABLY SOLELY MP
																TO C. 320-330 FT. FROM THIS PT. TO 416.1
																FT THE BX PROBABLY CONSISTS OF BOTH MP
																AND GR. BELOW 416.1 FT THERE IS NO HEM-
																ATITE AND TEXTURES SUGGEST GR.
473.1	10.2	"	2.45	95	0.67	TR.			st	mod	st	cov	"	"	BX'ED GR	Rk similar to above. Very st'ly alt'ed to
															(?) OR MP	a mass of qtz granules in ser – suggesting
															(?)	MICRO-GR except for pats w/nearly fresh
																diss biot. Diss py & py-cc throughout. Basal
																portion displays high angle slip-frac zones
																w/granular py & some cov & cpy. Localized bx
																w/a hm matrix. Cu min st.
478.1	5.0	"	2.57	94	0.60	TR.			mod	wk-mod	mod	cov	"	"	BX'ED MP	Somewhat dk'er gray, dense, and exhibiting
488.0	9.9	"	—	94	0.72	TR.			wk-mod	mod-st	wk-mod	cov	"	"	(?)	sct'ed, diss biot. Cut by narrow, high angle
496.2	8.2	"	2.61	80	0.85	TR.			wk-mod	mod-st	wk	cov	"	"	MP BX	zns of bx w/hm matrix. Vlts & small blebs
507.4	11.2	"	2.67	88	1.06	TR.			mod	mod	?	?	"	"		of cpy – cov – cc(?). Only wk cementing
517.2	9.8	"	2.67	97	0.85	TR.			mod	st			"	"		material in bx'ed zones. Cu min mod-st.
527.7	10.5	"	2.63	87	0.84	TR.			mod	mod-st			"	"		
538.3	10.6	"	2.56	93	0.71	TR.			mod	mod-st			"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-95
Sheet No. 3 OF 5
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
548.5	10.2	NXWL	2.64	90	0.80	TR.			st	mod-st			qtz	ser	MP Bx	Rk as described above - very st'ly br.
558.7	10.2	"	2.72	99	0.55	TR.			v. st	wk			"	"		Diss of cpy so fine grained they are,
568.5	9.8	"	2.80	92	1.05	TR.			v. st	wk			"	"		almost impossible to see. py coarse &
576.4	7.9	"	2.61	90	0.79	0.32			st	mod			"	"		granular. Cu min wk-st.
584.1	7.7	"	2.80	82	0.62	TR.			v. st	wk-mod			"	"		
592.8	8.7	"	2.72	84	0.32	0.02			v. st	wk			"	"		vns & frac filling of coarse, granular py
602.6	9.8	"	2.55	90	0.45	0.03			mod-st	mod-st			"	"		cpy in vlts & blebs.
611.7	9.1	"	2.49	63	0.45	0.08			mod	wk			"	"		
621.4	9.7	"	2.46	97	0.55	0.02			mod-st	mod-st			"	"		
631.7	10.3	"	2.51	89	0.64	0.02			mod-st	mod-st			"	"	MP Bx	Rk as above -- gen'ly mod'ly-st'ly alt'ed, dis-
641.8	10.1	"	2.51	97	0.59	0.07			mod	st			"	"		tinctly porph'ic, st'ly bx'ed & granulated, and
652.1	10.3	"	2.58	85	0.50	0.02			mod	mod-st			"	"		commonly hm flooded. Sct'ed gry. sil pats.
																Diss of py-cpy highly variable. Intervals
																locally cut by vns & frac filling of granular
																py & blebs cpy. Diss cpy so fine grained
																they can hardly be seen w/the hand
																lens. Cu min wk(?)-st.
662.0	9.9	"	2.55	93	0.77	0.02			mod	st			"	"	MP-GR	Gen'ly as above (although lighter colored
672.0	10.0	"	2.64	95	0.78	0.02			mod	mod-st			"	"	(?) Bx	and less porph'ic) to c. 678'. Below this
																pt a series of high angle shr's precede
																a more gray, more silif rk w/a somewhat
																fused, cg texture suggestive of the GR(?).
																This could be either a more silif phase
																of the MP which is flt'ed in, or it could be
																GR(?). Min remains the same, w/the bx
																matrix locally exhibiting st cpy or py. Cu
																min mod-st.
682.3	10.3	"	2.65	96	0.67	0.04			mod	mod-st			"	"	MP-GR	Similar to basal portion of above run... grn'ish
691.7	9.4	"	2.60	96	0.62	0.01			mod	mod-st			"	"	(?) Bx	gray, silif, and displaying a fused texture.
701.8	10.1	"	2.62	91	0.63	0.23			mod	mod-st			"	"		Grn undertone prob'ly chlor. Min as above
																Cu min mod-st.
711.8	10.0	"	2.52	95	0.44	0.05			mod	mod-st			"	"	MP(?)Bx	Similar, but exhibiting an interval w/some inter-
																cepts transitional to porph'ic textures. Gen'ly dk
																grn'ish gray w/hm in frac'ed zns. Rk displays vfg
																cpy throughout. Cu min mod-st.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-95
Sheet No. 4 of 5
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
723.2	11.4	NXWL	2.53	55	0.69	0.02			mod	mod-st			qtz	ser	MP(?)Bx	Rk becomes distinctly porph'ic below a a zn of st'ly bx'ed & granulated frags of the dk grn'ish gray material. Diss biot. Some zns exhibit 3-7 mm qtz eyes. Bleaching along fine vlts of py-cpy. Diss & blebs of vfg cpy. Cu min mod-st.
731.7	8.5	"	2.49	97	0.30	0.20			mod	mod-st			"	"	MP(?)Bx	Textures range fr/dense to porph. Color fr/dk grn'ish gray to hm flooded. Both characteristics highly variable. High angle fracs w/ low angle striations on hm-MoSz surfaces. cpy throughout as above. St ind lm on some fracs. Cu min mod-st.
741.0	9.3	"	2.53	100+	0.31	0.02			mod	mod-st		IND LM	"	"		
751.2	10.2	"	2.66	89	0.38	0.02			mod-st	mod-st		MoSz IND LM	"	"		
761.3	10.1	"	2.53	93	0.33	0.10			mod	mod-st						
771.4	10.1	"	2.55	90	0.31	0.02			mod	mod-st			"	"	MP(?)Bx & SILIF MP(?)	Again, more distinctly porph'ic - exhibiting narrow zones of silif & sil vlts. Much of cpy appears associated w/ these features. A dk shr'ed, chlor'ic zn at c. 770' precedes a mass of dense silif material (MP?) with original textures obliterated. Cpy throughout as above. Cu min mod-st.
781.8	10.4	"	2.56	85	0.52	0.02			wk-mod	mod			"	"	SILIF MP (?) & MP Bx	Similar to basal portion of above run... gray to grn'ish gray, dense... w/ short intercepts transitional to porph'ic texture along low angle cts. Mod-high angles fracs w/ fine filling of py-cpy. Suls wk'ly diss. Cu min wk-mod.
791.4	9.6	"	2.65	90	0.51	0.06			wk-mod	wk-mod			"	"		
800.1	8.7	"	2.57	97	0.34	0.01			wk-mod	wk			"	"	SILIF, FELDSPATHIZED MP or GR (?) Bx	Locally similar to above, but transitional to textures resembling a GR. The cpy occurs principally in vf str's & vlts. Cu min wk-mod.
810.0	9.9	"	2.60	83	0.33	0.02			wk-mod	wk			"	"		
820.4	10.4	"	2.62	89	0.54	TR.			mod	wk-mod			"	"		
828.4	8.0	"	2.52	86	0.42	0.01			mod	mod-st			"	"		
837.4	9.0	"	2.60	72	0.53	TR.			mod	mod-st			"	"		
847.6	10.2	"	2.61	74	0.38	TR.			wk-mod	wk-mod			"	"		
854.8	7.2	"	2.64	89	0.42	TR.			wk-mod	wk-mod			"	"		BASAL PORTIONS OF THE INTERCEPT FR 800.1' – 880.3' SUGGEST RK IS PROB'LY SILIF, FELDSPATHIZED MP THROUGHOUT.
861.9	7.1	"	2.60	94	0.46	TR.			wk-mod	wk-mod			"	"		
871.5	9.6	"	2.62	90	0.31	Nil			wk-mod	wk			"	"		
880.3	8.8	"	2.61	93	0.27	Nil			wk-mod	wk-mod			"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-95
Sheet No. 5 of 5
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu			Mineralization					Alteration		Rock Type	Remarks
					Total	Non-S	Average	Oxides	Pyrite	Cpy	Cc	Other				
888.8	8.5	NXWL	2.63	91	0.38	Nil			mod	mod-st			qtz	ser	SILIF, FELD	Similar to above in all respects.
901.5	12.7	"	2.55	62	0.31	Nil			wk-mod	wk-mod			"	"	SPATHIZED	
BOTTOM.															MP BX	

Final Depth 859.5'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

J.H.C

JAN 7 1969

HOLE NO. S-94
Sheet No. 1 of 4
Date Completed 5/8/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
																CORE SPLIT PRIOR TO LOG
0-110'	110	5" Robit														Alluvium and Conglomerate.
110	–	NXWL						START OF D.D. CORE								BEDROCK PUCKED AT 100 FT.
117.3	7.3	NXWL	2.44	90	0.09	0.07		tr	–	–	–	–	Qtz-	ser	Gr. Bx	Gently a strongly hematized breccia
125.2	7.9	"	2.50	96	0.04	0.03		–	–	–	–	tr. iridg Lim.				composed of granitic and gneiss fragments.
135.8	10.6	"	2.68	89	0.03	0.02		–	–	–	–	–				Noted traces of $CuSiO_3$ first interval.
143.7	7.9	"	2.24	94	0.05	0.02		–	–	–	–	–				
153.5	9.8	"	2.65	94	0.02	0.02		–	–	–	–	–	do		Mixed Gr. and porph. Gr (Mp?) Bx	Similar to above. Granitoid. Rock fragments granitoid which occasionally display distinct foliation phenos: porph grain or silicified Mp? FeOx shadows: mod st.
163.7	10.2	"	2.62	97	0.01	0.01		–	–	–	–	tr. iridg Lim				
172.7	9.0	"	2.55	97	0.02	0.02		–	–	–	–	–	do (Kaolinized in part)		Mixed Gr. Porph (Mp?) Bx	A mixed breccia of Gr and Porph. (Mp?) occ. some specularite. Intrusive FeOx throughout core. Latter inc.
183.6	10.9	"	2.51	90	0.03	0.02		–	–	–	–	–				
193.5	9.9	"	2.47	74	0.04	0.03		–	–	–	–	–				become dominant the granitoid. Tr. pyrite.
203.0	9.5	"	2.36	79	0.05	0.03		–	–	–	–	–				
211.6	8.6	"	2.59	98	0.04	0.03		–	–	–	–	–	Qtz-	ser	do	Core remains leached and oxidized.
221.5	9.9	"	2.62	94	0.05	0.03		–	–	–	–	tr. iridg Lim.				Wk-mod specularite throughout. Short
231.2	9.7	"	2.64	100	0.05	0.03		–	–	–	–	–				intercepts of Mp(?) within Granite Bx.
241.5	10.3	"	2.64		0.03	0.03		–	–	–	–	–				
									SULPHIDES							
251.7	10.2	"	2.55	99	0.57	0.27		tr-wk	–	–	wk-mod	mod. iridg Lim	do		"	First appearance of cc @ 242.7' within gr. Cu Ox (SiO_2 or $SO_4^{=}$?) @ 250'. Wk. specularite.
261.9	10.2	"	2.64	100	0.05	0.05		–	–	–	–	wk-mod Lim with Lim	do		Gr Bx	Granite breccia, leached and oxidized,
272.3	10.4	"	2.56	98	0.06	0.06		–	–	–	–	wk Lim				"heated" sections of porph. Wk-mod
282.7	10.4	"	2.68	98	0.06	0.06		–	–	–	–	–				specularite.
293.1	10.4	"	2.48	97	0.12	0.12		–	–	–	–	wk-mod Lim with Lim	Qtz-	Ser	Mixed Gr Porph (Mp?) Bx	Mixed granitoid and dense f. grd dk
303.2	10.1	"	2.58	99	0.72	0.64		–	–	–	–	do				grey rock w/heat'd porph. Spec. prevails
																lining cavities and along fract. Wk silic'd.
																(Note: No megascopic Cu min noted to
																account for total Cu assay of 0.72%)

Final Depth 859.5'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC - ASSAY LOG

Property SECTION

HOLE NO. S-94
Sheet No. 2 of 4
Date Completed 5/8/46
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
313.5	10.3	NXWL	2.56	94	0.36	0.36		wk	—	—	—	—	Qtz.	Ser	Mixed	Strong brecciation w/st. hem. remains
323.7	10.2	"	2.72	100	0.43	0.41		tr?	—	—	—	wk. incl. Lm.			Gr, Porph	the dominant characteristic. Granitoid
333.9	10.2	"	2.66	100	0.14	0.13		—	—	—	—	do			Bx.	w/scat'd sulph (Mp?) Cc. specularite.
344.2	10.3	"	2.70	100	0.22	0.20		tr	—	—	—	wk-mod Lm				Tr. Cu Ox as silicate and/or sulphate.
354.5	10.3	"	2.52	96	0.15	0.13		tr	—	—	—	—				last int. incr. in porph (Mp?)
364.7	10.2	"	2.66	90	0.28	0.25		tr	—	—	—	wk-mod Lm & Mn	do		"	An intimately mixed interval of porph
375.0	10.3	"	2.62	98	0.41	0.08		tr	—	—	—	do				(Mp?) and granite, the former predom-
																inating. Indig Lm and Mn locally
																conspicuous.
								SULPHIDES								
385.3	10.3	"	2.76	100+	1.57	0.61		wk-mod	tr-wk	—	mod	—	do		Gr, Mp.	From 375-378' azurite, malachite as
395.5	10.2	"	2.70	100	1.81	0.22		—	tr-wk	—	mod-st	—			Bx	veins followed by discem. cc. and scat'd,
																but pronounced specularite. Variably brec'd
402.7	7.2	"	2.66	81	2.15	0.14		—	tr	—	st	—	do		Gr	Mixed Gr, Mp first 2' of int, there granite
407.2	4.5	"	2.85	100	5.74	0.72		—	tr-wk	—	v. st	—				well mind by cc w/scat'd py gen'ly tar-
																nished so that it resembles cpy.
417.3	10.1	"	2.62	99	1.22	0.15		—	tr	—	mod-st	—	do		Gr. Bx.	Again st. brecciation from ± 410'.
422.5	5.2	"	2.67	94	1.77	0.27		—	—	—	wk-st	—	do		"	Scat'd cc within st. ser'd, brec'd gran.
																Cc as veinlets within crushed, ser'd gran
																last 6" of int.
432.9	10.4	"	2.67	98	1.89	0.19		—	tr	—	wk-st	—	do		Mixed	Extreme brecciation consisting of granite,
															Gr, Mp	Mp and fine gr'd dk-grey aphanic fragments
															Bx.	(Micro-granite?). Discem cc scat'd, wk;
																mostly as veinlets. Scat'd spec.
438.1	5.2	"	2.55	92	1.03	0.10		—	tr	—	mod	—	Qtz.	Ser	Porph Gr	Similar to above in brecciation, but
															and/or	text. appears porph yet maintaining
															st. Mp	granitoid charact's. Scat'd spec.
															Bx.?	
448.3	10.2	"	2.54	100	1.05	0.15		—	tr-wk	—	wk-mod	tr. cov	do		Gr Bx.	St. scat'd gran. especially porph frag-
															Mp Bx.	ments. Scat'd spec. At 447.5' ± 1' wide
																fault zone followed by Mps.

Final Depth 859.5'
Collar Elevation
Coordinates
Inclination — 90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-94
Sheet No. 3 of 4
Date Completed 5/8/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration	Rock Type	Remarks CORE SPLIT PRIOR TO 406
459.0	10.7	NWOL	2.68	95	0.61	0.11			tr	—	wk-mod	wk. cov	Sericitized	Mp. Bx.	Brecciation continues strong. Mp except
469.3	10.3	"	2.62	75	0.59	0.07			tr	tr	wk-mod	tr-wk cov	Kaolinized	Gr. Bx.	for local'd gran. segments. At 464.5' Granite
															to end of int. Noted tr. of cpy.
479.7	10.4	"	2.60	84	0.73	0.06			tr-wk	tr-wk	wk	tr cov	Qtz-Ser	"	Rock type: granite interrupted by short
489.5	9.8	"	2.56	92	0.39	0.05			tr-wk	tr	—	—			segments of porph (Mp?)
498.7	9.2	"	2.64	93	0.93	0.05			tr-wk	wk-mod	—		Sericitized	Mp Bx	Scat'd cpy throughout brecc'd, FeOx, Mp.
509.0	10.3	"	2.56	87	0.81	0.06			tr-wk	wk	—		↓	↓	
518.5	9.5	"	2.56	88	0.83	0.03			tr-wk	wk	—				
526.5	8.0	"	2.58	71	0.77	0.05			tr-wk	wk	—		Qtz-Ser	Mp/Gr Bx	As above w/short segment of gran. from ±521.0' – 526.0
531.7	5.2	"	2.52	60	1.17	0.08			wk	wk-mod	—		Sericitized	Mp Bx	Essentially ser'd w/periodic FeOx. and
540.2	8.5	"	2.66	81	0.74	0.05			wk	wk	—		↓	"	disem cpy. Short segments of granite
550.2	10.0	"	2.72	98	1.05	0.06			wk	wk-mod	—			Mp/GrBx	within last int.
562.5	12.3	"	2.60	96	0.68	0.05			tr-wk	tr-wk	—		Sericitized	Mixed Mp.	Do.
571.2	8.7	"	2.60	100	1.13	0.06			wk	wk-mod	—		Kaolinized	Gr Bx	
581.2	10.0	"	2.60	90	1.00	0.06			tr-wk	wk-mod	—		do	Gr. Mp	Granitoid rarably ser'd to 574', followed by
591.5	10.3	"	2.60	93	0.52	0.03			tr-wk	tr-wk	—		↓	Bx w/sh.	Mp which appears to have been locally
601.5	10.0	"	2.66	96	0.46	0.06			tr-wk	tr-wk	—		↓	And. porph.	silicif'd. Noted dk gray, f.gr'd porph. intr.
															@ 580.2' – 584' (±) From 596' to end of int.
															extr. brecciated ser'd.
609.6	8.1	"	2.50	90	0.60	0.03			tr-wk	tr-wk	—		do	Mp Bx	St. brecciated w/st. sericite. Noted occ'ly
618.7	9.1	"	2.62	76	0.59	0.04			tr	tr-wk	—		↓	↓	granitoid fragments within the porph. Last
628.6	9.9	"	2.50	78	0.83	0.03			tr-wk	mod?	—		↓	↓	int. v. sh'd, ser'd Mp?
639.0	10.4	"	2.58	89	0.34	0.03			tr-wk	tr	—		do	"	Similar to above. Mp w/scat'd fresh
649.4	10.4	"	2.64	81	0.84	0.06			tr-wk	wk-mod	—		↓	↓	biotite; wkly chlor'd. Cpy. occ'ly wkly
658.4	9.0	"	2.66	70	0.96	0.06			tr-wk	mod	—		+ wkly	↓	disem'd but pronounced, steeply dipping (60°)
663.7	5.3	"	2.56	75	0.49	0.03			tr-wk	tr-wk	—		chlor'd	↓	1½" wide cpy vein @ 654.3'.
674.1	10.4	"	2.60	79	0.53	0.02			tr	tr-wk	—		Sericitized	"	Mp w/scat'd granitoid inclusions.
679.3	5.2	"	2.50	100+	0.26	0.02			tr-wk	tr	—		Kaolinized &		In essence similar to above.
689.7	10.4	"	2.58	97	0.49	0.03			tr-wk	tr-wk	—		chlor'd. (in part)	↓	

Final Depth 859.5'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-94
Sheet No. 4 of 4
Date Completed 5/8/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
695.0	5.3	NXWL	2.68	95	0.78	0.03			wk-mod	wk-mod			do		Mp Bx	Similar to previous int's. w/decided
700.2	5.2	"	2.84	92	0.29	0.02			wk-mod	tr-wk			↓		↓	granite inclusions.
709.5	9.3	"	2.64	73	0.57	0.02			wk	wk						
725.2	15.7	"	2.68	44	0.89	0.02			wk	wk?			Sericitized		"	St. fragmented w/variable shearing throughout.
																Difficult to visualize Cu. content. Last
															FAULT.	2' of int. st. brec'd, sh'd, gran'd & wkly silic'd.
729.0	3.8	"	2.58	95	0.64	0.02			wk	wk-mod			Qtz	Ser	Gr	St. hem'd along fractures. Variably silic'd
739.7	10.7	"	2.70	92	0.45	0.02			tr-wk	wk			↓		↓	Brec'd. ser'd last 6' of int.
750.0	10.3	"	2.65	89	0.30	0.01			tr-wk	wk						
760.4	10.4	"	2.70	91	0.18	0.01			tr	tr			do		Gr. Bx.	Granite breccia w/ser'd matrix. At 758' a
															And(?)	50° intr. st. w/dk. greenish-gray porph.
															porph.	
770.8	10.4	"	2.66	89	0.04	0.01			—	—			Chloritized		And.	A strongly sh'd, chlor'd, dk green, porph
777.5	6.7	"	2.59	89	0.03	0.01			—	—			↓		Porph.	rock. Wk hem. coating easily shears.
787.2	9.7	"	2.62	99	0.03	0.01			—	—					↓	Unmin'd.
797.5	10.3	"	2.60	91	0.48	0.02			wk	wk			Kaolinized.		Mp Bx	St. brecciated to 793.5. Thence Mp. Chiefly
807.8	10.3	"	2.60	98	0.33	0.02			tr-wk	wk			↓		Mp	porphyritic. Mod. alt. Scat'd but conspic.
818.0	10.2	"	2.55	97	0.29	0.02			tr-wk	tr-wk					↓	biotite x'tals.
828.1	10.1	"	2.60	100+	0.40	0.02			tr-wk	wk			↓			
837.3	9.2	"	2.62	96	0.38	0.05			tr	tr			Kaolinized		Mp. And.	As above to ± 835.0' thence 60° ct w/
													Chloritized		Porph.	dk green And. porph., sh'd and hem coating
																fract.
847.5	10.2	"	2.58	98	0.15	0.04			tr	tr			Chloritized		And.	Sh'd chlor'd andesite porph. Brec'd in
859.5	12.0	"	2.56	100+	0.05	0.03			tr	—			↓		Porph.	part. Approx 4' of st. brec'd granite to 847.5'
																Last int. very gouey and granulated.
	E.O.H.															

Final Depth 859.5'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-94
Sheet No. 1 OF
Date Completed 4-10-68 TO 4-11 / 4-24-68 TO 5-8
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu			Mineralization					Alteration		Rock Type	Remarks
					Total	Non-S	Average	Oxides	Pyrite	Cpy	Cc	Other				
100	100	4 3/4" Ro Bit													Alluvium & Cgl	
																Bedrock Placed At 100'.
110	10	4 3/4" Ro Bit														
110		NXWL														Beginning of DD Core

Final Depth 757.8'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-93
Sheet No. 1 OF 4
Date Completed 4.9.68 TO 4.10.68 / 7.3.68 TO 7.13.68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
170	170	4¾" Ro BIT													ALLUVIUM & CGL	
																BEDROCK PLACED AT 170'±.
178	8	4¾" Ro BIT													MP & MP BX	SEE FOLLOWING DESCRIPTION.
180.6		NXWL														BEGINNING OF DD CORE
191.0	10.4	"	2.48	91	0.10	0.04							qtz	ser	MP & MP BX	A mod gray, fg to mg rk reflecting mod-st alteration. Some bleached pods. Zones of healed fracturing alternate w/ those of severe but healed bx'ion. Spec in diss pods, vf strs, & on frac surfaces. Mod-st hm along fracs & in bx matrix. Mod-high angle struct elements suggested. No Cu min obs unless indicated.
201.2	10.2	"	2.70	95	0.06	0.02							"	"		
211.2	10.0	"	2.62	96	0.03	0.02							"	"		
221.5	10.3	"	2.70	100	0.03	0.01							"	"		
232.1	10.6	"	2.58	94	0.03	0.02							"	"		
242.1	10.0	"	2.70	100	0.07	0.06							"	"		
252.2	10.1	"	2.74	97	0.41	0.36		$CuCO_3$				DISS IND LM	"	"		
262.5	10.3	"	2.70	97	0.82	0.78		$CuCO_3$				ST DISS SPEC	"	"		
272.8	10.3	"	2.64	97	0.65	0.62		$CuCO_3$ $CuSO_4$(?)				"	"	"		
282.8	10.0	"	2.74	99	0.89	0.67		$CuCO_3$ $CuSO_4$(?)				"	"	"		Ox Cu appears to be associated w/ spec.
293.1	10.3	"	2.70	100	0.88	0.36		$CuCO_3$				"	"	"		Marked decrease in hm. Azurite & malachite prese
303.3	10.2	"	2.64	97	1.13	0.97		$CuCO_3$		tr(?)	wk(?)		"	"	MP w/ PSEUDO GR TEXTURE(S)	Rk becomes more bleached, feldspathized, and
313.6	10.3	"	2.66	97	1.63	0.21		$CuCO_3$	tr-wk		wk	"	"	"		displays distinct alteration textures. Azurite & malachite diffused throughout... few associated pods of hm and cc (?) w/ tr cpy(?). Cu min mod-st.
323.8	10.2	"	2.54	96	1.68	0.06		Tr $CuCO_3$	wk-mod		mod-st	"	"	"		As above but exhibiting pods & high angle vlts of py w/ films & thin crusts of cc. Degree of diss of cc difficult to estimate w/ the high percentage of vfg diss spec which is present. The hm almost entirely restricted to narrow, high angle bx zns. Cu min mod-st.
334.1	10.3	"	2.75	87	1.40	0.03			wk-mod		mod-st	"	"	"	MP BX	Similar, but exhibiting a high percentage of healed, hm flooded bx. Some ox'ion of suls. Cu min mod-st.
343.1	9.0	"	2.66	100	0.98	0.03			wk		mod	"	"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-93
Sheet No. 2 OF 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
354.6	11.5	NXWL	2.66	86	1.63	0.03			wk		mod-st	DISS VFG SPEC	qtz	ser	MP Bx	As above, but healed, hm flooded bx'ion
364.8	10.2	"	2.57	78	2.58	0.04			wk		mod-st	"	"	"		gives way to more recent breakage & gg
375.8	11.0	"	2.56	54	0.72	0.10			mod		wk-mod	"	"	"		in which the hosted chunks & frags are
385.3	9.5	"	2.62	90	0.74	0.10			mod-st		mod	COV	"	"		dk gray. Strucf Trends low angle – mod-st
395.3	10.0	"	2.45	85	0.73	0.20			mod	mod(?)	wk-mod	COV	"	"		hm. Diss vfg cc & wk py. Cu min wk-st.
400.4	5.1	"	2.53	90	0.64	0.10			mod	mod(?)	wk	COV IND LM	"	"		The cpy is often extremely fg.
411.5	11.1	"	2.58	87	0.52	0.03			mod-st	mod-st		ST IND LM	"	"		Runs become less bx'ed w/depth. – Fresh
421.5	10.0	"	2.56	90	0.36	0.10			mod-st	mod-st		ST IND LM	"	"		biot diss throughout.
427.6	6.1	"	2.58	93	0.53	0.06			mod-st	tr-wk		COV (?) IND LM	"	"		
437.7	10.1	"	2.48	92	0.68	0.08			mod-st	mod	tr-wk	TR COV TR MoS2	"	"		ST IND LM.
447.8	10.1	"	2.52	100	0.44	0.02			mod-st	wk-mod	tr(?)	Tr COV(?)	"	"		" " ". Less hm flooding than above.
458.0	10.2	"	2.59	98	0.44	0.02			mod	mod			"	"		" " " " " "
468.1	10.1	"	2.57	94	0.36	0.01			mod	mod			"	"		" " " " " "
478.1	10.0	"	2.57	98	0.26	0.01			mod-st	st		ST IND LM	" & serp(?)	"	MP-SILIF & DACITE PORPH	Upper portion of run similar to above. With depth rk grades into a silif(?) phase with a coarser grained, fused, granitoid texture. Py-cpy diss throughout, w/ the py occurring in vlts and on most frac faces – where it is frequently deposited on st ind lm (orig cpy?). At 476.8' there is a sharp, br ct w/ a very dk gry-grn DACITE(?) PORPH displaying striking, 3 mm – 5 mm, anhedral, yel phenocrysts of serpentinized (?) feld. Qtz eyes set'ed throughout. Some conc of vfg cpy in this rk. Over all Cu min st
487.5	9.4	"	2.58	92	0.25	0.01			tr-wk	wk-mod			"	"	DP (?) OR BP (?)	Similar to basal portion of above run. Gen'ly st'ly br. Set'ed conc. of vfg cpy. Cu min wk-mod
495.5	8.0	"	2.58	97	0.29	0.01			mod	wk	tr	TR MoS2	"	"	DP(?) & SILIF MP	As above to c. 490 ft. Below an intrusive ct at this pt is a DP(?) soaked intercept of sil. gry MP. This extend to c. 492 ft. and is followed by a st'ly br zone of mixed frags and gg. Diss py-cpy throughout. Tr cc & MoS2. Cu min wk-mod.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-93
Sheet No. 3 OF 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
504.0	8.5	NXWL	2.55	100+	0.30	0.01			wk-mod	wk	?		qtz-ser		DP(?) & SILIF MP	Highly br zn of mixed frags & gg. Cu min wk-mod.
													serp			
510.1	6.1	"	2.61	95	0.12	TR.			wk-mod	wk-mod			"	"	DP (?)	As described above. Diss, fg py-cpy. Cu min wk-mod.
518.2	8.1	"	2.61	100	0.15	0.01			wk	wk			"	"	DP(?) & SILIF MP	As above. Only a short section of MP caught between intrusive cts.
525.2	7.0	"	2.62	100	1.03	0.02			wk-mod	wk-mod			qtz-ser		MP & MP Bx	Similar to upper portions of hole. Basically gry, w/ tightly packed, 1mm-2 mm phenocrysts which are grn stained. Gen'ly st'ly br, locally bx'ed, & displaying some gg. Wk-mod hm along fracs & in bx matrix. High angle py vlts common - some ind lm. Only wk cpy noted. Cu min wk-mod.
534.0	8.8	"	2.65	83	0.33	0.02			wk-mod	wk-mod			"	"		
545.3	11.3	"	2.56	98	0.87	0.02			wk-mod	wk-mod			"	"		
555.0	9.7	"	2.59	74	0.45	0.01			wk-mod	wk-mod			"	"		
565.0	10.0	"	2.57	86	0.34	0.01			wk-mod	mod			"	"		
575.0	10.0	"	2.58	95	0.37	0.01			wk-mod	mod			"	"		
585.3	10.3	"	2.65	80	0.59	0.02			wk-mod	mod			"	"		
593.7	8.4	"	2.52	77	0.33	0.01			wk-mod	wk			"	"	MP Bx & DP(?)	Similar, but containing a narrow dike of the dk DP (?). Min appears mostly pyritic. Cu min wk.
602.4	8.7	"	2.49	98	0.32	0.01			st	wk			"	"	MP Bx	As above, but more gry, dense, & silif. Phenocrysts less obvious. Textures almost suggest a MICRO-GR. Breakage & gran py both st. Cu min wk
610.8	8.4	"	2.66	92	0.22	0.01			mod-st	wk-mod			"	"	MP-GR Bx (?) OR SILIF MP Bx	Similar to c. 603.5'. Below this pt rk is coarser grained, more granitoid in texture -- grading into a finer grained phase toward the base of the run. Final texture suggests either a MICRO-GR or a silif phase of the MP. Gen'ly st'ly br throughout. Granular py in vlts, gg matrix, & diss. Sct'ed diss cpy. Cu min wk-mod

*Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-93
Sheet No. 4 OF 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
620.2	9.4	NXWL	2.61	89	0.45	0.02			mod-st	wk-mod			qtz	-ser	SILIF MP	Rk similar to basal portion of above run. Gen'ly
628.4	8.2	"	2.63	91	0.47	0.02			mod-st	wk-mod			"	"	BX or	med gry to reddish tan, fg, sil, w/a wk
638.7	10.3	"	2.65	89	0.39	0.01			mod	mod-st			"	"	MICRO GR	suggestion of feldspatization. Prob'ly the
647.0	8.3	"	2.66	96	0.33	0.04			mod	mod	tr(?)		"	"	BX	SILIF MP. St'ly br. Mod-high angle py vlts,
656.6	9.6	"	2.61	89	0.39	0.01			mod							some ox'ed. Diss vfg suls. Cu min wk-mod
665.9	9.3	"	2.58	93	0.25	0.01			mod	wk-mod			"	"	MP(?) BX	Rk still st'ly br, but less gry & sil than above.
															OR MICRO-	Tends to be reddish-tan & finely granular, w/
															GR(?) BX	some sections suggesting a granitoid texture.
																Believe these textures are a product of
																alt-- and that rk is a phase of the MP. Min
																as above.
672.8	6.9	"	2.66	96	0.75	0.02			mod	mod			"	"	MP(?) BX	As above. Texture highly variable -- fr/fg,
682.5	9.7	"	2.65	93	0.39	0.02			mod-st	mod-st			"	"		granular, chlor'ic - to mg, granitoid (feldspathized?)
																- to the type porphyritic. High degree of bx
																& breakage make it difficult to define relat-
																ionships. Min as above. Some ind)m on fracs.
692.9	10.4	"	2.60	91	0.50	0.01			mod-st	mod			"	"	MP(?) BX	Rk gen'ly uniform: fg, gry, equigranular-core
701.5	8.6	"	2.57	96	0.42	0.01			mod-st	mod			"	"	OR MICRO-	locally sil & exhibiting an undertone of wk
711.0	9.5	"	2.58	92	0.58	0.03			mod	wk-mod			"	"	GR(?) BX	chlor. Mixed hm-py along most fracs. Gen'ly
																fg py-cpy diss throughout. Cu min mod.
719.3	8.3	"	2.61	98	0.30	0.01			mod	wk-mod			"	"	MP-MICRO	As above, bot containing sections closely
															GR - GR(?)	resembling the coarser-grained type GR.
															BX	Other sections (or bx frags) have modified
																porph'ic texture.
728.8	9.5	"	2.57	91	0.25	0.02			mod	wk-mod			"	"	MICRO-GR	With depth the above more closely resembles
739.6	10.8	"	2.58	91	0.20	0.02			mod	wk-mod			"	"	-GR BX	a MICO-GR in texture. Some short sections (bx
745.6	6.0	"	2.65	66	0.37	0.02			mod	wk-mod			"	"		frags) do display a coarser-grained granitoid
747.1	1.5	"	NO REC		—	—										texture, but rk as a whole is fg, reddish-tan
757.8	10.7	"	2.42	48	0.37	0.02			mod	wk-mod			"	"	MP(?) BX	to lt gry, st'ly br, bx'ed, & granulated. Granular py,
																some cpy, & wk hm associated w/this bx.
BOTTOM																All frags exhibit fg, diss suls. Cu min wk-mod.
																Final run displays diss biot & wk phenocryst develop-

Final Depth 1771.6'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-92
Sheet No. 1 OF 4
Date Completed 4-6-68 TO 4-11-68 / 7-5-68 TO 7-19-68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1212 ±	1212 ±	4 3/4" Ro	BIT												ALLUVIUM & CGL	
																BEDROCK PLACED AT 1212'±.
1250	38 ±	4 3/4" Ro	BIT													
1258.0																BEGINNING OF DD CORE
1267.4	9.4	NXWL	2.49	73	0.43	0.31							qtz	ser	MP(?) OR MP SOAKED GR(?)	A mg, med'ly-st'ly alt'ed rk w/a fused, in definite texture. Basic color is actually gray, but wk Fe ox stain creates an overall lt reddish-tan appearance. Set'ed, diss biot. Physically distorted and locally br. No Cu min obs.
1278.0	10.6	"	2.57	99	0.88	0.74		wk-mod $CuSiO_4$ wk-mod $CuCO_3$					"	"	GR(?)Bx	Seemingly transitional from above. Rk more closely resembles a physically distorted GR. Basal portion of interval a zone of firmly healed, hm rich bx w/ high angle struct trends, Frac fillings, small blebs, & diffusion of $CuSiO_4$ & $CuCO_3$. Cu min mod-st.
1288.2	10.2	"	2.58	98	0.75	0.64		wk-mod $CuCO_3$					"	"	GR(?)Bx & PORPH	The hm flooded bx zone mentioned above ends c. 1281.5' in rk similar to the GR(?) above it. Basal portion is a bx zn w/ an intruded intercept of dk gray, unmineralized PORPH (?) displaying numerous, fine, hm-faced shr's. Granitic (?) portions display thin diffused crusts of $CuCO_3$. Cu min wk-mod.
1298.0	9.8	"	2.51	99	0.93	0.84		wk $CuSO_4$					"	"	GR(?) Bx & DB(?)	Relationship similar to above, but mostly a distorted, crumpled GR(?) Bx w/a short, ftt'ed in intercept of DB(?) - dk, gen'ly dense, & displaying only set'ed phenocrysts. wk $CuSO_4$ (?) diffused throughout the GR.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-92
Sheet No. 2 of 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1308.3	10.3	NXWL	2.52	97	1.20	1.09		mod-st $CuSO_4$					qtz	–ser	DB(?) IN GR Bx	Entire run a mass of fg or dense DB(?) -- dk grn'ish gry to bleached or reddish tan. This appears to have been intrusive into what was prob'ly originally GR Bx. Bx matrix & most fracs & slips st in hm. Few vert fracs filled w/clusters of radiating, grass-grn, acicular xls. (brochantite (?) or chalcanthite (?)). Color & occurrence suggest the former, but many of the xls. dehydrate on exposure to air. Cu min mod-st.
1318.8	10.5	"	2.50	92	0.57	0.48		wk-mod $CuSO_4$					"	"	DB Bx	Frags of DB in a matrix healed w/st hm. Sc'd blebs $CuSO_4$. Cu min wk-mod.
1329.0	10.2	"	2.55	99	0.47	0.37		tr $CuSO_4$				DISS IND LM			DB-GR Bx	As above, but exhibiting alternate intercep of DB Bx & GR Bx. Sct'ed ind lm in the GR. Tr $CuSO_4$, mostly in the DB. Cu min tr.
1339.6	10.6	"	2.54	96	0.06	0.01							"	"	GR Bx	As above, but entirely GR frags. Distorted, mottled w/hm, and locally displaying st bx w/a hm matrix. Sct'ed, diss ind lm in mod quantities. Rk gen'ly mod'ly to st'ly alt'ed. No Cu min obs.
1349.0	9.4	"	2.60	85	0.04	0.01							"	"		
1359.2	10.2	"	2.53	99	0.03	0.01						Mod LLM	"	"		
1369.4	10.2	"	2.55	97	0.03	0.01						"	"	"		
1379.6	10.2	"	2.54	98	0.03	0.01						"	"	"		
1389.9	10.3	"	2.52	95	0.29	0.23		tr $CuSO_4$					"	"	GR Bx & Bx'ED DB	As above to c. 1382.1' where bx'ed, intrusive ct precedes a med-gry to dk-gry DB also similar to that above. Frac'ed, healed, and locally bx'ed. Wk, diffused hm. Diss, ind lm. Only tr $CuSO_4$. Cu min tr.
1400.0	10.1	"	2.60	87	0.07	0.04		tr $CuSO_4$					"	"	DB	As above. Frac'ed and displaying mod-st hm. Diss ind lm & tr $CuSO_4$. Cu min tr.
1401.8	1.8	"	No REC.													
1412.0	10.2	"	2.55	96	0.33	0.22		tr $CuSO_4$	tr (?)		tr-wk (?)	"	"	"	Bx'ED DB & GR Bx	Rock types as above, but occurring in alternate intercepts. Gr displays fair ind lm & LLm. Tr $CuSO_4$. Upper run entirely ox'ed. First py-cc possibly at c. 1417 ft. Cu min tr-st.
1422.0	10.0	"	2.64	100	0.73	0.09			wk-mod		mod-st	cov (?)	"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-92
Sheet No. 3 of 4
Date Completed
Logged By NWO

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1432.1	10.1	NXWL	2.62	91	1.28	0.09			mod		mod-st		qtz	ser	GR Bx	GR as above - still displaying wk-mod hm stain, but hosting diss & fine strs of py-cc. Cu min mod-st
1442.3	10.2	"	2.58	100	0.73	0.03			mod		mod-st		"	"	GR-MICRO GR(?) & DB Bx	GR Bx similar to c. 1433 ft. Below a br ct at this pt is a fg, gry MICRO-GR (?) and a few short intercepts of DB (?) -- the latter hm flooded. Well bx'ed & br throughout, w/bx no longer well healed. Diss, strs and frac fillings of py-cc. Cu min mod-st.
1452.8	10.5	"	2.58	93	0.68	0.04			mod		mod-st		"	"	MICRO-GR (?) or DB (?) Bx	RK is fg, gry, & bleached in many intercepts. Some pots dk gry-grn. Entire run(s) too st'ly alt'ed to absolutely define rk type. Gen'ly well br & /or bx'ed. Most fracs display py-cc or hm. Diss, vfg py w/film of cc on 30% - 40% of it. Cu min mod-st
1462.7	9.9	"	2.57	99	0.63	0.02			st	wk(?)-mod	mod-st		"	"		
1473.0	10.3	"	2.55	93	1.13	0.02			mod-st	wk(?)-mod	mod-st		"	"		
1483.1	10.1	"	2.57	94	0.90	0.10			mod	wk(?)	wk-mod		"	"		
1493.7	10.6	"	2.57	86	0.62	0.07			mod-st	tr(?)	wk		"	"		
1504.1	10.4	"	2.54	92	0.78	0.02			mod	wk-mod	wk		"	"		
1512.8	8.7	"	2.58	100	0.78	TR.			mod	mod-st			"	"		
1523.6	10.8	"	2.56	94	0.79	0.01			mod	mod-st			"	"		Possibility that this is a bx of mixed rk types
1529.2	5.6	"	2.53	89	0.60	TR.			mod	mod-st			"	"		Sections which appear more DB'ic bear cpy: those which more closely resemble MICRO-GR host py-cc.
1534.5	5.3	"	No REC		—	—			—	—						
1535.1	0.6	"	No REC		—	—			—	—						
1542.4	7.3	"	2.51	96	0.42	TR.			mod	mod			"	"	DB Bx	← RK dk and diabasic.
1552.7	10.3	"	2.53	96	0.65	0.14			mod	mod			"	"		" " " " "
1562.3	9.6	"	2.56	89	0.66	TR.			mod-st	mod-st	tr		"	"		" " " " "
1573.0	10.7	"	2.55	89	0.80	TR.			mod	mod-st		TR MoS2	"	"		" " " " "
1582.7	9.7	"	2.52	100	0.46	0.01			st	mod-st			"	"		" " " " "
1593.2	10.5	"	2.52	92	0.54	0.05			mod-st	st			"	"		" " " " "
1603.2	10.0	"	2.68	94	0.39	0.01			wk-mod	tr-wk			"	"	DB-GR Bx & GR	Core fr/1593.2' to c. 1599' is a bx of the above DB and a typical, mg, mod'ly alt'ed GR. Below this, the balance of the run is a bx'ed GR, somewhat sil, and bearing wk-mod py & sc'tered cpy. along w/occasional wk hm. Cu min wk.
1612.0	8.8	"	2.55	90	0.67	0.03			wk-mod	wk-mod			"	"	DB & GR (MIXED INTERVALS)	RK types as above, but occurring in short, alternate intervals of br rk. Min as above.
1622.2	10.2	"	2.57	96	0.61	TR.			wk-mod	wk-mod			"	"		

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-92
Sheet No. 4 of 4
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1632.7	10.5	NXWL	2.50	96	0.45	TR.			wk-mod	tr	Tr		qtz	– ser	DB & GR (MIXED INTERVALS)	As above in all respects. Cu min tr-wk.
1643.3	10.6	"	2.46	95	0.22	TR.			wk-mod	wk-mod	tr(?)		"	"	BX'ED GR	GR as above. Gen'ly mg, lt gry, mod'ly alt'ed.
1653.5	10.2	"	2.57	97	0.38	TR.			mod-st	mod-st			"	"		Locally bx'ed along high angle trends. Localized cpy in milled suls c. 1644'-1645. Set'ed tr
1664.2	10.7	"	2.61	91	0.38	TR.			mod-st	tr			"	"		cc where noted. Cu min gen'ly wk.
1674.3	10.1	"	2.61	89	0.58	TR.			mod-st	tr		mod hm	"	"		
1684.8	10.5	"	2.55	93	0.47	TR.			mod	mod		mod hm	"	"		Shr'ed along high angle trends.
1695.2	10.4	"	2.54	100	0.57	TR.			mod	wk			"	"		
1704.8	9.6	"	2.69	93	0.27	0.01			mod-st	wk			"	"		St gran py in nearly vert vlt.
1712.3	7.5	"	2.58	88	0.33	0.01			mod	tr-wk			"	"		
1721.9	9.6	"	2.56	87	0.38	TR.			mod	tr-wk			"	"		
1727.1	5.2	"	2.56	92	0.25	TR.			mod	tr-wk			"	"		
1732.2	5.1	"	No	REC	—	—			—	—			—	—		
1742.0	9.8	"	2.58	76	0.50	0.01			wk	tr-wk			"	"		
1751.7	9.7	"	2.57	95	0.36	0.01			wk-st	tr-wk		Tr MoS2	"	"		Similar, but basal portion of run contains a high angle flt or shr zone w/st py.
1759.3	7.6	"	2.53	95	0.42	0.02			mod	wk-mod			qtz		AN(?)	Entire run a fg, dk gry to blk, br AN(?) containing set'ed, vfg, diss py-cpy. Cu min wk-mod.
1771.6	12.3	"	2.62	94	0.52	0.02			mod-st	tr-wk			"		AN(?)	As above, but displaying a fair amount of bleaching. Numerous strs of py. Some hm on frac surfaces.
BOTTOM																

Final Depth 868.6'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO
GEOLOGIC – ASSAY LOG

J.H.C.
DEC 17 1968

Property SACATON

HOLE NO. S-91
Sheet No. 1 OF 7
Date Completed 4-6-68 TO 4-24-68
Logged By NPW 4-23-68

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
10.0	110.0	4½" Ro Bit														OVERBURDEN DRILLED WITH ROCK BIT – No CHARACTER SAMPLES TAKEN. BEDROCK c. 104 FT.
18.4	8.4	NXWL	2.47	89	0.03	0.02							Qtz-Kaolin	ser-	Mz Porph & Bx.	Rk is mg, lt reddish-gray, and st'ly alt'ed. Partially hm flooded and completely leached and ox'ed. Mod-st, diss ind lm – much of it LLm. Texture gen'ly porph'ic. No Cu min obs.
28.7	10.3	"	2.42	98	0.02	0.01							"	"	Mz Porph	Similar to above. Highly frac'ed but not bx'ed. Wk-mod hm flooding. Completely leached, w/mod diss-ind lm. No Cu min obs.
38.8	10.1	"	2.67	98	0.03	0.01							"	"	Mz Porph Bx & Mz Porph	Similar to above. Completely healed and refractured bx. Leached and ox'ed diss, vns, and pats of former sulf. No Cu min obs
17.2	8.4	"	2.49	100	0.03	0.01			wk		tr-wk		Qtz-	ser	Mz Porph & GR(?)	Similar to above. Only a few narrow zones of bx w/hm. Bal gen'ly reddish tan to gray, st'ly alt'ed, and texturally similar to GR below c. 143'-144'. Mod-st diss & segregations of fg ind LLm. Localized pats of diss py-cc. Cu min tr-wk.
7.0	9.8	"	2.66	100	0.18	0.06			wk		wk		"	"	Bx of GR & MP	As above -- Principally GR w/localized zones of texture resembling MP which could be acting as the matrix of an intrusive bx. Fair diss ind lm and LLm seted throughout. Only very small pat of unoxidized py w/thin films of cc. Cu min wk.
67.0	10.0	"	2.69	100	0.14	0.07			wk-mod		wk		"	"	Bx or Mix of GR-MP	Similar to above -- percentages of the two rk types about balanced -- textures transitional. Color gray-grayish purple-hm red. Few pats diss py-cc. Cu min wk.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-91
Sheet No. 2 OF 1
Date Completed 4/24/68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
172.0	5.0	NXWL	2.70	100	0.06	0.02					tr(?)		qtz	- ser	GR Bx	As above - Rk lt gray to purple, qtzose, and displaying fair ind hm on fracs and in diss. Appears to be completely ox'ed and leached. Cu min tr-wk.
182.2	10.2	"	2.54	100	0.02	<0.01					tr(?)					
192.4	10.2	"	2.54	100	0.02	0.01							qtz	- ser	GR-MP Bx	As above, but composed of both rk types. Mp appears to have been intrusive into the GR -- and then both subject to subsequent bx'ion. Completely ox'ed and leached. No Cu min obs.
202.2	9.8	"	2.55	100	0.04	0.01								kaolin		
212.0	9.8	"	2.65	100	0.03	0.01							qtz	- ser	GR Bx	As above, but entirely GR. Fair amount of ind lm in set'ed pods, on frac surfaces, and diss. No Cu min obs.
223.0	11.0	"	2.70	88	0.80	0.20			mod		mod-st		"	"	GR-MP(?) Bx	As above, but retaining a few unox'ed to partially ox'ed intercepts displaying high angle vlts and diss of py-cc. Cu min mod-st.
233.3	10.3	"	2.52	96	0.34	0.11			mod		mod-st	cov(?)	qtz	- ser	MP-GR Bx	Principally the Mp -- w/st'ly min but very localized pods of py-cc in basal portion of run. Partial to complete ox throughout. Cu min mod-st.
														kaolin		
243.2	9.9	"	2.46	97	0.05	0.03							"	"	MP Bx	Similar to above. Rk varies fr/dk gray to bleached lt gray to hm flooded. Set'ed, diss fg ind lm. No Cu min obs.
253.4	10.2	"	2.60	99	0.15	0.07			wk		tr-wk		"	"	MP Bx	As above - few pats w/tr-wk py-cc. Fair amount ind lm. Cu min tr-wk.

Final Depth 868.6'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-91
Sheet No. 3 of 7
Date Completed 4/24/63
Logged By CHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
263.4	10.0	NXWL	2.61	100	0.07	0.03		–	wk	–	wk	–	Qtz-Kaolinized	Ser	Mp, Gr Bx.	In general a highly sericitized - kaolinized int. const'g mainly of Mp w/sh. sections of granite. Mod. indig Lim. and calcite throughout. Last .8' almost 100% SiO2.
273.5	10.1	"	2.45	99	0.62	0.12		–	wk-mod	–	mod	–	Qtz	Ser	Gr. Bx	C. gr'd. granite w/py cont'd by cc. Pronounced steeply dipping py/cc. veinlets. @ 276.0' 60° contact w/ FeOx st'd. gran. and py-cc. along it. - cont. to end of interval and is st. Bx.
283.7	10.2	"	2.54	94	0.03	0.02		–	–	–	–	–	do		"	Granite breccia w/st. FeOx. No Cu min. obs. Scatt'd indig Lim. and along fract.
293.7	10.0	"	2.60	100	1.68	0.25		–	wk-mod	–	mod-st	wk Lim.	do		"	As above to 288.9'; thence ±2" transitional zone w/Lim to sulphides. No Non-S obs.
303.8	10.1	"	2.75	100	3.70	0.18		–	mod	–	V st	–	do		"	Chalcocite is very pronounced as disem and steeply dipping (60-70°) 1/4" veins w/py.
312.0	8.2	"	2.64	99	1.57	0.14		–	wk-mod	–	st	wk-mod spec.	do		"	Well mineralized by cc. St. Bx @ 310' to end of int. w/FeOx coating fract.
322.2	10.2	"	2.74	98	1.79	0.13		–	wk	–	st	mod spec.	do		Gr, Mp.	Bx'd to 313.3'. At 316.3' sharp contact @ ±20° to core with Mp - At 319' a gradational (?) contact with sil Mp (mod gr'd w/wk, but conspic qtz phenos. - or Gr.?)
323.7	1.5	"	2.62	100	1.34	0.15			wk-mod	–	mod-st	–	do		Gr Bx	Bx Gr. - well mineralized. St. sh'd @ 332.0'. Latter int. good cc. esp. along sh'd surf.
333.8	10.1	"	2.74	100	1.50	0.27			wk-mod	–	mod st	–				
338.3	4.5	"	2.60	100	2.13	0.25			wk-mod	–	st	–				
348.3	10.0	"	2.83	98	2.37	0.53			mod	–	mod-st	wk-mod spec.			Gr, Mp Bx	Do - to 342.4' thence int. becomes st. Bx Mp w/st iron oxides + spec. (incl. silicif) to end of int.
358.4	10.1	"	2.56	99	1.65	0.29			wk	–	mod-st	wk-mod spec.	do		Mp, Gr	Do - to 358.7' St. Bx w/FeOx, thence Gr w/FeOx along shd portions.

Final Depth 868.6'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC - ASSAY LOG

Property SACATON

HOLE NO. S-91
Sheet No. 4 of 7
Date Completed 4/24/68
Logged By CHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
368.3	9.9	NXWL	2.70	92	1.35	0.32			wk	–	mod	mod-st spec.	Qtz-ser (Kaolinized Fsp)		Gr, Mp Bx	P'mixed assemblage of Gr and Mp, the former predominating. Continues to be sil'd throughout and thoroughly brecciated to end of int.
378.3	10.0	"	2.58	92	1.61	0.35			wk	–	mod-st	wk-spec.	Qtz-ser.		Gr, Mp Bx	Do - to ±378.0', thence Gr to 378.3'. Bx. Mp to end of int. well min. throughout.
387.3	10.0	"	2.70	92	1.40	0.24			tr	–	mod-st	mod spec.	do		Mp, Gr Bx	Mp to 370.0', thence Gr. Bx to end of int. Fe ox primarily along fract.
387.9	0.6	"	2.66	100	1.34	0.13			tr	–	mod	wk. spec.	do		Gr and Bx	Qtz-ser Granite Bx w/wk-mod Fe ox along
398.3	10.4	"	2.56	88	1.17	0.05			tr	–	mod-st	–			Sil. Mp?	steeply dipping fractures. St. localized spec.
408.5	10.2	"	2.56	93	0.84	0.05			tr	–	mod	wk-mod spec.			Bx	@ ±408.5'. Bx intense from 405.5-416.2'
416.2	7.7	"	2.61	81	0.82	0.02			tr	–	mod	–				where rock type is obscure, but seems at times sil Mp.
426.4	10.3	"	2.65	90	1.33	0.07			tr-wk	–	mod-st	wk spec.	do		Gr? and/or Mp	St. Bx, grad'd, sericitized rock w/ pronounced Fe ox along steeply dipping fractures. Well min. cc-py veinlets @ 60-70° @ 429-432.0'.
433.7	7.3	"	2.72	97	2.07	0.07			tr-wk	–	mod-st	wk spec.				
443.8	10.1	"	2.64	95	1.50	0.07			wk	–	mod	wk spec.	do		do	St. Bx as above. Abrupt decr. in cc, cov in 2nd int.
450.7	6.9	"	2.53	86	0.54	0.03			wk		wk	wk spec.				
457.0	6.3	"	2.60	92	0.60	0.02			wk-mod	–	mod	do	do		Mp?	St. fractured Mp? w/localized silicif. Notable py in part. as vnlts. Mod cc w/cov.
463.5	6.5	"	2.69	94	0.43	0.06			mod	–	wk-mod	do	do		Mp	Essentially as above.
471.4	7.9	"	2.57	95	0.73	0.03			v st	–	(cov) mod	–	do		Mp, Gr Bx	From 464(±) - 467.5 massive py. Thence granite as main rock type w/cov. Bx'd.
479.9	8.5	"	2.67	92	0.47	0.04			st	–	(cov) wk-mod	tr spec.	Sericitized		Mp (sil in part)	St. Bx, sericite develop't. Covellite persists ass w/py.
487.4	7.5	"	2.53	91	0.45	0.04			mod		(cov) wk	–	do		Mp	As above.

Final Depth 868.6'
Collar Elevation
Coordinates
Inclination -90°

ASARCO
GEOLOGIC – ASSAY LOG

Property SPECTON

HOLE NO. S-91
Sheet No. 5 of 7
Date Completed 4/24/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
492.4	10.0	NXWL	2.52	98	0.44	0.08		–	wk	tr	(cov) wk	tr. spec.	Seri	tized	Mp. Bx	Monzonite porphyry breccia. Noted first appearance of cpy @ 493.2'. Locally st. gran'd.
507.5	10.1	"	2.62	96	0.37	0.05		–	mod	tr	(cov) tr	do	do		"	Noted sporadic occ. of cov/cpy. Core continues to be brecciated.
515.8	8.3	"	2.74	96	0.44	0.04			wk	tr	(cov) tr	do	do		"	Do.
526.0	10.2	"	2.56	93	0.39	0.07			wk	tr	(cpy) tr	do	Kaolinized Sericitized		"	Sb'd, Bx'd, Ser'd Mp.
536.2	10.2	"	2.66	92	0.38	0.03			wk	tr	–	do	do		Mp/Gr	As above. Last 4' of int. comp'l. mix'd. Mp interfingers w/Gr, former predominating.
546.4	10.2	"	2.67	93	0.53	0.06			wk	wk	–	tr spec.	do		Mp	Porph. cont. fresh bi. wkly Bx'd but st toward cut of int.
556.4	10.0	"	2.69	98	0.51	0.05			wk	wk	–	do	do		Mp	St. Bx'd Mp, st. FeOx; locally quartzose.
564.7	8.3	"	2.70	95	0.36	0.03			wk-mod	tr	–	wk. spec.	↓		Bx	and st. ser'd segments.
572.7	8.0	"	2.67	91	0.38	0.03			wk	tr	–	do	↓		↓	
581.8	9.1	"	2.52	97	0.41	0.03			wk	wk	–	do	do		Mp	Gen'lly as above.
599.8	8.0	"	2.68	92	0.46	0.04			wk	wk	–	do	do		"	
599.9	10.1	"	2.62	96	0.61	0.05			wk	wk	–	do	do		Gr, Mp	Mixed int. Variably Bx'd.
606.6	6.7	"	2.54	97	0.79	0.04			wk	wk-mod	–	–	do			(N.B. Interval in box reads: "608.6".)
616.8	10.2	"	2.60	79	1.45	0.04			wk	mod	–	–	do		Mp?Bx	St. Bx'd. Dissem cpy. occurs in f.gr.
624.3	7.5	"	2.82	84	1.59	0.03			wk-mod	mod-st	(cov) tr					greyish-green rock w/conspic. black bi. (Phase of Mp?) No obv. feldspar phenos. Py as distinct vnlts and dissem.
629.8	5.5	"	2.63	82	0.56	0.02			mod	wk	–	–	Qtz-Ser		Gr Bx	Extr. ser'd, granid w/variable rounded f.gr. qtz-ose, grey fragments, locally granitoid. Steeply angled structure elements w/FeOx.
636.0	6.2	"	2.72	95	0.60	0.03			mod-st	?	–	–	do			
640.2	4.2	"	2.48	88	0.63	0.03			wk-mod	?	–	–	do		"	Almost decrease in ser. Bx'n. w/incr. in hematite.
648.7	8.5	"	2.56	97	0.48	0.04			wk	wk	–	–	Qtz-Ser Kaolinized		Gr, Mp	No megascopic Cu min. From 640.2' mixed Gr and Porph.

Final Depth 868.6'
Collar Elevation
Coordinates
Inclination – 90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SPERANZA

HOLE NO. S-91
Sheet No. 6 of 7
Date Completed 4/24/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
659.7	11.0	NXWL	2.64	98	0.73	0.05		—	mod	wk-mod	—	—	Qtz-	Ser	Gr, Mp	As before a mixed Gr-Porph. (Mz?)
													Kaolinized.		Bx	int. w/st. Bx'n. Locally silicified w/finely
																disem. cpy
666.0	6.3	"	2.68	72	1.61	0.05			mod	mod	(cov) tr	—	Qtz-	Ser	Gr Bx.	Extr. ser'd to 664.3'. Rock highly Bx'd
675.2	9.2	"	2.54	52	1.16	0.10			wk	mod	—	—	+ Kaolin			Gr. thence comp't gran. to end of int.
															Mp Bx	Scat'd cpy throughout. Mz porph @ 673',
																to end of int.
685.7	10.5	"	2.54	94	0.66	0.04			wk	tr-wk	tr	—	Sericitized		Mp Bx	Do. St. gran'd, quartzose from 692.6 to
696.3	10.6	"	2.48	94	0.78	0.05							Kaolinized			end of int. Trace cc.
706.2	9.9	"	2.52	100	0.45	0.07			wk	tr	wk-mod	—	Qtz-	Ser	Gr	(Core unsplit from 696.7 - 698.7') Locally
																steeply dipping gran'd zones.
716.2	10.0	"	2.56	99	0.50	0.07			tr	—	wk-mod	—	do		Gr, Mp?	Gran to 714.0, thence int. becomes porphic for
													Kaolinized		(mixed)	1', reverting to gran.
725.0	8.8	"	2.56	98	0.61	0.04			wk	tr.	wk	—	Sericitized		Mp	Monz. porph. w/tr. disem. cpy to 718.9'
													Kaolinized			thence silicif. ser'd. Bx'd, cont. py, cc to 721.4
734.7	9.7	"	2.54	100+	0.41	0.04			wk	wk	—	—	do		Mp	Do. At 744.2' porph-soaked gran becoming
742.4	7.7	"	2.78	99	1.02	0.05			wk-mod	wk	tr-wk	—	Sericitized		↓	more granitoid @ 747.7'(gradational contact?)
752.8	10.4	"	2.70	96	0.55	0.03			wk	wk-mod	—		Qtz-	Ser	Gr Bx	Variable brecciation throughout, but becoming
																st. last 3' of int.
763.0	10.2	"	2.70	93	0.61	0.03			wk-mod	wk	—	—	Qtz-	Ser	Gr	St. brecciation, silicif./sericite to ±763.0',
770.9	7.9	"	2.50	100	0.50	0.02			wk	wk	—	—	↓		↓	thence Gr except for segment of porph @
778.5	7.6	"	2.62	100	0.35	0.02			wk-mod	tr	—	—				767.0'. Py, hydroxide, @ 772.0 at mod. angle.
786.1	7.6	"	2.68	100	0.28	0.02			wk	tr	—	tr, mdy	↓		↓	Tr-wk disem cpy.
795.3	9.2	"	2.52	100	0.42	0.03			wk	wk	—	—	Qtz-	Ser	Gr, Mp	As above to 789.0'; thence a mixed
798.2	2.9	"	2.54	91	0.53	0.02			wk-mod	wk	—	—	(Kaolinized)		Bx	sequence of porph and granite to end of
808.5	10.3	"	2.58	98	0.54	0.04			wk	wk	—	—	↓		↓	int, latter predominating. St. Bx'd w/local
818.1	9.6	"	2.58	94	0.58	0.03			wk-mod	wk	—	—				st. sericite.
826.7	8.6	"	2.54	94	0.52	0.02			wk-mod	wk	—	—	Qtz-	Ser	Gr	Variable brecciation. wkly disem cpy.
836.9	10.2	"	2.76	95	0.60	0.02			wk-mod	wk	—	—	↓		↓	
845.2	8.3	"	2.54	96	0.55	0.02			wk	wk	—	—				

Final Depth 868.6'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property ACUTON

HOLE NO. S-91
Sheet No. 7 of 7
Date Completed 4/24/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
855.6	10.4	VxWL	2.64	66	0.56	0.03			wk	wk	—	—	Qtz-	ser	GS	Principally as for previous interval.
863.8	8.2	"	2.64	93	0.74	0.02			wk	wk-mod	—	—	↓		↓	
868.6	4.8	"	2.58	92	0.85	0.03			wk-mod	mod	—	—	↓		↓	
	E.O.H.															

Final Depth 868.6'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-91
Sheet No. 1 OF
Date Completed 4-6-68 To 4-24-68
Logged By NPW 4-23

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
110.0	110.0	4½" Ro BIT														OVERBURDEN DRILLED WITH ROCK BIT – No CHARACTER SAMPLES TAKEN. BEDROCK c. 104 FT.
118.4	8.4	NXWL	2.47	89	0.03	0.02							Qtz-Kaolin	ser-	Mz PORPH & Bx	Rk is mg, lt reddish-gray, and st'ly alt'ed. Partially hm flooded and completely leached and ox'ed. Mod-st, diss ind lm - much of it LLm. Texture gen'ly porph'ic. No Cu min obs.
128.7	10.3	"	2.42	98	0.02	0.01							"	"	Mz PORPH	Similar to above. Highly frac'ed but not bx'ed. Wk-mod hm flooding. Completely leached, w/mod diss-ind lm. No Cu min obs
138.8	10.1	"	2.67	98	0.03	0.01							"	"	Mz PORPH Bx & Mz PORPH	Similar to above. Completed healed and refractured bx. Leached and ox'ed diss, vns, and pats of former suls. No Cu min obs
147.2	8.4	"	2.49	100	0.03	0.01			wk		tr-wk		Qtz-	ser	Mz PORPH & GR(?)	Similar to above. Only a few narrow zones of bx w/hm. Bal gen'ly reddish tan to gray, st'ly alt'ed, and texturally similar to GR below c. 143'-144'. Mod-st diss & segregations of fg ind LLm. Localized pats of diss py-cc. Cu min tr-wk.
157.0	9.8	"	2.66	100	0.18	0.06			wk		wk		"	"	Bx of GR & MP	As above -- Principally GR w/localized zones of texture resembling MP which could be acting as the matrix of an intrusive bx. Fair diss ind lm and LLm seted throughout. Only very small pat of unoxidized py w/thin films of cc. Cu min wk.
167.0	10.0	"	2.69	100	0.14	0.07			wk-mod		wk		"	"	Bx or Mix of GR-MP	Similar to above -- percentages of the two rk types about balanced -- textures transitional. Color gray-grayish purple-hm red Few pats diss py-cc. Cu min wk.

Final Depth
Collar Elevation
Coordinates
Inclination

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-91
Sheet No. 2 OF
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
172.0	5.0	NXWL	2.70	100	0.06	0.02					tr(?)		qtz	ser	GR Bx	As above – Rk lt gray to purple, qtzose, and
182.2	10.2	"	2.54	100	0.02	<0.01					tr(?)					displaying fair ind hm on fracs and in diss.
																Appears to be completely ox'ed and leached.
																Cu min tr-wk.
192.4	10.2	"	2.54	100	0.02	0.01							qtz	ser	GR-MP	As above, but composed of both rk types.
202.2	9.8	"	2.55	100	0.04	0.01								kaolin	Bx	Mp appears to have been intrusive into the
																GR -- and then both subject to subsequent
																bx'ion. Completely ox'ed and leached. No
																Cu min obs.
212.0	9.8	"	2.65	100	0.03	0.01							qtz	ser	GR Bx	As above, but entirely GR. Fair amount of ind
																lm in sct'ed pods, on frac surfaces, and diss.
																No Cu min obs.
223.0	11.0	"	2.70	88	0.80	0.20			mod		mod-st		"	"	GR-MP(?)	As above, but retaining a few unox'ed to
															Bx	partially ox'ed intercepts displaying high
																angle vlts and diss of py-cc. Cu min mod-st
233.3	10.3	"	2.52	96	0.34	0.11			mod		mod-st	cov(?)	qtz	ser	MP-GR	Principally the MP – w/ st'ly min but very
														kaolin	Bx	localized pods of py-cc in basal portion of
																run. Partial to complete ox throughout. Cu
																min mod-st.
243.2	9.9	"	2.46	97	0.05	0.03							"	"	MP Bx	Similar to above. Rk varies fr/dk gray to
																bleached lt gray to hm flooded. Sct'ed,
																diss fg ind lm. No Cu min obs.
253.4	10.2	"	2.60	99	0.15	0.07			wk		tr-wk		"	"	MP Bx	As above – few pats w/ tr-wk py-cc. Fair
																amount ind lm. Cu min tr-wk.

Final Depth 669.5 FT.
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-90
Sheet No. 1 OF 7
Date Completed 4-3-68 T 4-11-68
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
210.0	210.0	4¾" Ro Bit														BEDROCK PROB'LY 185 FT.
219.8	9.8	NXWL	2.62	90	0.04	0.02									MzPORPH Bx	Gen'ly lt gray to mod bluish gray, med'ly to st'ly alt'ed to qtz-kaolin-ser, and almost entirely bx'ed, hm flooded, and healed. Set'ed spec in small vugs & f. vlts. No Cu min obs.
229.5	9.7	"	2.60	85	0.05	0.02									MzPORPH Bx	As above in all respects. Some bx structures in the st'ly hm flooded zones may be replacement types. Possible wk, diss, vfg ind hm. No Cu min obs.
239.4	9.9	"	2.62	86	0.05	0.03									MzPORPH Bx	As above. Few fracs leached and vuggy. No Cu min. obs.
249.4	10.0	"	2.68	100	0.07	0.03									MzPORPH Bx	Similar to above. Spec perhaps more common. Core displays st qtz-ser-kaolin alt. Locally leached and vuggy. No Cu min obs.
259.4	10.0	"	2.59	98	0.19	0.16		$CuCO_3$ $CuSO_4$?					Qtz	Ser	MzPORPH Bx	Similar, but locally more st'ly alt'ed and somewhat bleached. Rather high qtz. Set'ed small vug w/spec. Few zones display fine vlts of malachite and 2 mm flecks of blk Cu ox (?) on fracs. Locally leached - w/ vfg, diss ind hm. Cu min wk - mod.
269.0	9.6	"	2.60	100	1.41	1.35		$CuCO_3$ $CuSO_4$(?)					Qtz	ser	MzPORPH Bx	Rock similar to above but more st'ly min'ized. Malachite and possible brochantite antlerite in f. vlts and on fracs. Abundant fg, diss ind hm. Cu min. st.
278.3	9.3	"	2.67	100	1.19	1.16		$CuCO_3$					Qtz	ser	MzPORPH Bx	As above. Still thoroughly bx'ed and healed. St, local hm flooding. Crusts and vlts of azurite & malachite. Cu min st.

RECOVERY

LINEAR

Final Depth
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-90
Sheet No. 2 of 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
288.4	10.1	NXWL	2.69	100	1.96	1.87		$CuCO_3$					Qtz	ser	Mz Porph	Similar - some zones st'ly flooded w/ hm
								CuO							Bx	display the shadows of former feld phenocrysts
				RECOVERY												Rather st azurite & some malachite in
																vf vlts, blebs, & crusts. Tr of melaconite (?)
																on some fracs. Cu min st.
298.4	10.0	"	2.47	93	0.09	0.07		$CuCO_3$					"	"	Mz Porph	Similar - w/ basal portion more st'ly hm
															Bx	flooded and essentially devoid of min. Bx-hm
																structure dips 50°-60°. Cu min. wk.
308.3	9.9	"	2.44	95	0.07	0.05							"	"	Mz Porph	Similar to basal portion of above. Gen'ly
															Bx	st hm & qtz. Still displaying some vfg
																diss ind hm. No Cu min obs.
318.0	9.7	"	2.68	100	0.05	0.04							"	"	Mz Porph	As above - somewhat less hm flooding,
															Bx	more spec in small cavities. Locally mthar
																st, diss, fg ind hm. No Cu min obs.
328.0	10.0	"	2.70	100	0.35	0.33		$CuCO_3$					"	"	Mz Porph	Local, narrow, high angle bx zones w/st
															Bx	hm & intervening zone which are lt red-gr
																w/ blebs of spec. Few spots and vlts of
																$CuCO_3$. Cu min tr to wk.
338.2	10.2	"	2.61	99	1.39	1.39		$CuCO_3$					"	"	Mz Porph	Dk gray to lt red-gray, locally hm flooded
															Bx	and bx'ed. Azurite-malachite throughout
				LINEAR												much of core as flooding, f. vlts, & frac
																crusts. Core begins to appear less st'ly
																ox'ed. Some spec appears pseudomorphous
																after py. Cu min mod-st.
348.5	10.3	"	2.51	96	0.07	0.06		$CuCO_3$					"	"	Mz Porph	Stronger bx & hm flooding. Leached, partially
															Bx	open vugs and fracs. Few Tr malachite. Ind,
																diss hm common. Cu min Tr.
358.5	10.0	"	2.60	98	0.12	0.11		$CuCO_3$							Mz Porph	Similar. More st'ly bx'ed, hm flooded,
													"	"	Bx	and leached. Much of core qtz'ose. Tr
																malachite or $CuSO_4$ on few fracs. Cu
																min tr.

Final Depth
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-90
Sheet No. 3 OF 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
368.2	9.7	NXWL	2.58	92	0.13	0.13		$CuCO_3$					Qtz-	ser	Mz Porph Bx	As above in all respects. Set'ed tr malachite throughout. Cu min tr-wk.
379.7	11.5	"	2.50	97	0.15	0.15		$CuCO_3$					"	"	Mz Porph Bx	Similar to above, bx'ed, healed, and displaying mod hm flooding throughout. Fair percentage of fresh, diss, biotite common. Set'ed traces of malachite in f. vlts and on fracs. Wk, diss ind hm. Cu min tr.
389.6	9.9	"	2.52	99	0.05	0.05							"	"	Mz Porph Bx	As above in all respects. Numerous high angle bx zones. No Cu min obs
399.6	10.0		2.58	98	0.03	0.03						Nat Cu	"	"	Mz Porph Bx	Similar in all respects. Very st'ly crumpled and distorted. First tr Nat Cu obs in basal portion this run. Cu min tr.
409.7	10.1	"	2.50	84	0.28	0.13						Nat Cu	"	"	Mz Porph Bx	Similar to above, but displaying far less hm flooding. Locally rather chloritic. Fine vlts and small blebs of Nat Cu common. These are gen'ly high angle to vert and cross-cut and/or postdate the high angle bx-hm zones. Cu min mod-st.
420.1	10.4	"	2.50	61	0.78	0.33					WK	Nat Cu	Qtz + kaolin & chlor		Bx'ed Mz Porph	Similar, but considerably less ox'ed and bx'ed. Chlor'ic, hosting diss, fresh biotite. Somewhat ruggy, high angle vls & fracs w/ Nat Cu & partially ox'ed cc. Cu min st.
429.6	9.5	"	2.57	100	2.63	0.62					Mod-St	Nat Cu	"	"	Bx'ed Mz Porph	Similar to above - Nat Cu and cc in vlts and small blebs and along fracs. Unox'ed zones display vfg diss cc. Cu min st.
431.4	1.8	"	2.60	100	1.36	0.38			Tr		Tr		"	"	Bx'ed Mz Porph	Similar to above - Somewhat chlor'ic, w/ set'ed, diss py - displaying partial to complete replacement by cc. Cu min tr-wk.

RECOVERY

LINEAR

Final Depth
Collar Elevation
Coordinates
Inclination VERT

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-90
Sheet No. 4 of 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
436.2	4.8	KXWL	2.51	100	1.22	0.44			Tr		Tr-wk		Kaolinized		An Porph	Dike w/ intrusive cts. Rk is mod olive grn and gen'ly hm flooded. Phenocrysts of kaolinized feld are commonly anhedral and 2-7 mm in diam. Diss, alt'ed biotite(?) and a few qtz blebs. A few localized vlts and sct'ed tr of vfg diss py-cc. Cu min tr-wk
443.0	6.8	"	2.54	100	1.48	0.32			Tr		Tr-wk		Qtz-ser-Kaolin		Bx'ed Mz Porph	As above the preceding dike. Mod grn'ish gray w/ diss, alt'ed biotite and pervasive, mod hm flooding. Fracs and vlts of st hm Partially ox'ed & leached, w/some fracs displaying ind lm Sct'ed tr diss, vfg py-cc. Cu min tr-wk.
453.3	10.3	"	2.51	96	1.46	0.54			Tr		wk-mod		"	"	Bx'ed Mz Porph	As above. Locally bx'ed or qtzose. Leached w/abund ind lm - much of it appearing to be after cc. Few vns cc and some sct'ed diss of cc-py. Cu min wk-mod.
463.4	10.1	"	2.58	96	1.59	0.61			Tr-wk	Tr	Tr-wk		"	"	Bx'ed Mz Porph & An Porph	As above, w/ a few short intercepts of andesite porph. Mod hm flooding throughout. St ind lm. Sct py-cc, and a Tr of diss vfg cpy. Cu min tr-wk.
473.6	10.2	"	2.58	98	0.46	0.18			Mod	Tr(?)	wk-mod		"	"	Bx'ed Mz Porph	As above - Rk less hm flood. Numerou vns of lm after cc & partially ox'ed cc. Local zones of fg py in st conc. Cu min wk-mod.
483.7	10.1	"	2.56	94	0.33	0.13			Mod-St	Tr(?)	St	cov(?)	Qtz-ser		Bx'ed Mz Porph	As above, Except for v. high angle to vert vn & narrow bx zones, rk is devoid of major hm flooding. Qtz-ser alt st. Localized segregations of fg py-cc (w/some cov?). Sct'ed vns of these same. Cu min st.
493.7	10.0	"	2.49	97	0.74	0.23			Mod-St	Tr(?)	Mod	cov(?)	"	"	Bx'ed Mz Porph	As above in all respects. wk to mod diss, w/ most of suls in vns & on fracs. Cu min min mod-st.

RECOVERY

LINEAR

Final Depth
Collar Elevation
Coordinates
Inclination VERT

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-90
Sheet No. 5 OF 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
503.8	10.1	NXWL	2.54	93	0.31	0.14			Wk-Mod		Tr-Wk		Qtz-	ser	Bx'ed Mz Porph	As above in all respects. Cu min tr-wk.
513.7	9.9	"	2.60	95	0.65	0.09			Mod	Tr(?)	wk		"	"	Bx'ed Mz Porph	As above in all respects. Dark grn'ish gray to lt red-brn, locally hm flooded, qtzose & locally chlor'ic. Some fracs leache and partially open. Mod-st qtz-ser alt. Py is streaked out on a few post-min slips. Cu min wk.
524.0	10.3	"	2.78	95	0.29	0.03			Mod		Tr		Qtz-ser Kaolin		Mz Porph	Rk much more obviously porphyritic. Ground mass gen'ly hm flooded. Phenocrysts 2-3 mm and anhedral. Mod'ly alt'ed. Py diss throughout - most fracs leached. Cu min tr.
534.0	10.0	"	2.53	95	0.23	0.01			Mod	Tr(?)	Tr-wk		"	"	Mz Porph	As above, but more qtzose - w/textures obliterated by alt. Crumpled & locally broken. Felds somewhat grn. Mod py diss throughout. Tr-wk cc, principally along fracs. Cu min tr-wk.
542.0	8.0	"	2.60	93	0.19	0.01			Mod	Tr(?)	Tr-Wk		"	"	Bx'ed Mz Porph	Similar to above. Broken, crushed, and locally bx'ed. Hm vlts, frac filling, & matrix common. Alt mod-st. Gen'ly fg py diss throughout. Cu min wk.
552.0	10.0	"	2.50	78	0.55	0.03			Mod	Tr(?)	Tr-wk		"	"	Bx'ed Mz Porph & Flt GG	As above to c. 546'-547'. Below this pt rk is st'ly crushed, hm stained, and intermixed w/flt gg. The latter zone appears to be post min. In gen min is as above. Cu min tr-wk.
562.2	10.2	"	2.56	89	0.61	0.02			Wk-Mod	Wk			"	"	Flt GG & Mz Porph	Flt zone as above extends to a. 559'. Rk below this pt similar to that in preceding runs. Many of the feld phenocrysts are dk grn & completely kaolinized. Diss py-cpy, w/ some cpy in fine vlts.

RECOVERY

LINEAR

Final Depth
Collar Elevation
Coordinates
Inclination VERT

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-90
Sheet No. 6 of 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
571.0	8.8	NXWL	2.56	RECOVERY	0.42	0.01			Mod	Wk			Kaolin Qtz-	w/some ser	MzPORPH	Well frac'ed, but gen'ly healed. Groundmass is hm-red to grayish-blue, mod'ly silf in some zones. Phenocrysts completely alt'ed. Py diss and in a few vns. Cpy in set'ed diss. Cu min wk.
578.0	7.0	"	2.62	100	0.27	<0.01			Wk-Mod	Tr			Qtz- & Kaolin	ser	MzPORPH	As above. St ser alternates w/kaolin Set'ed vfg py & tr cpy. Cu min tr-wk.
588.2	10.2	"	2.55	93	0.20	<0.01			Mod	Wk-Mod			"	"	MzPORPH	As above. Locally frac'ed and broken Zone where grn felds are common bear diss & frac deposits of cpy. Copper min wk-mod.
595.2	7.0	"	2.74	LINEAR 86	0.56	<0.01			Mod	Mod			"	"	MzPORPH	As above. Variable in texture as it has been -- fr/porph'ic to dense fr/qtz. Still mod'ly to st'ly alt'ed. Diss & frac deposit of py-cpy. Cu min mod.
606.1	10.9	"	2.58	81	0.37	<0.01			Wk-Mod	Wk			"	"	MzPORPH	As above - grayish grn, dense, w/obliterated orig. textures. Very st'ly broken. Diss mg py & wk cpy. Cu min wk.
614.1	8.0	"	2.57	80	0.44	<0.01			Mod	Wk			"	"	MzPORPH	As above. Dense, silf, and v. highly broken. Cu min wk.
624.0	9.9	"	2.54	52	0.38	<0.01			Mod	Mod			"	"	MzPORPH	As above. More of original texture remains Still displaying a fair amt of hm flooding and chlorite. Few vns of cpy. Diss py. Cu min mod
632.4	8.4	"	2.54	95	0.11	<0.01			Mod	Tr-Wk			"	"	MzPORPH	As above. Again, orig texture present. Locally crushed, gen'ly chlor'ic, & wk'ly hm flooded. Few vns py. Cu min tr-wk.
641.4	9.0	"	2.50	90	0.18	<0.01			Mod-St	Tr-wk			"	"	MzPORPH	As above in all respects. A number of low angle py vns and frac deposits. Tr-wk, diss cpy. Cu min tr-wk.

ASARCO

GEOLOGIC – ASSAY LOG

Final Depth
Collar Elevation
Coordinates
Inclination VERT.

Property SACATON

HOLE NO. S-90
Sheet No. 7 OF 7
Date Completed
Logged By NPW

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu			Mineralization					Alteration		Rock Type	Remarks
					Total	Non-S	Average	Oxides	Pyrite	Cpy	Cc	Other				
649.6	8.2	NXWL	2.54	89	0.25	<0.01			Mod	Tr-Wk			Qtz-ser		Mz PORPH	As above. Highly br and crushed w/mod-st silif & local chlor. Few segregations of chlor, sil, & py. Wk-mod hm throughout. Diss suls. Cu min tr-wk.
													Kaolin-chlor			
660.1	10.5	"	2.54	85	0.27	<0.01			Mod	Tr			"	"	Mz PORPH	As above. Many orig textures obliterated by silif. Wk hm & chlor throughout. Still highly broken & crushed. Numerous f. vlts. of py. Cu min tr.
669.5	9.4	"	2.64	53	0.50	<0.01			Mod	Tr			"	"	Mz. PORPH	Similar to above in all respects except that rk is somewhat more chlor'ic. Cu min tr.
BOTTOM																

RECOVERY LINEAR

Final Depth 1798.3'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO
GEOLOGIC – ASSAY LOG

J. H. C.
JAN 7 1969

Property SACATON

HOLE NO. S-89
Sheet No. 1 of 6
Date Completed 3-30-68 to 4-5-68, 4-12-68 to 5-15-68
Logged By NW, RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu: Total	Non-S	Average	Mineralization: Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
.0	1194.0	4¾" Ro Bit														HOLE DRILLED THROUGH OVERLYING ALLUVIUM AND CONGLOMERATE(S) w/RK BIT. CHARACTER SAMPLES REPRESENTING 30 FT. INTERVALS WERE TAKEN.
																BEDROCK WAS PROB'LY c. 1185 FT.
93.8		NXWL	BEGINNING OF CORE													
102.2	8.4	"	2.49	92	0.21	0.12							Qtz-	ser	Mz PORPH (?)	Rk is v. st'ly alt'ed and bleached -- w/most of the orig textures obliterated and/or mottled by wk hm. Basic color v. pale gray – fg to mg w/small blebs of qtz. Some zones are gray, silicified, and dense. No ind Im or Cu min obs.
113.3	11.1	"	2.32-2.50	96	0.53	0.50		$CuCO_3$ $CuSiO_4$					Qtz- Kaolin	ser	Mz PORPH & DA PORPH (?) w/an AN DIKE	As above to approx 1205'. Below this pt and a 60° ± slip w/assoc healed bx is a mod olive-grn porph'ic AN dike (?) w/tr Cu CO_3 (malachite) on fracs. Below 1207'± is another healed bx zone -- followed by a hm flooded DA(?) porph w/well alt'ed, 2-3 mm, anhedral to euhedral phenocrysts. Tr $CuSiO_4$ & $CuCO_3$ on some fracs. Cu min wk.
124.7	11.4	"	2.45	88	0.35	0.28		$CuCO_3$ $CuSiO_4$ cup(?)					Qtz-	kaolin	DA PORPH (?)	Similar to basal portion of above run. Color varies fr/olive-gray to hm red fr/flooding. Tr $CuCO_3$ & $CuSiO_3$ on fracs. Set tr of possible cuprite. Cu min tr-wk.
134.0	9.3	"	2.51	100	0.42	0.35		$CuCO_3$ $CuSiO_4$ $CuSO_4$(?)					"	"	DA PORPH (?)	As above -- locally bx'ed and healed. Bx matrix st in hm and core mod'ly flooded. Few dense, gray silif frags in the bx'ed zones display diffused $CuCO_3$ and/or $CuSO_4$(?). Few fracs w/$CuSiO_4$ & $CuCO_3$. Cu min wk-mod.

Final Depth 1798.3'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-89
Sheet No. 2 OF 6
Date Completed 5/15/68
Logged By NPW, RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
244.5	10.5	NXWL	2.46	95	0.58	0.52		$CuCO_3$ $CuSiO_4$					Qtz-	Kaolin	DA PORPH (?)	As above -- mod hm flooding of groundmass common. Few zones are light gray, silif, and bear diffused & diss $CuSiO_4$ & $CuCO_3$. Cu min mod-st.
254.8	10.3	"	2.48	96	0.84	0.76		$CuSiO_4$					"	"	DA PORPH (?)	As above, Color fr dk grn-blk to hm flooded. Mod alt'ed, w/ $CuSiO_4$ along fracs and diffused. Cu min wk-mod.
259.7	4.9	"	2.47	100	0.22	0.17		$CuSiO_4$					"	"	DA PORPH (?)	Similar to above. Somewhat more crumpled and pitted. Some ind (?) lim on a few fracs. $CuSiO_4$ along same. Cu min wk.
266.4	6.7	"	2.50	96	0.09	0.05		$CuSiO_4$					"	"	DA PORPH (?)	As above. Few bxed and healed zones. Basal portion displays a few bleached pats w/ fg, diss ind lm. Set'ed $CuSO_4$ on a few fracs. Cu min wk.
270.0	3.6	"	2.79	96	3.62	0.23			Mod		St		Qtz -	ser	DA PORPH (?)	Rk is bleached and silif, w/ fg, diss py -- partially to completely replaced by cc. Orig textures partially obliterated. Few pats of oxidation. Cu min st.
280.6	10.6	"	2.46	90	0.93	0.06			Mod		St		"	"	DA PORPH (?)	As above in all respects. Few ox'ed zones w/ st hm. Diss and vlts of py-cc. Cu min st.
288.3	7.7	"	2.51	90	1.49	0.10			Mod		St		"	"	DA PORPH (?)	As above in all respects. Replacement of py by cc appears less complete than in preceding runs, but core is cut by a greater number of py-cc vns. Cu min st.
298.3	10.0	"	2.40-2.5	40	0.11	0.05			Mod	TR(?)	TR-Wk	TR COV	"	"	DA PORPH (?)	As above, but leached and ox'ed. Few vlts of cc in zones of st qtz-hm are not completely leached. Cu min wk.
307.2	8.9	"	2.43	34	0.14	0.07							Qtz- Kaolin	Set	DA PORPH (?)	As above, but well br, granulated in some zones, and completely leached. St hm along high angle bx zones. No Cu min obs.

Final Depth 1798.3'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-89
Sheet No. 3 of 6
Date Completed 5/13/68
Logged By NPW, RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
318.2	11.0	NXWL	2.40	99	0.10	0.08							Kaolin	qtz	DA PORPH (?) or Mz PORPH (?)	Upper portion of run healed bx and more recent breakage & granulation w/fairly st hm. Rk textures appear intermediate between the DA PORPH and the Mz PORPH. Some zones display 2-3 mm, alt'ed, gen'ly subhedral, feld phenocrysts. Other intervals the 2-3 mm qtz eyes or blebs. Mod-st hm throughout -- w/ leaching complete. Fair diss and frac. deposits of ind lm. No Cu min. obs.
328.9	10.7	"	2.56	96	0.09	0.06							Qtz-kaolin	ser	Mz PORPH (?)	Rk more closely resembles the Mz PORPH. Some zones, mod grn'ish-gray w/35° banding & narrow bx'ed intervals. Much of balance of core st in qtz-hm and gen'ly porph'ic in texture. No Cu min obs.
338.3	9.4	"	2.40	100	0.07	0.05							Qtz-	Kaolin	Mz PORPH (?) and GRANITE Bx	As above, w/ Mz PORPH (?) becoming dk grn'ish-gray. At c. 1331.6' a low angle, hm surfaced slip initiates a 2 ft. zone of well indurated mylonitized (?) porph. This is terminated at 1333.4 by a low angle slip. Balance of run is a healed, well indurated, hm flooded bx of GRANITE frags which exhibits mod qtz-ser alt and diss ind lm. No Cu min obs.
																CT. BETWEEN Mz PORPH (?) AND GR Bx c. 1333.4 FT.
346.3	8.0	"	2.47	89	0.03	0.03							Qtz-	ser	GRANITE Bx	As above. Gen'ly rounded frags of GR, 5-20 mm in diam, and a few short zones of highly distorted GR. Wk-mod hm flooding. Mod qtz-ser alt. Set'ed, diss ind lm. No Cu min obs.
352.7	6.4	"	2.54	100	0.04	0.03							Qtz-	ser	GRANITE Bx	As above. Very highly bx'ed and mod'ly hm flooded throughout matrix. Locally mod-st fg, diss ind Lm. No Cu min obs.

Final Depth 1798.3'
Collar Elevation
Coordinates
Inclination VERT.

ASARCO
GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-89
Sheet No. 4 OF 6
Date Completed 5/15/60
Logged By NPW, RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Mo Average	Mineralization: Cu Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
357.7	5.0	NXWL	2.53	94	7.18	1.68		mod	tr	st	st	wk-mod indig Lm	Qtz-	Ser	GRANITE Bx and Diabase (?)	Brecc'd granitoid fragments, hem'd to 1355' followed by strongly hem'd sections, 5" long, accompied by a massive cc, cpy vein dipping 45°, 2" wide, followed by pale blue Cu_2SiO_4. At this point rock becomes f. gr'd, dense, gen'ly light to dk grey color.
367.7	10.0	"	2.50	98	0.21	0.16		tr	–	–	–	wk. indig Lm, Lim	do		Diabase (?) Bx.	St. hem'd, brecc'd, since gr'd, occ. quite strong and sericitized rock. Occ granitoid, suggesting an incorporation or "soaking" process. At times rock is porph'ic. (phenos 1 m.m or less)
373.7	6.0	"	2.40	97	0.12	0.07		–	–	–	–	wk Lim	↓			
382.7	9.0	"	2.60	100	0.16	0.10		–	–	–	–	wk. indig Lm				
391.7	9.0	"	2.48	97	0.14	0.10		–	–	–	–	wk. indig Lm, Lim	do		"	Core remains f. gr'd. ser'd, qtzose as above w/scat'd phenos (< 1 m.m in size) of feldspar → clay (complete)
398.3	6.6	"	2.38	100	0.14	0.12		–	–	–	–		↓		↓	
408.2	9.9	"	2.41	96	0.14	0.11		–	–	–	–					
418.3	10.1	"	2.37	98	0.26	0.22		tr	–	–	–					
428.3	10.0	"	2.42	100	0.48	0.45		wk	–	–	–				"	Brecciated, variably hem'd, in particular along steeply dipping fractures. Fine gr'd dk grey micaceous groundmass. Scat'd small feldspar phenos.
438.4	10.1	"	2.43	97	0.84	0.72		wk-mod	–	–	–				↓	
									SULPHIDES							
444.5	6.1	"	2.48	85	1.30	0.60		wk	–	–	mod	–	Qtz-	Ser	Diabase Mp(?) FAULT	Sho int. charac'd by st. brecciation, shearing w/hem (especially @ 1446.3') followed by about 2' of crushed, sericitized rock w/disseminated cc. Int. decidedly porph for remainder of run (± 2 m.m in size)
452.7	8.2	"	2.44	97	1.54	0.48	0.008	wk	–	–	mod-st	–	Sericitized		Mp Bx	Medium gr'd, porph (feldspars → clay) w/ scat'd qtz phenos. Cu Ox (silicate?) along fract. Noted Cu_2O (cuprite) and unknown pale green Cu min @ 1463.6'.
464.0	11.3	"	2.49	96	2.48	0.76	0.010	tr-wk	–	–	mod-st	cuprite Cu_2O	& Kaolinized			
474.2	10.2	"	2.50	98	1.25	0.51	0.012	tr	–	–	mod	–	↓			
486.2	12.0	"	2.52	96	0.42	0.12		–	tr-wk	–	wk	–	Sericitized		Mp Bx	Rock type similar in characteristics to above. St. ser'd from 1482' to 1491.0'. Granite encountered @ 1494'.
491.0	4.8	"	2.60	81	0.47	0.16		–	tr	–	wk	–	do		Mp Bx	
500.2	9.2	"	2.54	98	0.29	0.10		–	tr-wk	–	tr-wk	–	Qtz-	Ser	Mp Bx & Gr Bx	
506.2	6.0	"	2.49	93	0.28	0.06		–	–	–	tr-wk	–	Qtz-	Ser	Gr Bx	Variably brecc'd, ser'd w/scat'd cc throughout.

Final Depth 1798.3'
Collar Elevation
Coordinates
Inclination — 90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-80
Sheet No. 5 of 6
Date Completed 5/15/60
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay – % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks
1516.2	10.0	NXWL	2.54	84	0.40	0.07			—	—	wk-mod	—	Qtz	Ser	Gr. Bx.	St. ser'd granite w/disseminated cc. interspersed
1523.4	7.2	"	2.56	96	0.32	0.06			—	—	tr-wk	—	↓		↓	by st. hem'd and brec'd granite.
1531.2	7.8	"	2.58	92	0.26	0.06			tr	—	tr-wk	—				
1542.3	11.1	"	2.50	85	0.56	0.08			—	—	wk-mod	—	do		"	Similar in character to above. St.
1551.0	8.7	"	2.54	64	0.79	0.14			—	—	mod	—	↓		↓	hem'd, brec'd from 1550 – 1554!
1560.7	9.7	"	2.53	94	0.46	0.23			tr	—	wk	—				
1568.7	8.0	"	2.48	96	0.28	0.16			—	—	tr-wk	—	do		Gr. Bx	As above with variable brecciation, hema-
1572.7	11.0	"	2.58	88	0.34	0.10			tr	—	tr-wk	tr cov	↓		↓	tite and sericite development. Minerali-
1580.2	7.5	"	2.58	100	0.37	0.17			tr	—	tr-wk	tr cov				zation as noted.
1591.3	11.1	"	2.58	100	0.52	0.17			tr-wk	—	wk-mod	—				
1598.3	7.0	"	2.52	94	0.40	0.11			tr-wk	—	wk	—				
1600.2	10.9	"	2.66	86	0.17	0.04			tr	tr	tr-wk	—	Qtz	Ser	"	St. ser'd throughout w/wk FeOx develop-
1619.1	9.9	"	2.68	90	0.13	0.02			tr	tr	tr	—	↓		↓	ment, predominantly along fractures. Noted
1628.0	8.9	"	2.46	91	0.12	0.02			tr	tr	tr	—				ocas'l specks of cpy w/tr of cc. Wkly silic'd
1638.3	10.3	"	2.48	94	0.15	0.02			tr	tr	—	—				Massive SiO2 @ 1645.0' w/py, cpy?
1648.7	10.4	"	2.66	96	0.20	0.02			tr-wk	tr	tr?	—				
1658.0	9.3	"	2.54	96	0.30	0.02			tr-wk	tr-wk	—	—	do		Gr. Bx.	Do. Ser'd, wet competent granite w/st.
1669.3	11.3	"	2.54	88	0.16	0.02			tr	tr	—	—	↓		Gr. Bx.	gran'd sections. At 1671.6' rock becomes
1679.8	10.5	"	2.58	79	0.46	0.02			tr-wk	wk?	—	—	chlor'd		FAULT	st sh'd, gran'd, chlor'd fault breccia, gouge.
													gouge.			
END OF NX CORE.																
START BX.																
1687.6	7.8	BXWL	2.58	20.5	0.32	0.02			tr	tr-wk	—	—	chlor'd	serp'd	Mp?	Granite-shaped porph.? or silicif'd Mp?
1695.3	7.7	"	2.54	100+	0.28	0.02			tr	tr-wk	—	—	Sericitized		Mp	to 1687.6'; thence Mp (chlor'd/serp'd) w/
1704.5	9.2	"	2.42	100+	0.29	0.02			tr	tr	—	tr moly				variable sericite development. Noted 1"
1713.1	8.6	"	2.16	79	0.30	0.01			tr-wk	tr	—	—	↓		↓	wide py, cpy vein @ 1709.8'.
1724.3	11.2	"	2.08	90	0.03	<0.01			—	—	—	—	Qtz	Ser	Mp. Gr	Similar to above in rock type to 1724.3';
1735.2	10.9	"	2.63	100+	0.34	<0.01			tr	tr	—	—	chlor'd		Gr, Mp?	thence granite to 1731.5', chlor'd, sh'd to
																end of int.
1744.6	9.4	"	2.62	70	0.23	<0.01			tr-wk	tr	—	—	chlor'd		Porph. Gr	Porphy (Mp) st. chlor'd, sh'd. Granite
																occurs from 1742.5 – 1744.6'.

Final Depth 1798.3'
Collar Elevation
Coordinates
Inclination -90°

ASARCO

GEOLOGIC – ASSAY LOG

Property SACATON

HOLE NO. S-89
Sheet No. 4 of 6
Date Completed 5/15/68
Logged By RHL

Depth	Interval	Core Size	Sp Grav	Core Rec %	Core Assay - % Cu Total	Non-S	Average	Mineralization Oxides	Pyrite	Cpy	Cc	Other	Alteration		Rock Type	Remarks CORE SPLIT PRIOR TO LOG
1753.6	9.0	EXTL	2.62	.85	0.46	<0.01			Tr wk	wk	—	Tr moly	Qtz-	ser	Gr	Scat'd cpy within granite. Wkly micas->
1761.0	7.4	"	2.44	96	0.28	<0.01			tr	tr	—	—	chlor'd		BROKEN	chlorite. Last 2' of int. highly shd, dkr
															FAULT.	and grn'd.
1771.3	10.3	"	2.50	82	0.05	<0.01			tr	—	—	—	chlor'd		Gr	St. sparsi. grn'd ± first 2' of core
1778.1	6.8	"	2.64	99	0.02	<0.01			—	—	—	—				w/tr of py. At 1784.0' becomes mod.
1789.0	10.9	"	2.50	88	0.02	<0.01			—	—	—	—				to coarse grn'd st. chlor'd granite.
1798.3	9.3	"	2.58	91	0.01	<0.01			—	—	—	—				
	E.O.H.															