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PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. S.M-1 SHEET NO. 1

COORDINATES

TYPE DRILL Diamond Drill BIT SIZE N X

DATE STARTED May 6 1963

0' to 100'

GEOLOGIC LOG

Project Silver Mountain

St. - Stain
Sil. - Silicification
Cu - Copper Sulfide
Py - Pyrite
Clay - Coffee Soils Min.
Fe Ox - Iron Oxide Min.
Gr - Grain

Fresh Less Min. Included Etc.
S - Shear - Unalt'n
M - Mineral & Rock Transformation
Sh - Shatfield - Many Textures & Breccia
Same Symbols For Fox & Etc.

COLLAR ELEVATION 5000'
TOTAL FOOTAGE
LOGGED BY
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0							
10	10	0	—	No Core			
	10.0	0.5	Silicified Granite	Weathered Granite, Mostly Fine, 3% Course Arts	Weathered, Some Sil., Clay, Scant Sericite, Chlorite	None Fox Stks. Few Cu Ox Specs	60°S
	10.5	11					
	11.5	0.5					
	11.5	19		Foliated, Some Brecciation			
20	13.4	20					
	20.5	2.5					
	21.0	9.2	"	Weathered Fine Gr Granite to 23.0, Then Oxidized, Bleached Fine Gr. Granite, Some Shearing, Breccia 4- 21.5 to 22.5 Possible Fault	Weathered With Clay to 23 Bleached	Fox Stks, Few Py Casts	45° F
30	29.7	29.8	2.8				
	30.0	33.4	4.6	Bleached Fine Gr. Granite	Sil. Bleaching, Iron Oxide St.	Fox, 6" Stk At 39.5 to 40.0 Fox After Chalcocite(?)	
40	38.4	38.8	5.2				
	38.8	41.1	2.3	Bleached Fine Gr Granite, Fractured From 40 to 45, Mostly Steep And Healed, 44.8 to 45.7 Crushed Zone, Course Gr. Then Fine Gr. Granite, Then Intermittant Inclusions of Biotite Schist From 45.4 to 49.2 Then Bleached Fine Gr Granite	Sil. Bleached, Iron Oxide St.	Fe Ox. Fox After Chalcocite(?)	30°
45	41.1	45.7	4.6				30°
50	45.7	48.3	3.6				
	48.9	51.4	2.5	Bleached Medium To Fine Gr Granite To 51.4 Some Breccia, Fractured With Intermittant Biotite Schist Inclusions 2" to 3" Wide, Foliation In Schist Inclusions Conform With 45° Fracturing.	Sil Bleached, Iron Oxide St. Sericite, Clay	Fox Stks, 3" Fox Stringers	
55	51.4	53.2	1.8				
60	53.5	58.3	5.0				
	58.3	63.0	4.1	Bleached Fine Gr. Granite To 62.0, Breccia And Gouge 62-63 Possible Fault. Intermittant Biotite Schist Was Fractured With Some Brecciation to 68.0, Then Oxidized Fine Gr. Granite.	Sil., Bleached Iron Oxide St. Some Sericite, Clay	Fox Stks., Few Py Casts	
70	63.0	65.9	2.3				
	65.9	70.1	4.2				
	70.1	72.1	2.0	Bleached, Granite, Oxidized, Severely Fractured Fine Gr. Granite To 74.0, Course Gr. Granite To 75.5, Breccia And Gouge To 76.0, Then Fine Gr Schists, Fractured Granite.	Sil., Bleached, Iron Oxide St., Sericite, Clay	Fox Stks	
80	72.1	76.0	3.7				
	76.0	81.2	5.2				
	81.2	82.4	1.2	Bleached Fine Gr. Granite With Intermittant Schist Inclusions To 81.2, Then Breccia To 82.9, Then Bleached Medium Gr Granite With Biotite Schist Inclusions To 85.0 Then Fine Gr Granite, Silicified And Fractured	Sil., Bleached, Iron Oxide St. Abundant Sericite, Some Clay	Fox Stks., Py Casts.	
90	82.4	85.7	3.4				
	85.7	88.9	3.2				
	88.9	94.1	5.2	Bleached Fine Gr Granite To 92.0, Oxidized Medium Gr To 95.0, Then Fine Gr To 98.0 Then Banded Granite With Biotite Schist Inclusions	Sil. Bleached, Iron Oxide St. Some Sericite And Clay	Iron Stks., Py Casts, Fox After Chalcocite(?)	
100	94.1	99.3	5.2				
	99.3	100.7	1.4				

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-1 SHEET NO. 2
COORDINATES
TYPE DRILL Diamond Wl BIT SIZE NX
DATE STARTED May 4, 1962

Project Sheep Mountain

COLLAR ELEVATION 3000'
TOTAL FOOTAGE
LOGGED BY C.J.Z
DATE COMPLETED

100' - 200'

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
100							
99.3	103.3	4.4	Granite	Bleached Fine Gr Granite to 101.0, Altered, Brecciated, Moderately Fractured Schist Inclusions With Some Epidote Medium to Fine Gr Granite With Stringers of Iron Oxide.	Sil./Iron Oxide St. Some Sericite	Fox Stks, 2" Fox Stk At 102.4, 3" Fox With Green Copper At 102.5, 1" Fox Stk. At 102.2, Thru 2" Fox Stk At 102.0	45° Fract 45° Fract
103.7	108.9	5.2					
110							
108.9	114.1	5.2	"	Bleached Medium to Fine Gr Oxidized Granite, Specially Fractured To 111.0 Then Oxidized Medium to Fine Gr. Fractured Granite	Sil./Iron Oxide St. Some Sericite, Some Clay	Fox Stks, Py. Casts, Fox After Chalcopyrite	45° Fract 15° Fract 60° 60°
114.1	119.0	4.9					
120							
119.3	124.2	4.9	"	Bleached Medium Gr Oxidized Granite, Fractured To 126.0 Then Brecciated To 128.0, Then Medium To Fine Gr Granite	Sil., Iron Oxide St Some Sericite, Clay	Fox Stks., Py Casts Fox Casts After Chalcopyrite 3" Fox Stk. At 123.9	60° 60° 45° 45°
124.2	129.5	5.3					
130							
129.5	133.7	4.2	"	Bleached Fine Gr To 131, Then Medium Gr. Oxidized Well Fractured To 132, Then Fine Gr Fractured to 135.0, Then Medium Gr Oxidized Fractured Granite, Some Epidote To 137.0, Then Oxidized Well Fractured Medium to Fine Gr Granite Then Oxidized Well Fractured Medium to Fine Gr Granite	Sil., Iron Oxide St. Some Sericite, Clay	Fox Stks., Py Casts 2" Fox Stk At 134.0	45° Fract 45° 45° 60° 60°
133.7	137.1	3.4					
137.1	139.9	2.8					
140							
139.5	142.5	2.6	"	Bleached Medium Gr. Oxidized And Well Fractured Granite To 145, Then Sheared Broken With Gouge To 149.6 Probable Fault, Then Granite.	Sil., Iron Oxide St. Some Sericite And Clay.	Fox Stks., Py Casts	60° 60°
142.5	147.7	5.2					
147.7	149.6	1.9					
150							
149.6	152.2	2.6	"	Bleached Sheared With Gouge, Probable Fault To 151.0 Then Fractured And Oxidized To 153.4, Then Sheared With Gouge To 153.7, Then Well Fractured Medium To Fine Gr Oxidized Granite.	Sil., Iron Oxide St. Some Sericite Clay.	Fox Stks., Py Casts	10° Fox 60° 60°
152.2	153.7	1.1					
153.7	156.8	3.0					
160							
156.8	160.1	3.3					
160.1	165.4	5.3	"	Bleached Well Fractured Medium to Fine Gr. Granite, Well Oxidized.	Sil. Iron Oxide St., Some Sericite, Clay	Fox Stks., Py Casts	45° 45°
165.4	170.5						
170							
165.5	172.9	7.1	"	Bleached Well Fractured Medium to Fine Gr Granite, Well Oxidized.	Sil., Iron Oxide St., Some Sericite, Clay.	Fox. Stks, Py Casts	45° 45°
172.9	178.1	5.2					
180							
172.1	182.3	9.2	"	Bleached. Fractured Medium to Fine Gr. Granite, Oxidized	Sil, Iron Oxide St., Some Sericite, Clay.	Fox Stks, Py Casts	10° Fox 60° 60°
182.3	186.2	3.2					
190							
186.2	190.3	4.1	"	Bleached Well Fractured Medium to Fine Gr. Granite, Oxidized	Sil., Iron Oxide St., Some Sericite And Clay	Fox Stks, Py Casts, Fox After Chalcopyrite	45° 45°
190.3	193.0	3.0	Porphyry	To 194.0, Fractured With Gouge To 194.2 Bleached Well Fractured Oxidized Porphyry	Sil. Iron Oxide St. Some Sericite And Clay		60° 60°
193.0	196.5	3.5					
196.5	200.0	3.5					
200							

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-1 SHEET NO. 3

COORDINATES ____

TYPE DRILL Rotary BIT SIZE NX

DATE STARTED May 6, 1963

Project Sheep Mountain

COLLAR ELEVATION 3000'

TOTAL FOOTAGE ____

LOGGED BY E.T.

DATE COMPLETED ____

200-300'

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
200							
200.2	205.4	4.2	Porphyry	Bleached, Fractured Medium to Fine Gr. Porphyry, Oxidized With Some Gouge At 202', Then Oxidized Fractured Medium Gr Porphyry.	Sil, Feox St., Some Sericite And Clay, Bleached	Feox Stks., Feox After Chalcopyrite By Calcs.	
205.4	209.4	4.0					
210							
209.4	212.2	2.8	"	Bleached With Silicification Medium to Fine Gr Porphyry Oxidized to 212.2 Then Fine Grained Fractured Porphyry To 217.0', Stks Of Green Copper, Then Well Fractured Oxidized Porphyry to 219.0, Then Gouge To 219.1, Then Fractured Porphyry With Green Copper	Sil. Feox St., Some Sericite And Clay Bleached	Feox Stks., Feox After Chalcopyrite Quox, Chalcocite Spks 212 to 217.5 By Calcs, Quox, Chalcocite Spks And Py 217.5 to 220.	
212.2	217.5	5.3					
220							
217.5	222.0	4.5	"	Bleached Fractured Medium To Fine Gr. Porphyry With Green Copped Stks., Flecks Of Chalcocite And Chalcopyrite, Oxidized, Fractured, Jugcy Fine Gr Porphyry.	Sil., Feox St., Some Sericite And Clay, Bleached.	Feox St., Feox After Chalcopyrite Quox Chalcocite Spks., Chalcocite Replacing Py And Py Spks 220 to 222.5	
222.0	227.3	5.3					
230							
223.0	229.0	2.0	Granite	Bleached Fractured Medium Gr. Porphyry With Some Gouge Oxidized With Stks Of Green Copper To 231.4 Then Bleached Well Fractured And Broken Medium to Fine Gr Granite With Some Gouge	Sil, Feox St., Some Sericite And Clay, Bleached	Feox St. Feox After Chalcocite Green Copper 231 to 232 With Stks Py And Cus.	
229.0	232.2	3.2					
240							
240.5	242.5	2.0	"	Bleached Granite Medium To Fine Gr Well Fractured, With Gouge 241.3 to 245.0, Then Fractured Medium to Fine Gr to 248.3 Then Well Crushed With Gouge Probable Fault Zone	Sil, Feox St., Sericite And Clay, Bleached	Feox St. Feox After Chalcocite And Chalcopyrite., Py And Chalcocite Replacing Py.	
247.5	249.5	2.0					
250							
241.5	248.8	2.8					
251.5	253.5	2.0	"	Bleached Modern Granite Well Fractured To 253 Then Bleaches Fine Gr Silicified Granite, Fractures Contain Sulfides	Sil, Feox St., Bleached, Clay.	Feox St., Feox After Chalcopyrite Chalcocite Replacing Py, Spks Py And Chalcopyrite.	
253.5	256.1	2.6					
256.1	257.4	3.3					
260							
257.4	261.0	3.6	"	Silicified Granite Well Fractured, Contains Inclusions Of Biotite Schist, Brecciated And Completely Healed, Bleached	Well Sil. Some Feox Stks, Clay Bleached	Some Feox Stks, Chalcocite Film On Some Of The Py,	
261.5	266.1	4.6					
270							
266.1	270.8	4.7	Porphyry	Fractured Silicified Rhyolite Porphyry, Medium to Fine Gr. Bleached	Sil. Some Feox Stks., Some Clay	Some Feox Stks. Py Is Chalcocite Film On Py.	
270.8	275.5	5.2					
280							
275.5	280.6	4.1	"	Rhyolite Porphyry Medium to Fine Grained, Fractured And Bleached	Sil Some Feox Stks., Clay	Some Feox Stks, Py, Chalcocite Replacing Py.	
280.6	284.7	4.1					
290							
284.7	289.5	4.8	"	Rhyolite Porphyry Medium to Fine Gr Fractured And Bleached	Sil, Some Feox Stks, Clay	Some Feox Stks, Py, Chalcocite Replacing Or Filming Py	
289.5	294.5	5.0					
300							

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Silver Mountain

HOLE NO. SM-1 SHEET NO. 4

COORDINATES _____

TYPE DRILL [illegible] BIT SIZE NX

DATE STARTED [illegible] 1972

COLLAR ELEVATION [illegible]

TOTAL FOOTAGE _____

LOGGED BY [illegible]

DATE COMPLETED _____

300-400

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
300.2	304.7	5.0	Porphyry	Bleached, Fractured Medium to Fine Gr Oxidized Porphyry	Sil., Fcox St. Clay.	Fcox St., Py Chalcocite Filmi Py.	60°Fcx 60°Fcx 45°Fcx 45°S 45°S
304.7	308.7	4.0					
308.7	313.6	5.3	"	Bleached, Fractured Medium to Fine Gr Porphyry	Sil., Fcox Stks	Fcox St., Py., Chalcocite Filming Py.	60°Fcx 45°Fcx 60°S 45°S
313.6	315.9	2.4					
315.9	320.1	4.2					
320.1	323.0	2.9	"	Bleached, Fractured Medium to Fine Gr Porphyry	Sil., Fcox Stks.	Fcox St., Py, Chalcocite Filming Py.	45°S 60°S 60°Fcx 45°Fcx
323.0	326.0	3.0					
326.0	330.0	4.0					
330.1	333.9	3.8	" 140.7/150.2 Ft Qtz	Bleached, Fractured Medium to Fine Gr Porphyry.	Sil., Fcox Stks.,	Fcox St., Py., Chalcocite Filming Py.	45°S 60°S 45°Fcx 45°S
333.9	337.5	3.6					
337.5	339.2	1.7					
339.2	342.8	3.6	"				

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-7 SHEET NO. 1
COORDINATES 8100N 1500E
TYPE DRILL [illegible] DIT SIZE NX
DATE STARTED Dec. 17, 1963

ALTERATION CODE: P- POOR, F- FAIR, M- MODERATE, G- GOOD

GEOLOGIC LOG

Project SHEEP MOUNTAIN

Si SILICIFICATION, Fe-Ox- IRON OXIDES, Py - PYRITE

COLLAR ELEVATION 3207
TOTAL FOOTAGE
LOGGED BY CWP
DATE COMPLETED

S - FRACTURE.
(S) FRACTURES MORE THAN 1 PER FOOT - BACKSLASH WHEN LINE IS INCLINED RIGHT - SLASH WHEN LINE IS INCLINED LEFT - [illegible]

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	10	No Core	—				
10	20	70%	Andesite	Brecciated partly healed fractured weathered Andesite, strong silicification M-S.			45° S
23.8' 29.0'			"	Brecciated, fractured and broken well weathered Andesite.			
29.0' 40.0'			"	Broken, weathered fine grained Andesite, pyrite and quartz stringers.			
40.0' 49.6'		100%	"	Fractured, weathered Andesite, with isolated high angle fractures and strong silicification zones			
60	60	70%	"	Fractured, brecciated, weathered Andesite to 56, then fractured Andesite			60° S
70		100%	"	Fractured, weathered, brecciated Andesite with the brecciation well healed			60° S
			"	Weathered, fractured, brecciated Andesite with strong silicified breccia [illegible] 71+73. Then [illegible]			60° S 70° S
			"	Weathered, fractured Andesite banded with [illegible] colored inclusions of pyrite. Core [illegible]			
95.0				[illegible] fractured Andesite with minor colored inclusions.			
100			"	Weathered, [illegible] brecciated Andesite, strong silicification, [illegible] and fractured [illegible] to end.			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-2 SHEET NO. 2
COORDINATES 2100N 1500E
TYPE DRILL [illegible] BIT SIZE N/X
DATE STARTED [illegible]

ALTERATION GRADES: P - POOR; F - FAIR; M - MODERATE; G - GOOD

GEOLOGIC LOG

Sil - SILICIFICATION
Flox - IRON OXIDE
Py - PYRITE

Project SUPER MOUNTAIN

COLLAR ELEVATION -22.57
TOTAL FOOTAGE
LOGGED BY D.J.P.
DATE COMPLETED

S - FRACTURE
(2) FRACTURES MORE THAN 1 PER FOOT
WHEN LINE IS INCLINED RIGHT - BROKEN
WHEN LINE IS INCLINED LEFT - MINERALIZED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
110	120	40%	ANDESITE	WEATHERED, BROKEN, FRACTURED ANDESITE HEAVILY BRECCIATED AND SHATTERED IN PLACES THEN SOLID WITH FEW FRACTURES.			60° S 50° S
120	130	100%	"	WEATHERED BRECCIATED FRACTURED ANDESITE WITH SOME ALTERNATE DARK AND LIGHT BANDING.			60° S 50° S
130	140	100%	"	WEATHERED FRACTURED ANDESITE WITH FEW SEAMS OF DARK AND LIGHT TUFF TO 135. INCLUSIONS OF CALCITE.			60° S
140	150	100%	"	WEATHERED FRACTURED FINE GRAINED ANDESITE. SLICKENSIDES AND STRINGERS OF CALCITE. ALSO WITH VEINS TO 1/2" THICK DENSE FINE GR.			50° S
155	160	100%	"	WEATHERED FRACTURED FINE GRAINED ANDESITE. FEW SEAMS OF DARK AND LIGHT TUFF			60° S.
160	170	100%	"	WEATHERED FRACTURED FINE GRAINED ANDESITE AND LESS THAN BRECCIATED WELL WEATHERED WITH FRACTURED ANDESITE			30° S 60° S
170	180	100%	"	WEATHERED FRACTURED DENSE BANDED ANDESITE			30° S 30° S
185	190	100%	"	WEATHERED, FRACTURED, DENSE ANDESITE			45° S 60° S
193	200	90%	"	WEATHERED, FRACTURED ANDESITE, BROKEN AND WEATHERED FROM 193			60° S 50° S
200	210	75%	"	WEATHERED FINE GRAINED ANDESITE, SLICKENSIDED BROKEN AND WEATHERED SOFT FROM 207-210			50° S
				[illegible] FRACTURED [illegible]			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

OLE NO. [illegible] SHEET NO. 3

OORDINATES [illegible] N [illegible] E

YPE DRILL [illegible] BIT SIZE [illegible]

ATE STARTED [illegible]

GEOLOGIC LOG

Project [illegible]

A- Alteration Scale
P- Poor
F- Fair
M- Medium
G- Good

Sil.- Silicification
Fe.- Iron Oxides
By Pyrite

COLLAR ELEVATION 8207

TOTAL FOOTAGE

LOGGED BY [illegible]

DATE COMPLETED

S- Fracture
(S)- Fractures More Than 1 Per Foot
Broken
Veinlets Inclined Pious - Axis Not Measured

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
[illegible]	[illegible]	[illegible]	ANDESITE	WEATHERED FINE GR. FRACTURED ANDESITE			60° S 60° S
[illegible]	[illegible]	100%	"	WEATHERED MEDIUM TO FINE GR. ANDESITE			60° S 45° (S)
[illegible]	[illegible]	98%	"	WEATHERED FRACTURED MEDIUM TO FINE GR. ANDESITE. BROKEN 247 TO 250			60° S Broken Zone 45° (S)
252 50	270	95% N.V. to 270'	"	WEATHERED BROKEN & FRACTURED ANDESITE			15 ft. Broken
[illegible] 60	310	80% - 100%	"	WEATHERED, BROKEN & FRACTURED ANDESITE BRECCIATED TO 266, BRECCIATED AND HEALED TO 295 THEN FRACTURED WITH [illegible]			60° (S)
[illegible]	290	100%	"	WEATHERED FRACTURED VUGGY ANDESITE SOME BANDS OF CALCITE			60° (S) 60° (S)
[illegible]	320	100%	"	WEATHERED, FRACTURED VUGGY ANDESITE CALCITE IN PART OF THE VUGS.			
[illegible]	330	90%	"	WEATHERED, FRACTURED VUGGY ANDESITE CALCITE IN VUGS FROM 296 TO 299. BROKEN AND BRECCIA FROM 296-300			60° S 60° S
[illegible]	340	95%	"	FRACTURED ANDESITE			45° S
[illegible]	[illegible]	[illegible]	"	FRACTURED ANDESITE BRECCIATED AND HEALED 310 TO 311			[illegible]
[illegible]	[illegible]	[illegible]	"	FRACTURED ANDESITE			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Silver Mountain

HOLE NO. SM-3 SHEET NO. 4
COORDINATES 2100R) 1500E
TYPE DRILL Diamond BIT SIZE BX
DATE STARTED May 11 1963

COLLAR ELEVATION 3207
TOTAL FOOTAGE
LOGGED BY C.S.
DATE COMPLETED

ALTERATION GRADES
P- POOR
F- FAIR
M- MODERATE
G- GOOD

SIL-SILICIFICATION
FeOx - IRON OXIDES
Cu - COPPER SULFIDES
Py - PYRITE

S- FRACTURE
(5)-FRACTURES- MORE THAN 1 PER FOOT
LINE INCLINED RIGHT - BROKEN
LINE INCLINED LEFT - MINERALIZED.

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
[illegible]	340	98%	ANDESITE	FRACTURED ANDESITE			60° (5) 70° S
340	350	95%	"	FRACTURED ANDESITE, HIGH ANGLE FRACTURES CONTAIN QUARTZ ALSO FORM WATER COURSES.			60° (5) 45° S 45° S 20° (5)
[illegible] 350	360	90%	"	FRACTURED ANDESITE, HIGH ANGLE FRACTURES ALL QUARTZ LINED. FORM WATER COURSE			45° (5)
360.9 [illegible]	370	98%	"	ANDESITIC BRECCIATED 361 to 362 WELL HEALED.			
370	380	100%	"	ANDESITE HIGH ANGLE FRACTURES IN 371 FORMS WATER COURSE.			60° S 25° (5)
[illegible]	390	100%	TUFF	ANDESITE TUFF			20° S
[illegible]	[illegible]		"	" "			45° (5) 60° (5)
[illegible]	[illegible] 405	98%		TUFF			[illegible]
[illegible]	415	99%	ANDESITE	FRACTURED ANDESITE			[illegible]
[illegible]	430	100%	"	ANDESITE, BRECCIATED 419 - 0 430			20° S
[illegible]	[illegible]	95%	" TUFF	ANDESITE TO 430 TUFF			20° S 60° S
430	440	100%	" ANDESITE	TUFF to 431 [illegible] SOME [illegible] 437-438			[illegible]

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. [illegible] SHEET NO. 5

COORDINATES [illegible] [illegible]

TYPE DRILL [illegible] BIT SIZE [illegible]

DATE STARTED [illegible] 1952

Alteration Codes: P - Poor, F - Fair, M - Moderate, G - Good

GEOLOGIC LOG

Project Sacramento Mountain

COLLAR ELEVATION [illegible]

TOTAL FOOTAGE [illegible]

LOGGED BY [illegible]

DATE COMPLETED [illegible]

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
[illegible]	[illegible]	[illegible]	Andesite	Andesite Broken Hard Dense & Seamless Dense			[illegible]
[illegible]	[illegible]	[illegible]	"	Broken Andesite			60°
[illegible]	[illegible]	50%	"	[illegible] Andesite Shattered [illegible]			[illegible]
[illegible]	[illegible]	70%	"	[illegible] Andesite Dark Maroon Color Slightly Broken			[illegible]
[illegible] 490	490	95%	"	Fractured Andesite Broken 484 to 490			60° 75°
490	520	90%	"	Fractured Andesite Broken 490 to 497 Dark Maroon Andesite to 497 then Broken to 520			60° 45°
[illegible]	[illegible]	70%	"	Fractured Andesite			60°
[illegible]	[illegible]	[illegible]	"	[illegible] Fractured Andesite [illegible] 196 [illegible] to Fracture Planes			60° [illegible]
[illegible]	[illegible]	[illegible]	Tuff	[illegible] Tuff			[illegible]
[illegible]	[illegible]	100%	"	Tuff			[illegible]
[illegible]	[illegible]	[illegible]	"	Tuff			[illegible]

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-3 SHEET NO. 6

COORDINATES 3[illegible] 11 [illegible]E

TYPE DRILL [illegible] BIT SIZE 12¼

DATE STARTED [illegible] 19[illegible]

Project Superior Pourover

COLLAR ELEVATION 3207

TOTAL FOOTAGE [illegible]

LOGGED BY D.S.Z.

DATE COMPLETED [illegible]

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
5040 5300	5460	100%	Andesite Tuff	Breccia Fractured Andesite Tuff			60° S
5460 5619	5770	[illegible]	"	Banded Breccia Tuff.			50° S 20° S
5770 [illegible]	[illegible]	[illegible]	"	" " "			50° S
[illegible] 5900	[illegible]	90%	"	" " "			60° S 10° S
[illegible] 6053.0	6400	70%	"	" " "			60° S 10° S
6053.0	6410	96%	"	" " "			60° S 10° S [illegible]
[illegible] 6410 6413.5	6420	78%	"	" " "			60° S 60° S 20° S
6420	6425	100%	"	" " " Breccia 6425-6426			50° S
6426	6430	[illegible]	Andesite	Fractured Andesite			60° S 20° S
6430	6440	100%	"	" "			50° S
6440	6444	[illegible]	"	" "			
[illegible]	6500	[illegible]	[illegible]	Tuffy Tuff Breccia, Small Granite Inclusions			
6500	6540	75%	"	Tuff Breccia Salmon Pink Color, With Small			[illegible]

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Silver Mountain

HOLE NO. SM-2 SHEET NO. 1
COORDINATES 3100N 1500E
TYPE DRILL Diamond DIT SIZE BK
DATE STARTED May 17, 1963

COLLAR ELEVATION 3207
TOTAL FOOTAGE
LOGGED BY W.J.L.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
660	670	90%	TUFF	WHITE BRECCIATED TUFF, PROBABLE FAULT ZONE AT 662 TO 664 FAULT GOUGE THEN WHITE BRECCIATED TUFF W/ 1/2 IN SMALL GRANITE INCLUSIONS.	Possibly A MINOR ISO !!		FAULT GOUGE 50° S
670	690	100%	ANDESITE	FRACTURED ANDESITE			60° S 10° S
690	690	100%	"	" "			50° S 50° S
690	700	100%	"	" "			50° S
700	710	100%	"	" "			45° S
710	716	100%	"	" "			60° S
716	730	100	TUFF	TUFF SOME QUARTZ LENSES			70° S
730	735	100%	"	"			20° S 60° S
735	740	100%	"	" BLEACHED 735 to 740.			45° S 45° S
740	750	100%	"	FRACTURED TUFF			45° S 50° S 30° S
750	752	100%	"	" " FAULT GOUGE 752 to 755'			60° S 30° S
752	767	100%	"	" "			30° S
767	775	100%	ANDESITE	BRECCIATED ANDESITE			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM 2 SHEET NO. 8
COORDINATES 2100 N 1500 E
TYPE DRILL Diamond Drill BIT SIZE EX
DATE STARTED May 17, 1963

Alteration Codes: P- Poor, F- Fair, M- Moderate, G- Good

GEOLOGIC LOG

Project Sierra Mountain

Sil. - Silicification
Flox - Iron Oxide
Py - Pyrite

COLLAR ELEVATION 3207
TOTAL FOOTAGE
LOGGED BY D. P.
DATE COMPLETED

5 - Fracture
(5) - Fractures More Than 1 Per Foot
With Line Inclined Dip - Direction
With Line Inclined Left - Misch.

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
710	774	100%	ANDESITE	SILICIFIED ANDESITE			45° (5)
774	780	100%	"	ANDESITE			60°S
780	783	100%	"	"			45° (5) 20°S
783	790	90%	TUFF	SOFT, FRIABLE TUFF WITH SMALL GRANITE PEBBLE INCLUSIONS			50°S 20°S
790	800	100%	"	SOFT, FRIABLE TUFF TO 792 THEN BLEACHED WHITE TUFF.			50° (5) 20°S
800	810	80%	"	WHITE TUFF TO 803 GRADING TO A FINE SOFT FRIABLE TUFF WITH INCLUSIONS OF GRANITE UP TO ½" TO 807, THEN GRANITE INCLUSIONS RANGE UP TO 2". WELL BROKEN			60°S
810	812	70%	"	FINE SOFT FRIABLE, BROKEN TUFF WITH GRANITE INCLUSIONS UP TO 2".			50°S
812	820	100%	GRANITE	FRACTURED, OXIDIZED, MEDIUM FINE GRAINED GRANITE	SIL G, FELDSPAR G, FLOX G	FLOX 1-2% TRACE IRON MINERALS	60° FLOX
820	830	95%	"	BLEACHED, OXIDIZED, FRACTURED MEDIUM FINE GRAINED GRANITE, GOUGE 821.5 TO 822. ALL FRACTURE SURFACES CONTAIN IRON OXIDES	SIL G, FELDSPAR G, FLOX G, SERICITE P.	FLOX 2-3%	50° FLOX 60° FLOX 50° FLOX
830	840	95%	"	BLEACHED, OXIDIZED, FRACTURED MEDIUM FINE GRAINED GRANITE, TRACE OF GREEN COPPER CARBONATE AT 830.5, TRACE OF LIMONITE AFTER COPPER SULFIDES AT 832, TRACE OF GREEN COPPER AT 838.3, LIMONITE COATED FRACTURES AT 839, VUGGY AT 836.	SIL G, FELDSPAR G, FLOX G, SERICITE P.	FLOX 2-3% TRACE OF GREEN COPPER	20° FLOX 60° FLOX
840	850	95%	"	OXIDIZED, FRACTURED MEDIUM FINE GRAINED GRANITE, GOUGE 842.5 TO 843. VUGGY 847 TO 850. FRACTURES CONTAIN IRON OXIDES WITH TRACE OF LIMONITE AFTER COPPER SULFIDES.	SIL G, FELDSPAR G, FLOX G, SERICITE P.	FLOX 2-3%	60° FLOX 70° FLOX 50° FLOX 50° FLOX
850	870	95%	"	OXIDIZED, FRACTURED MEDIUM FINE GRAINED GRANITE	SIL G, FELDSPAR G, FLOX G, SERICITE P.	FLOX 1-2% TRACE COPPER	45° FLOX
870	880	70%	GRANITE	OXIDIZED, FRACTURED MEDIUM FINE GRAINED GRANITE	SIL G, FELDSPAR G, FLOX G, SERICITE P.	FLOX 2-3% TRACE COPPER	60° FLOX 60° FLOX
880	890	70%	"	OXIDIZED, FRACTURED MEDIUM FINE GRAINED GRANITE	SIL G, FELDSPAR G, FLOX G, SERICITE P.	FLOX 2-3% TRACE COPPER	50° FLOX
890	900	70%	"	OXIDIZED, FRACTURED MEDIUM FINE GRAINED GRANITE, GOUGE 893 TO 894 FRACTURES CONTAIN PYRITE MOSTLY SERICITIZED	SIL G, FELDSPAR G, FLOX G, SERICITE M, SERICITE P.	FLOX 2-3%, TRACE COPPER AS COATING ON FRACTURE SURFACES	50° (5)

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. 2 SHEET NO. 1
COORDINATES 3100 N 1500 E
TYPE DRILL [illegible] BIT SIZE PV
DATE STARTED 11-10-1982

Alteration Codes: P- Poor, F- Fair, M- Moderate, G- Good

GEOLOGIC LOG

Project Silver Hammer

Sil. - Silicification, Fox. - Iron Oxide, Py - Pyrite, Cpy - Chalcopyrite, Mos - Molybdenite

COLLAR ELEVATION 2207
TOTAL FOOTAGE
LOGGED BY CJS
DATE COMPLETED

F - Fracture
(5) - Fractures Mode Tenth / Per Foot
X/Axis Line Inclines Right Degrees
Y/Axis Line Inclines Left - Millirad

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
[illegible]	[illegible] 992	95%	Pegmatite	Fractured, Vuggy Pegmatite to 28% Then Lenses of Quartz Gneiss with Pegmatite To 28% Then Vuggy Fracture - Pegmatite.	Sil. G, Iddingsite F, Sericite F, Fox P.	Py - 2-3%, Cpy <1%, Mos. Trace, Chalcocite Blanket On Py, Fox 1% Total Oxidation Of Sulfides 1-3% Total Sulfides = 2-3%	50° (Py) 60° Py 30° S 50° S
992	1000	100%	Granite - Gneiss	Fractured, Fine Grained Schistose Gneiss With Lenses Of Pegmatite.	Sil F, Feldspar F, Sericite F, Fox P, Chlorite P	Py 3-4%, Cpy <1%, Mos Trace, Trace Chalcocite Blanket On Py, Fox 1% Total Oxidation Of Sulfides 1-2% Total Sulfides 3-4%	45° S 10°
1000	1010	100%	"	Fractured, Fine Grained Schistose Gneiss With Pegmatite Lenses To 70% Then Granite Lenses To 70%.	Sil F, Feldspar F, Sericite P, Fox P, Chlorite P	Py 2-3%, Cpy <1%, Mos Trace, Trace Chalcocite Blanket On Py, Fox 1% Total Oxidation Of Sulfides 1-2% Total Sulfides 2-3%	60° (F) 45° S 10° (F)
1010	1015	100%	"	Fractured Fine Grained Schistose Gneiss With Pegmatite Lenses. Gouge At 913	Sil F, Feldspar F, Sericite F, Fox P, Chlorite F	Py 2-3%, Cpy <1%, Trace Mos, Trace Chalcocite Blanket On Py, Fox 1% Total Oxidation Of Sulfides 1-2%	60° S 45° S
1015	1020	100%	Pegmatite	Fractured Dense Pegmatite, Vuggy White Quartz To 919, Pegmatite Grading Into Granite	Sil G, Feldspar F, Sericite P, Fox P	Py 2-3%, Cpy <1%, Fox 1%, Total Oxidation Of Sulfides 1-3%	45° S
1020	1050	100%	Granite	Fractured Coarse To Medium Grained Granite Vuggy 1022 - 1024 Forming Water Course.	Sil P, Feldspar F, Sericite P, Fox P.	Py 2-3%, Cpy <1%, Fox <1%, Some Chalcocite On Surface Py In Fractures Total Oxidation Of Sulfides 1-3% Total Sulfides 2-3%	45° (F)
1030	1040	100%	"	Fractured Vuggy Coarse To Medium Grained Granite	Sil M, Feldspar G, Sericite P, Fox P.	Py 2-3%, Cpy <1%, Fox <1%, Specs Mos, Trace Chalcocite Forming Py In The Oxidation Of Sulfides 2-3% Total Sulfides 2-3%	60° S 50° S
1040	1050	100%	"	Fractured Coarse To Medium Grained Granite Vugs 1043 - 1045, Then Coarse Grained Granite To 1048 With Aplitic Schistose Gneiss Lens To [illegible]	Sil M, Feldspar G, Sericite F, Fox P, Chlorite F	Py 2-3%, Cpy <1%, Fox <1%, Specs Mos, Trace Bornite & Trace Chalcocite In Fractures Py Total Oxidation Of Sulfides 2-3% Total Sulfides 2-3%	50° (E) 45° (E)
1050	1060	100%	"	Fractured Coarse To Medium Grained Granite To Aplitic Dike At 1058 Forming Vuggy Fracture	Sil M, Feldspar G, Sericite F, Chlorite F.	Py 3-4%, Cpy <1% Specs Mos Total Oxidation Of Sulfides 2-3% Total Sulfides 3-4%	30° (F)
1060	1070	100%	"	" " Very Siliceous	Sil M, Feldspar G, Sericite P	Py Trace To Cpy <1% Trace Mos Total Oxidation Of Sulfides 1-2%	60° (F)
1070	1120	100%	Granite - Gneiss	Fractured Schistose Gneiss, Pegmatite To 5% Vuggy 1077-1078	Sil M, Feldspar P, Sericite P.	Py 4-5% Cpy <1% Trace Mos Total Oxidation Of Sulfides 1-2%	60° Py (F) 30° (F)
1120	1220	100%	"	Fractured Schistose Gneiss Banded Of Granite From 1124 Grading Into Coarse Grained Siliceous Granite At 1150	Sil M, Feldspar M, Sericite P, Chlorite P, Fox P.	Py 4-5%, Cpy <1%, Fox <1% Total Oxidation Of Sulfides 2-4% Total Sulfides 4-5%	60° (F) 60° (F)
1220	1290	100%	Granite	Fractured Coarse Grained Siliceous Granite With Lenses Of Schistose Gneiss And Pegmatite 1255 To 1270	Sil M, Feldspar M, Sericite P, Chlorite P.	Py 3-4%, Cpy <1%, Fox <1% Total Oxidation Of Sulfides 3-4%	45° (F)

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 7 SHEET NO. 10
COORDINATES 21000 N 15000 E
TYPE DRILL Diamond 1.11 BIT SIZE A X
DATE STARTED May 17, 1963

Alteration Grades
P- Poor
F- Fair
M- Moderate
G- Good

Project Sierra Mountain Cpy Chalcopyrite Mos Molybdenite

Sil.-Silicification
Fsp- Feldspar
Dy- Pyrite

COLLAR ELEVATION 3207'
TOTAL FOOTAGE
LOGGED BY G.L.R.
DATE COMPLETED

S- Fractures
⊙ - Fractures, Mode Tr-11 Per Foot
When Line Inclined Right - Basin
When Line Inclined Left - Mountain

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
970	1010	100%	Granite	Highly Siliceous Fractured Granite with Pegmatite 990 to 994 then Jugby Granite 994 to 1008. Then Basic Dioritic Granite.	Sil. M, Feldspar P, Sericite F Chlorite P.	Py 2-4%, Cpy 1/2% Fck 1/2% Trace Bornite Total Sulphides 2-4%	45° Veg Flow
1010	1030	100%	Granite Porphyry	Fractured Basic Dioritic Granite Porphyry with Lenses of Pegmatite.	Sil. M, Fem Min M, Sericite P, Chlorite P, Fck P	Py 3-4%, Cpy 1/2% Fck 1/2% Trace Bornite Total Sulphides 3-4%	45° Py Cpy 60° Cpy
1030	1040	100%	" "	Fractured Basic Dioritic Granite Porphyry Vugs When Cored 1013 to 1020'.	Sil F, Feldspar G, Sericite F, Chlorite F Fck P	Py 4-5%, Cpy 1/2% Fck 1/2% Trace Bornite Total Calculated Sulphides 4-5%	45° Py Cpy 60° Cpy Py
1040	1054	100%	" "	Fractured Basic Dioritic Granite Porphyry Veins & Lens of Massive Siliceous White Pegmatite 1041 to 1043. Then Numerous Veins of Pegmatite Ranging to Pegmatite Dikes and Veins of Pegmatite Ranging to Pegmatite Dikes with Inclusions of Dioritic Granite	Sil F, Feldspar G, Sericite F Chlorite F Sil G, Feldspar Sericite F	Py 3-4% Cpy 1/2% Total Sulphides 3-4% Py 3-4% Cpy 1/2%	45° Py 10° 45°
1054	1070	100%	Granite	Pegmatite with Inclusions of Dioritic Granite			
1070	1080	100%	"	Massive Siliceous White Pegmatite with Streaks Inclusions of Basic Granite Vugs and Water Cavities 1072.5 to 1074.5 Then Fractured to 1080	Sil G, Feldspar G Sericite F	Py 2-3% Cpy 1/2%	10°
1080	1085	100%	"	Siliceous White Pegmatite With Some Pink Waxy Feldspar	Sil G, Feldspar F	Py 1-2% Cpy 1/2% Trace Bornite Total Sulphides 1-2%	45° 60°
1085	1091	100%	"	Siliceous White Pegmatite to 1086 Then Veins of Clay and Lenses of Schist to 1090	Sil G, Feldspar G Sericite P	Py 1-2% Cpy 1/2% Trace Bornite Total Sulphides 1-2%	60° 45° 60°
1091	1070	100%	Granite	Fine to Medium Grained Granite, Banded with Schist and Pegmatite.	Sil F, Feldspar G, Chlorite P, Fck P	Py 2-3% Cpy 1/2% Trace Granite Fck 1/2% Total Sulphides 3-5% Total Sulphides 3-5%	10°
1070	1090	100%	"	Medium Grained Granite Strongly Banded with Schist and Basic Pegmatite. In Spots Pink White Aplitic Granite with Pegmatite Veins	Sil F, Feldspar G, Sericite F Chlorite P, Fck P	Py 2-3% Cpy 1/2% Fck 1/2% Trace Bornite Total Sulphides 3-5% Total Sulphides 3-5%	10° 45°
1090	1100	100%	"	Medium Grained Granite Strongly Banded with Schist and Porphyritic Textured Granite	Sil F, Feldspar G, Sericite F Chlorite P, Fck P	Py 2-4% Cpy 1/2% Fck 1/2% Trace Bornite Total Sulphides 3-5%	45° Py Cpy 45°
1100	1120	100%	"	Medium Grained Granite, Banded with Schist and Porphyritic Textured Granite and Pegmatite.	Sil F, Feldspar G, Sericite F Chlorite P, Fck P	Py 2-4% Cpy 1/2% Fck 1/2% Trace Bornite Total Sulphides 3-5%	60° Py Cpy

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 7 SHEET NO. 11
COORDINATES 2100N - 1500E
TYPE DRILL Diamond Wl BIT SIZE AX-NX
DATE STARTED May 17, 1963

Alteration Codes
P- Poor
F- Fair
M- Moderate
G- Good

Project Silver Mountain Cpy Chalcopyrite
Mos Molybdenite

Sil. Silicification
Feox-Iron Oxides
Py - Pyrite

S - Fracture.
(S) - Fractures, More than 1 per Foot
Main Line Inclined Rig - Bearing
Minor Lines Inclined Feet - Measured

COLLAR ELEVATION 3207
TOTAL FOOTAGE 1112.5
LOGGED BY CLS
DATE COMPLETED July 23, 1963

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1100	1110	100%	Granite	Coarse to Medium Grained Granite with Schistose Zones - to 1104, Then Gneiss Grained Granite with Schist Bands to 1106 Gneiss to Medium Grained Granite. Water	Sil M, Feldspar M, Sericite S Chlorite P, Feox P.	Py 1-2 % Cpy 1% Feox 1% Trace Bornite Total Oxidation of Sulfides 3-5% Total Sulfides 1-2%	60° Py Feox 45° (S) 10° S
1110	1112.5	100%	"	Medium Grained Granite with Clay Bands	Sil P, Feldspar M, Sericite F Chlorite P, Feox P.	Py 1-2% Cpy 1% Feox 1% Trace Bornite Total Oxidation of Sulfides 2-3% Total Sulfides 1-2%	Aspect Feox
				End of Hole			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Silver Mountain

DLE NO. SM-3 SHEET NO. 1
COORDINATES N 700 W 3100 E
PE DRILL [illegible] BIT SIZE NX
TE STARTED June 11, 1963

COLLAR ELEVATION 3154
TOTAL FOOTAGE
LOGGED BY C.L.R.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	5	—	—	No Core			
5	10	20%	Andesite	Fractured & Weathered Andesite			
10	15	70%	"	Fractured, Broken Weathered Andesite			
15	20	95%	"	Fractured Andesite Porphyry			
20	30	98%	"	" " "			
30	40	100%	"	" " " Hard And Dense			60° S
40	50	100%	"	Fractured Andesite Porphyry Weathered			50° S 60° S
50	55	90%	"	" " " "			
55	65	70%	Tuff	Tuff, Broken And Vuggy And Friable			
65	70	80%	"	" "			
70	75	100%	Andesite	Fractured Andesite Porphyry, Weathered			
75	80	75%	Tuff	Tuff, Green			45° S
80	85	95%	"	"			
85	100	100%	Andesite	Andesite Porphyry			
100	110	100%	"	" "			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sierrita Mountain

HOLE NO. [illegible] SHEET NO. 2
COORDINATES 12000 N 31000 E
TYPE DRILL [illegible] BIT SIZE NX
DATE STARTED June 11, 1963

COLLAR ELEVATION 3159
TOTAL FOOTAGE
LOGGED BY W. C. H.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
[illegible]	[illegible]	[illegible]	Andesite	Dense Hard Grey Andesite			
120	130	100%	"	" " " "			45° ±
130	136	100%	"	" " " "			
136	141	[illegible]	[illegible]	Tuff Broken			45° ±
[illegible]	150	90%	"	" "			20° ±
150	160	90%	"	" "			20° (±)
160	170	90%	"	" " Vuggy 164 to 170			
170	180	50%	"	Broken Fractured Vuggy Tuff			
180	190	50%	"	" " " " Brecciated 187 to 189 w/ Granite Inclusions			45° ± 60° (±)
[illegible]	[illegible]	[illegible]	Andesite	Broken Fractured Andesite			
[illegible]	[illegible]	[illegible]	"	" " "			20° (±)
[illegible]	210.5	[illegible]					
				End Of Core Section 210.5' Started Plug Bit Drilling 6-12-63'			

Broken

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-3 SHEET NO. 3
COORDINATES 19[illegible] 2100E
TYPE DRILL [illegible] BIT SIZE N/A
DATE STARTED June 11, 1963

Project Silver Mountain

COLLAR ELEVATION 2159
TOTAL FOOTAGE
LOGGED BY R.J.R.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
247	250	90%	Andesite	Fractured Andesite			45° (S)
250	260	100%	"	" "			45° (S)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			45° [illegible]
[illegible]	270'	100%	Tuff	Vuggy Friable Tuff			45° S 60° S
270	280'	100%	"	" " "			60° (S) 45 S
280	290	100%	"	" " "			60° (S)
290	295'	100%	Andesite	Andesite with second banding of fragmental fragments of Rhyolite, Granite, Schist and Varied Volcanic Andesite. Silica Indicated			45° S
295'	300'	100%	"	Porphyritic Andesite with Angular Fragments of Rhyolite, Granite, Schist and Andesite Cemented by a Light Pink Andesite, Very Indurated. Some Fragments More Than 2"			60° S 60° (S) 60° (S)
300	310'	100%	"	Fragmentals with Angular Fragments of Rhyolite, Granite, Schist, Andesite and Basic Rocks Cemented by a Light Pink Andesite Fragmentals with Small Fragments up to 1/8"			45° S 60° S
310	320'	100%	"	Fragmentals with Angular Fragments of Rhyolite, Granite, Schist and Varied Volcanic Porphyrite in a Light Pink Andesite Cement Fragments up to 1"			60° S
320	324	100%	"	Fragmentals Identical to That of 310-320.			60° S
324	330	100%	"	Hard, Dense Maroon Colored Andesite with Hairline Seams of Quartz			
330	340	100%	"	Hard, Dense, Maroon Andesite			60° S
340	349	100%	"	" " " Some Silica Veinlets. 1/2" Vein at with Hornblende &			15° S 45° S

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sierrita Mountain

E NO. 513 SHEET NO. 1

RDINATES 7000 W 2100 N

E DRILL Failing 300 BIT SIZE NX

E STARTED June 11, 1963

COLLAR ELEVATION 3159'

TOTAL FOOTAGE 951

LOGGED BY BJL

DATE COMPLETED

S- FRACTURES

F- FRACTURES, MORE THAN 1 PER FOOT

WHEN LINE INCLINED TO RIGHT — CALCITE

WHEN LINE INCLINED TO LEFT - UNMINERALIZED

OM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
9	341	100%	TUFF	VUGGY, FRINGED TUFF.			40° S 10° S
1	370	100%	ANDESITE	FRACTURED ANDESITE BRECCIA WELL HEALED 342 TO 369.5			60° S 45° S 60° S
0	380	95%	"	FRACTURED ANDESITE			40° S 45° S 60° S 10° S
0	390	90%	"	BROKEN FRACTURED ANDESITE. EXTENSIVE WATER COURSES 380 TO 386' VUGGY. VERY HEAVY WATER FLOW		BROKEN	60° S 45° S
0	400	85%	"	BROKEN FRACTURED VUGGY ANDESITE, WATER COURSES THROUGHOUT.			60° S 10° S 45° S
0	410	90%	"	BROKEN FRACTURED ANDESITE.		BROKEN	
	420	20%	"	BROKEN FRACTURED ANDESITE SLICKENSIDED AND POORLY CEMENTED		BROKEN	
	430		"	SLIGHTLY BROKEN FRACTURED ANDESITE LITERALLY NO CORE RECOVERED — BROKEN FORMATIONAL CAVITY REQUEST TO PENETRATE SHATTERED ZONE.		BROKEN	
		60%		SLIGHTLY BROKEN FRACTURED ANDESITE TO 438, REMAINDER BROKEN FRACTURED ANDESITE — CORE RECOVERY [illegible]		BROKEN	60° S
		70%	"	FRACTURED ANDESITE, MODERATELY MINERALIZING. CALCITE IN FRACTURES.			45° S 10° S 60° S
		90%	"	FRACTURED ANDESITE, CALCITE IN FRACTURES.			45° S 60° S

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sierra Mountain

HOLE NO. SM-2 SHEET NO. 1

COORDINATES 15400 N 31000 E

TYPE DRILL [illegible] BIT SIZE NX

DATE STARTED June 11 1963

COLLAR ELEVATION 3154'

TOTAL FOOTAGE

LOGGED BY J. D.

DATE COMPLETED

5 - Fractures

(3) - Fractures, Mod Thin 1 Per Foot; When Line Inclines Right - Broken When Line Inclines Left - Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	470	40%	Intrusive	Well Crowded Andesite Porphyry With Small Granite Inclusions Throughout 160 to 970.			A A A A Broken
[illegible]	480	50%	"	Andesite With Schist & Granite Inclusions to 476. Extremely Friable Arkosic Sand at 472 Lost Circulation With Sands Moving Into Hole.			Broken Hard
480	490	80%	"	Broken Fractured Deep Maroon Andesite With Gouge Very Soft			Broken
490	510	90%	"	Grading to Medium Hard Maroon Andesite @ 498.			Broken 60° (3)
[illegible]	510	100%	"	Medium Hard Fractured Maroon Andesite			10° S 45° S 100%
510	520	100%	"	Vuggy 517 to 520			45° (3)
520	525	100%	"	Medium Hard, Fractured Maroon Andesite Inclusions of Granite to 525'			45° (3) 30° S
525	540	100%	"	Medium Hard, Fractured Maroon Andesite Water Gauge at 538.5' Granite Inclusions Throughout Entire Length of Rock			60° S 45° (3) 100%
540	550	[illegible]%	"	Soft Schooly Broken Red Andesite With Some Gouge 546 to 549.			45° (3) 60° (3) 100% S
550	560	100%	"	Soft Broken Arkosic Andesite to 553 Then Cemented Andesite Breccia to 557 With Granite Pebbles Then Medium to Fine Grained Maroon Andesite			30° (3) 30° S 100%
560	570	100%	"	Soft Arkosic Andesite With Granite Inclusions up to 5" Throughout			30° (3)

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-7 SHEET NO. 6
COORDINATES 18000 N 21000 E
TYPE DRILL [illegible] BIT SIZE BX
DATE STARTED [illegible], 1963

Project Sugar Mountain

COLLAR ELEVATION 3159'
TOTAL FOOTAGE
LOGGED BY PLT
DATE COMPLETED

5 LINE INCLINED RIGHT - FRACTURE - BARREN
(3) LINE INCLINED RIGHT - FRACTURE MORE THAN 1 PERCENT
LINE INCLINED LEFT - MINERALIZED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
570	520	100%	ANDESITE	SOFT ARKOSIC ANDESITE WITH INCLUSION OF GRANITE UP TO ½", 10-15 PER FOOT			60 S 60° (3) +50 (5)
520	590	25%	"	✓ ✓			60° (3)
590	600	90%	"	✓ ✓ SEVERELY BROKEN SOFT TO STIFF WITH GOUGE			45° S +0° (5)
[illegible]	610	100%	"	SOFT ARKOSIC MAROON ANDESITE WITH INCLUSIONS OF GRANITE TO 1CM THEN SCHISTATED ANDESITE FOLLOWED WITH CALCITE FILLING PEBBLES IN BRECCIA			60° S. 60° S
610	620	100%	"	MEDIUM DEEP MAROON BRECCIATED ANDESITE CEMENTED WITH CALCITE - CONTAINS GRANITE AND RHYOLITE INCLUSIONS			60° (3) +5° (5)
620	630	100%	"	✓ ✓ ✓			60° S +5° (5)
630	640	100%	"	GRADING TO DENSE DEEP MAROON ANDESITE AT 635. ✓ ✓ ✓			60° (5) 10° S
[illegible]	650	100%	"	DENSE DEEP MAROON ANDESITE TO 642 THEN WEAK CALCIFIED BRECCIATED ANDESITE WITH GRADING INCLUSIONS TO 644 THEN SOFT SHALEY [illegible] AT [illegible] WHITE CLAY			60° (5)
650	660	100%	"	MEDIUM FRACTURED ARKOSIC ANDESITE GRAY-WHITE WITH RED STRIAKS			20° S 30° S 15° S 15° (5)
660	670	100%	"	MEDIUM, FRACTURED ARKOSIC ANDESITE GRAY-BLUE WITH RED STRIAKS.			10° S +5° (5)
670	680	100%	"	MEDIUM, FRACTURED ARKOSIC ANDESITE, GRAY PLUS GRADING TO MAROON FRACTURES MUCH [illegible] GRANITE INCLUSIONS FROM			20° (5) 15° S

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sierra Mountain Sky - Chalcopyrite

HOLE NO. SM-3 SHEET NO. 7

COORDINATES 1400N 5100E

TYPE DRILL Diamond Hill BIT SIZE BX

DATE STARTED June 11 1962

Alteration Codes
P- Poor
F- Fair
M- Medium
G- Good

Sil-Silicification
Fe$_2$O$_3$-Iron Oxides
Py-Pyrite
Sk-Chalcopyrite
Mal-Malachite

COLLAR ELEVATION 3159'

TOTAL FOOTAGE

LOGGED BY D.S.

DATE COMPLETED

S - Line inclined right - Foliation & Banding
(S) - Line inclined right - Fracture or Veining
Line inclined left. - Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
680	690	100%	Andesite	Medium-soft, fractured gouy-altered Nearsic Andesite, Granite inclusions 1-3 per foot. Friable 680.5 to 682 then dense with gouge in fractures.			45° (S) 45° (S) 20° (S)
690	694	100%	"	Siliceous-dark fractured, Nearsic dense Porphyritic Andesite Contains some Pyrite & Specs Andesite & Fractures			20° S 60° S
694	700	100%	Free Granite	Light, fine grained, Coarse Grained, Siliceous Granite Boundary Limonite in all fractures	Sil G, Fe$_2$O$_3$ G, Feldspar G, Sericite F	Fe$_2$O$_3$ - 3-5%, Py 1-2% Chalcopyrite & Malachite in fractures	30° (S) 60° (S)
700	710	95%	"	Highly fractured, Coarse Grained, Siliceous Granite Limonite in all fractures, Water course at 706. Closed zone at 707.	Sil G, Fe$_2$O$_3$ G, Feldspar G, Sericite P.	Fe$_2$O$_3$ 3-5%, Py 1-2% Oxidation of Sulphides 100% Trace Chalcopyrite	60° (S) 30° 45° 60° (S)
710	720	100%	"	Highly fractured and Broken, Coarse Grained Granite Core at 711, 716.5, 717.4 and 719.5	Sil G, Fe$_2$O$_3$ G, Feldspar G, Sericite P.	Fe$_2$O$_3$ 3-5%, Py 1-2% Oxidation of Sulphides 100% Trace Chalcopyrite	20° (S) 30° Fe$_2$O$_3$ 60° (S)
720	730	96%	"	Highly fractured and Broken, Coarse Grained Granite, Porphyritic Texture 721 to 728. Biotite schist bands from 728 to 730	Sil G, Fe$_2$O$_3$ G, Feldspar G, Sericite P.	Fe$_2$O$_3$ 3-5%, Py 1-2% Oxidation of Sulphides 100% Trace Chalcopyrite	60° Fe$_2$O$_3$ (S) 30° S 30° (S) 20° (S)
730	740	100%	"	Fractured and Broken Coarse Grained Granite with intermittant bands of Iron Oxides Porphyritic from 732 to 733.5 (Veining unit Dionite)	Sil F, Fe$_2$O$_3$ G, Feldspar G, Sericite P.	Fe$_2$O$_3$ 1-3%.	45° (S)
740	750	100%	"	Fractured and Broken Coarse Grained Granite Strongly Banded with Iron Oxides and Biotite Schist.	Sil F, Fe$_2$O$_3$ G, Feldspar G, Sericite F.	Fe$_2$O$_3$ 3-5%.	
[illegible]	760	100%	"	Fractured Strongly Banded Granite with Iron Oxides and Biotite Schist, Porphyritic 754 to 760. Py 1-2% to 760.	Sil P, Fe$_2$O$_3$ G, Feldspar G, Sericite P.	Fe$_2$O$_3$ 3-5% Py 1-2% Oxidation of Sulphides 100% Trace Sulphides 2-3%.	
760	770	96%	"	Fractured Banded Coarse Grained Granite, Porphyritic 760 to 765 then strongly Banded with Iron & Schist.	Sil F, Fe$_2$O$_3$ M, Feldspar G, Sericite F	Fe$_2$O$_3$ 3-5% Py 1-2% Oxidation of Sulphides 100% Trace Chalcopyrite 1-2%	
[illegible]	780	100%	"	Fractured Coarse Grained Granite, Strongly Banded with Biotite Schist & ½" Vein of Pyrite at 778.	Sil M, Fe$_2$O$_3$ P, Feldspar G, Sericite F	Fe$_2$O$_3$ 1-3%. Py 2-3%. Oxidation of Sulphides 5-10% Trace Sulphides 2-3%	15° (S)
780	790	100%	"	Fractured Coarse Grained Granite, With Bands of Schist 787 to 790. - Weak Veining 785 to 786 Py Well Disseminated.	Sil M, Fe$_2$O$_3$ F, Feldspar G, Sericite F	Fe$_2$O$_3$ 1-3% Py 2-4%. Trace of Bornite Oxidation of Sulphides 5-10%	15° (S)

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. [illegible] SHEET NO. 8
COORDINATES [illegible] 2100E
TYPE DRILL [illegible] BIT SIZE 2¼
DATE STARTED [illegible]

Alteration Codes:
P - Poor
F - Fair
M - Medium
G - Good

GEOLOGIC LOG

Project Silver Mountain

Sil. - Silicification
Feox - Iron Oxides
Py - Pyrite
Cpy - Chalcopyrite
Mag - Magnetite

COLLAR ELEVATION 3151'
TOTAL FOOTAGE
LOGGED BY R.L.G.
DATE COMPLETED

S - Line scribed Right - Fracture Cleavage
D - Line parallel Right - Fracture Fissure
Line Inclined Left - Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
[illegible]	500	100%	Granite	Fractured Coarse Grained Granite, Chloritic with Series of ¼" to ½" Water Courses 475 to 492 Large Pegmatitic Granite Grading to Coarse Grained Granite	Sil G, Feldspathic G, Feox F, Sericite P.	Py 2-3% Fox 1% Tr. Cpy. Trace Sulphide Inclusions Total Oxidation of Sulphides 1-2% Total Sulphides 3-4%	10° S 60° S 45° S
500	710	100%	"	Fractured Coarse Banded Granite to Soft Highly Chloritic Schist 650 to 670 & 690 to 710 Soft and Broken with Gouge.	Sil M, Feldspathic G, Feox F, Sericite P.	Py 2-3% Fox 1% Cpy 1% Trace Sphalerite Trace Mos Total Oxidation 1-2% Total Sulphides 3-4%	30° 45° 45° 60°
710	820	100%	"	Fractured Coarse Grained Granite with Bands of Schist to 810 Then Dense Fractured Granite with Water Courses Crushed Zone with Gouge 813 to 815.5	Sil G, Feldspathic G Feox Sericite F.	Py 2-3% Feox 1% Cpy 1% Trace Sphalerite Trace Mos Total Oxidation of Sulphides 2-3%	60° 45°
820	930	100%	"	Fractured Dense Medium to Coarse Grained Granite Water Courses at 821 to 825 Very Strong Pyrite 820 to 830	Sil G, Feldspathic G, Feox F, Sericite F	Py 1-2% Feox 1% Cpy 1% Sphalerite 1% Trace Mos Total Oxidation of Sulphides 1-2% Total Sulphides 2-3%	45° Py Feox 60° S
930	932	100%	"	Fractured Medium to Coarse Grained Granite with Lenses of Sericite Schist and Pegmatite Gouge at 931 Again at 933	Sil F, Sericite G, Feox P Sericite F	Py 4-5% Feox 1%, Cpy 1%, Sphalerite 1% Total Oxidation of Sulphides 1-2% Total Sulphides 4-5%	20° S 45° 45°
932	951	100%	Schist	Crushed Soft Schist with Lenses of Pegmatite, Covered from 946 to 963	Sil F, Feox M, G, Feox P, Sericite F	Py 3-4% Cpy 1% Sphalerite 1% Feox 1% Trace Mos Total Oxidation 2-3% Total Sulphides 3-4%	30° S 75°
951	960	100%	Pegmatite	Fractured Pegmatite with Lenses of Schist	Sil F, Feox M, G, Feox P, Sericite F	Py 2-3% Cpy 1% Sphalerite Trace Chalcopyrite Total Oxidation of Sulphides 1-2% Total Sulphides 3-4%	20°
960	970	100	"	Fractured Pegmatite with Lenses of Schist	Sil M, Feldspathic M, Feox Sericite F	Py 2-3% Cpy 1% Sphalerite Trace Chalcopyrite Total Oxidation of Sulphides 2-3% Total Sulphides 3-4%	45° Py Feox 75°
970	980	100%	"	Fractured Pegmatite	Sil M, Feldspathic M, Feox Sericite F	Py 2-3% Cpy 1% Sphalerite Trace Sphalerite Total Oxidation of Sulphides 3-5% Total Sulphides 4-6%	30° 75°
980	991	100%	"	Fine Grained Pegmatite Grading to Granite	Sil M, Feldspathic F Sericite F Feox P.	Py 2-3%, Cpy 1% Sphalerite Trace Total Oxidation of Sulphides 3-5% Total Sulphides 3-4%	60°
991	1060	100%	Granite	Coarse Grained Granite	Sil M, Feldspathic M, Sericite Feox F	Py 2-3%, Cpy 1% Sphalerite Trace Total Oxidation of Sulphides 2-3%	

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. 81-3 SHEET NO. 9
COORDINATES 17000N 3100E
TYPE DRILL Diamond Drill BIT SIZE BX-4 1/2 EHX
DATE STARTED June 11 1981

Alteration Scale
P- Poor
F- Fair
M- Moderate
G- Good

GEOLOGIC LOG

Project Sheep Mountain

Sic- Silicification
Fox- Iron Oxide
Py - Pyrite
Cpy - Chalcopyrite
Mos - Molybdenum

COLLAR ELEVATION 2,150'
TOTAL FOOTAGE
LOGGED BY P.L.R.
DATE COMPLETED

S- Line Inclined Right - Fractures - Granis
(S)- Line Inclined Right - Fractures: >1 per foot
Line Inclined Left - Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
900	910	100%	GRANITE	FRACTURED MEDIUM TO COARSE GRAINED GRANITE.	SILF, MILDAR F, SERICITE P FOXP	Py 2-3%, Cpy <1%, Fox <1% TOTAL OXIDATION OF SULFIDES 2-5% TOTAL SULFIDES 2-3%	45° Py Fox 10°
910	920	100%	"	" " " " " "	SILF, FELDSPAR F, SERICITE P FOXP	Py 2-3%, Cpy <1%, BIOTITE TRACE Fox <1% TOTAL OXIDATION OF SULFIDES 3-5% TOTAL SULFIDES 2-3%	60°
920	930	100%	"	" " " " " "	SILF, FELDSPAR F, SERICITE P FOXP	Py 2-3% Cpy <1% BIOTITE TRACE TRACE TOTAL OXIDATION OF SULFIDES 1-3% TOTAL SULFIDES 2-3%	45°
930	940	100%	"	MEDIUM GRAINED GRANITE WITH SCHIST 930.5 TO 934 AND A LENS OF PEGMATITE 935 TO 940	SILF, FELDSPAR G SERICITE F	Py 2-3%, Cpy <1% BIOTITE TRACE TOTAL SULFIDES 2-3%	15° 45° 60° (S)
940	950	100%	"	MEDIUM TO COARSE GRAINED GRANITE	SILF, FELDSPAR G, SERICITE M	Py 2-3%, Cpy <1%, BIOTITE TRACE TOTAL SULFIDES 2-3%	45°
950	960	100%	"	" " " " "	SILM, FELDSPAR G, SERICITE F	Py 2-3% Cpy <1% TOTAL SULFIDES 2-3%	45° 45° (S)
960	970	100%	"	" " " " "	SILF, FELDSPAR G, SERICITE F	Py 2-3% Cpy <1% BIOTITE TRACE TOTAL SULFIDES 2-3%	
970	980	60%	"	" " " " " OPEN WATER COURSE 973 TO 976 AND 978 TO 979	SILF, FELDSPAR G SERICITE M	Py 2-3%, Cpy <1% TOTAL SULFIDES 2-3%	
980	990	90%	"	FAULT GOUGE AND BRECCIA 980 TO 982.5 COARSE TO MEDIUM GRAINED GRANITE	SILF, FELDSPAR M SERICITE M	Py 2-3%, Cpy <1% TRACE SULFIDES 2-3%	45° 45° (S)
990	1000	100%	"	COARSE TO MEDIUM GRAINED GRANITE	SILF, FELDSPAR M SERICITE M	Py 3-4%, Cpy <1% TOTAL SULFIDES 3-4%	15° 45° (S)
1000	1010	45%		" " " " OPEN WATER COURSE 1000.5 TO 1009.5 TUFF BRECCIA WELL CEMENTED TO 1001	SILF, FELDSPAR M, SERICITE M	Py 2-3%, Cpy <1%	45° 15° (S)

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-3 SHEET NO. 10
COORDINATES 1900 N 2100 E
TYPE DRILL [illegible] BIT SIZE 11X
DATE STARTED 1-11-1963

Project Superior

ALTERATION CODE: P - POOR, F - FAIR, M - MODERATE, G - GOOD

GEOLOGIC LOG

SIL - SILICIFICATION
PY - PYRITE
FEOX - IRON OXIDES
C.P.Y. - CHALCOPYRITE
MOS - MOLYBDENUM

COLLAR ELEVATION 3154'
TOTAL FOOTAGE
LOGGED BY CWR
DATE COMPLETED

5 - LINE INCLINED RIGHT - FRACTURE - BARREN.
(3) - LINE INCLINED RIGHT - FRACTURES >1 PER FOOT
LINE INCLINED LEFT - MINERALIZED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1010	1016			MEDIUM TO COARSE GRAINED GRANITE WITH VUGS & WATERCOURSES TO 1013. END OF HOLE SEPTEMBER 4, 1963	SIL F, FELDSPAR M, SERICITE P FEOX F	PY 2-3% FEOX < 1% TRACE CPY TOTAL OXIDATION OF SULFIDES 5-7% TOTAL SULFIDES 2-3%	30° MEAS 30° CPY FEOX 10° S

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-4 SHEET NO. 1
COORDINATES 1900 N 100 W
TYPE DRILL [illegible] BIT SIZE N X
DATE STARTED [illegible]

Project Silver Mountain

COLLAR ELEVATION 5197'
TOTAL FOOTAGE
LOGGED BY
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0'	10'	—	—	No Core			
10	20	70%	Andesite	Fractured, Broken, Gouge Andesite			30°(S)
20	30	70%	"	" " " "			30°(S)
30	40	80%	"	" " " " Poorly Cemented Breccia Zone, Andesite & Tuff Fragments			15°(S)
40	50	90%	"	Fractured, Broken Andesite, Poorly Cemented Breccia Zone, Tuff & Red Andesite.			15°(S) 45°(S) 70°(S)
50	60	90%	"	Fractured, Banded Andesite with Gouge in Fracture Planes			70°(S) 10°(S)
60	70	95%	"	Fractured, Dark Red Andesite			15°(S) 15°(S) 10°(S)
70	80	100%	"	Fractured, Dark Red Andesite, Broken [illegible] Zone 76 to 80 Very Soft.			15°(S) 10°
80	90	100%	"	[illegible]			70° 70° 45°
90	100	100%	"	" " " "			10° 10°
100	110	75%	"	[illegible] Broken, Unconsolidated Andesite Gouge & Fractured Ice Crystals Left Behind			30

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. [illegible]4 SHEET NO. [illegible]

COORDINATES [illegible] [illegible]

TYPE DRILL [illegible] BIT SIZE [illegible]

DATE STARTED [illegible]

Project Silver Mountain

COLLAR ELEVATION 3076

TOTAL FOOTAGE

LOGGED BY D.I.C.

DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
110	170	90%	Andesite	Dark to Chocolate, Maroon Red Andesite			
170	180	1/2	"	" " " " " " " " Porphyritic Rock, Cemented 132 to 150, Soft with Stain Vugs, Andesitic			
[illegible]	[illegible]	[illegible]	A	Porphyritic Rock, Andesite Medium to 132 Siliceous to Fractured Maroon Red Andesite Tuff - Porphyritic to Small Tuff			
[illegible]	192	[illegible]	Tuff	Silicified Maroon Tuff to Fractured Soft			
[illegible]	[illegible]	[illegible]	"	Breccia Tuff Grading to Well Cemented Tuff with Inclusions of White to Red Andesite Pebbles			
192	[illegible]	[illegible]	"	Tuff with Inclusions of Kaolite to Red Porphyritic Well Indurated.			
[illegible]	[illegible]	[illegible]	"	" " " " Grading To a Cemented Soft Friable Tuff to 135 Thin [illegible]			
[illegible]	[illegible]	[illegible]	"	[illegible] Tuff, Soft Breccia [illegible] Kaolite Red Soft			
[illegible]	[illegible]	10%	"	[illegible] Buff			
200	211	95%	"	Breccia Soft Friable Tuff Buff Turning to Red and Extremely Broken			
211	220	[illegible]	Andesite	Fractured Maroon Andesite Breccia Moderately Cemented Medium Soft			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sierra Mountain

HOLE NO. [illegible] SHEET NO. 3
COORDINATES 1200 N 1000 W
TYPE DRILL [illegible] BIT SIZE NX to 230'
DATE STARTED [illegible] NX 230'+

COLLAR ELEVATION 3070
TOTAL FOOTAGE
LOGGED BY C.P.L.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
220	230	100%	Andesite	Fractured, Broken Soft Maroon Andesite Breccia, Poorly Cemented.			Broken 45° (5)
230	240	70%	"	" "			Broken
240	250	70%	"	" " to 247 Fine Medium Hard Maroon Fractured Andesite			Broken 30° (3)
250	260	90%	"	Medium Hard Maroon Andesite Grading Broken Soft Brecciated Maroon Andesite Breccia Poorly Cemented @ 257'			Broken 45° (5)
260	270	100%	"	Fractured Deep Maroon Andesite Breccia with Fragments of Granite and Schist Medium Hard.			60° (6) 60° (6) Axial (1)
270	280	100%	"	" " " to 277 Grading to Medium Fine Grained Maroon Andesite Medium Hard			45° (5) 45° (5)
280	290	70%	"	Fractured Medium Fine Grained Maroon Andesite Grading to Tuff @ 287.			Broken 45° (5)
290	300	90%	Tuff	Fractured White-Buff Tuff Soft.			Broken 60° (6)
300	310	100%	"	" " " " Grading to Medium Hard Light Maroon Andesite			45-50°
310	320	100%	Andesite	Maroon Fine Slightly Sandy Maroon Andesite			45° (5)
320	330	100%	"	" " Color Grading to Buff.			45° (5)

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-5 SHEET NO. 4
COORDINATES [illegible] 10010
TYPE DRILL [illegible] BIT SIZE RX
DATE STARTED July 21, 1963

Project Sierra Mountains

COLLAR ELEVATION 3071.
TOTAL FOOTAGE [illegible]
LOGGED BY [illegible]
DATE COMPLETED [illegible]

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
330	340	100%	ANDESITE	WHITE-CLIFF FELSIC ANDESITE to 336. THEN MAROON MEDIUM HARD ARKOSIC ANDESITE.			60° S 45° S
340	350	100%	"	MEDIUM HARD MAROON ARKOSIC ANDESITE WITH OCCASIONAL INCLUSIONS OF GRANITE.			45° S 20° S
350	360	100%	"	" GRANITE INCLUSIONS INCREASING UP TO 1" MAX DIAMETER 5 TO 8 PER FOOT.			45° S
360	370	100%	"	"			45° S 30° S
370	380	100%	"	FELSIC MEDIUM MAROON ARKOSIC ANDESITE WITH GRANITE AND SCHIST INCLUSIONS UP TO 2".			
380	390	100%	"	"			45° S 30° S
390	400	100%	"	"			NO SAMPLE
400	410	100%	"	" FREQUENCY OF INCLUSIONS LESS 1-2 PER FOOT.			
410	420	100%	"	"			
420	430	100%	"	" FREQUENCY OF INCLUSIONS INCREASING TO 3 PER FOOT			
430	440	100%	"	"			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-11 SHEET NO. 5
COORDINATES 1900N 100W
TYPE DRILL [illegible] BIT SIZE 5⅞"
DATE STARTED July 26 1962

Alteration Grades
P - Poor
F - Fair
M - Moderate
G - Good

GEOLOGIC LOG

Project Superior Mountain

Sil-Silicification
Fck-Iron Oxides
Py-Pyrite
Cpy-Chalcopyrite
Mos-Molybdenum

COLLAR ELEVATION 2076'
TOTAL FOOTAGE
LOGGED BY D.C.S.
DATE COMPLETED

C-Line Inclined Right - Fracture - Broken
(D)-Line Inclined Right - Fracture: Tight
Line Inclined Left - Mineralized.

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG		
							Mc	Structure	Bo
440	450	100%	Andesite	Friable, Soft, Maroon Arkosic Andesite With Occasional Inclusions Of Granite (Pegma-					
450	460	100%	"	Friable, Soft Maroon Arkosic Andesite Grading To Coarse, Broken With Inclusions From 451 To 457 Also 1 Of Granite At 457.5'	Fracture Healed Some Barren Py - 457.				
460	470	100%	"	Friable, Soft, Maroon Arkosic Andesite With Numerous Inclusions Of Granite And Schist Up To 2"					
470	480	100%	"	Friable Soft Maroon Arkosic Andesite With 40% Of Total Granite Inclusions. Some Fragments Of Granite Up To 4"					
480	491	90%	"	Friable Soft Maroon Arkosic Andesite With 40% Of Core 40 To 487 Granite Inclusions When Solid Mud Broke With Surfaces Of Fract.					
491	500	90%	Granite	Fractured, Well Broken Medium To Coarse Grained Granite. The Fractures Contain Iron Oxides. Mafic Content 40% To 45%, Crushed With Grade 40% To 45%	Sil. F, Feldspar G, Fck G, Sericite M.	Fck 2-3%			10° Fck 45° Fck 45° Fck
500	510	85%	"	Fractured, Broken Medium To Coarse Grained Granite, Crushed 501 To 504 With Some Fck 504 To 508 Fracture. Mafic Cont. Throughout	Sil M, Feldspar G, Fck M, Sericite M	Fck 1-2%			45° Fck 60° Fck 45° Fck
510	520	95%	"	Fractured & Broken Medium To Coarse Grained Granite Mafic Cont.	Sil M, Feldspar M Fck F Sericite F	Fck 1-2%			
520	560	100%	Diabase	Fractured Fine Grained Diabase Mafic To Felsitic With Fck	Sil P, Feldspar M Fck F, Sericite F	Py 1-2% Fck 1-2% Total Sulfides 1-2%			50° Fck 40° Fck
560	580.5	100	"	Fractured Fine Grained Diabase With Calcite In Some Fractures, Pyrite And Fck In Some Fractures, Pyrite Disseminated	Sil P, Feldspar M, Fck M Sericite F	Py 2-3% Fck 1-2% Disseminated Sulfides 2-3% Total Sulfides 2-3%			50° Fck
580.5	591	90%	Granite	Fine Grained Grey To Dk. Grey Porphyritic Quartz Sericite With Grains Of Biotite Throughout	Sil P, Feldspar M, Fck F Sericite M	Py 2-3% Fck 1-2% Trace Bornite & Chalcocite Total Sulfides 2-3%			45° Fck 30° Fck 20° S
591	640	[illegible]	Pegmatite	Fractured Pegmatite With Bands Of Biotite	Sil M, Feldspar M, Fck F Sericite M	Py 2-3% Fck 1-2% Trace Chalcocite & Chalcopyrite Total Sulfides 2-3%			
640	641	15%	"	Fractured Pegmatite	Sil G, Feldspar M, Fck F Sericite M	Py 2-3% Fck 1-2% Trace Chalcocite & Chalcopyrite Total Sulfides 2-3%			20° S

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. CM-4 SHEET NO. 6
COORDINATES 1000N 100W
TYPE DRILL [illegible] BIT SIZE BX
DATE STARTED July 24, 1963

Project [illegible]

Alteration Grades
P - Poor
F - Fair
M - Moderate
G - Good

Sil - Silicification
Iron Iron Oxides
Py - Pyrite
Cpy - Chalcopyrite
Mos - Molybdenum

COLLAR ELEVATION 2076
TOTAL FOOTAGE
LOGGED BY C.J.D.
DATE COMPLETED

① - Line Inclined Right - Fracture - Barren
② - Line Inclined Right - Fractures 7 per foot
Line Inclined Left - Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
550	561	95%	Granite	Medium to Coarse Grained Granite	Sil M, Feldspar M, Sericite P Feox P	Py 1-2% Feox <1% Cpy Trace Total Oxidation Of Sulfides 1-2% Total Sulfides 1-2%	30° S 30° S 45° ①
561	570	100%	Pegmatite	Siliceous Pegmatite With ft Lens Of Schist 562 To 565	Sil M, Feldspar F, Sericite P Feox P	Py 1-2%, Feox <1% Cpy Trace 45° ① Granite Trace Total Oxidation Of Sulfides 1-2% Total Sulfides 1-2%	60° ① 45° ①
570	620	90%	"	Pegmatite, Sericia Zone 572 to 620	Sil F, Feldspar F Sericite M Feox P	Py 2-3% Feox <1% Cpy <1% Trace Bornite Total Oxidation Of Sulfides 2-3% Total Sulfides 2-3%	45° ①
620	630	100%	"	Pegmatite With Schist From 622 To 624, Strong Locally Vertical Fracture 620 to 622.	Sil F, Feldspar F Sericite M	Py 1-2% Cpy Trace Total Sulfides 1-2%	10° S 45° ①
630	650	100%	Granite	Coarse Grained Granite	Sil M, Feldspar F Sericite P	Py 1-2% Cpy Trace	40° ①
650	660	100%	"	Coarse Grained Granite	Sil M, Feldspar F Sericite M	Py 1-2% Trace Cpy. Total Sulfides 1-2%	10° S 45° ② 20° S
660	665	100%	"	Granite Grained Granite	Sil F Feldspar F Sericite M	Pyrite 1% Trace Cpy Trace	50° ①
665	670	100%	Pegmatite	Pegmatite With Lens Of Schist From 669-670	Sil F Feldspar F, Sericite M	Py 1-2% Trace Cpy Trace Total Sulfides 1-2%	30° S
670	680	95%	"	Pegmatite With Lens Of Schist 671 to 672	Sil F, Feldspar F Sericite M	Py <1% Total Sulfides less than 1%	45° S 60° ①
"	690	100%	"	Pegmatite	Sil M, Feldspar F Sericite M	Py <1% Trace Cpy	20° S
690	700	100%	Granite	Fractured Grained With Veins Of Schist 692 to 696 And A Line Of Fracture 694 to 696	Sil M Feldspar F Feox P	Py 1-2% Trace Cpy Trace <1% Iron Staining Along Fracture Total Sulfides 1-2%	45° ①
700	704	100%	"	Medium to Coarse Grained Granite With Veins Of Schist 701 to 702	Sil M, Feldspar F, Sericite M Feox P	Py 1-2% Trace Cpy Trace <1% Total Oxidation Of Sulfides 1-2% Total Sulfides 1-2%	45° ①
704	710	100%	Pegmatite	Fractured Pegmatite With A Lens Of Granite 654 to 656	Sil M, Feldspar F, Sericite M Feox P	Py 1-2% Trace Cpy, Trace <1% Total Oxidation Of Sulfides 1-2%	30° ①

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-1 SHEET NO. 7
COORDINATES 1000 N 100 W
TYPE DRILL [illegible] BIT SIZE BX
DATE STARTED [illegible] 26, 19 62

Alteration Grades: P- Poor, F- Fair, M- Moderate, G- Good

GEOLOGIC LOG

Project Sugar Mountain

Sil.- Silicification, Feox- Iron Oxides, Py- Pyrite, Cpy- Chalcopyrite, Mos- Molybdenum

COLLAR ELEVATION 3076
TOTAL FOOTAGE
LOGGED BY Cusa
DATE COMPLETED

C- Line Inclined Right - Fracture - Barren
C- Line Inclined Left - Fractures 7 Per Foot
Line Inclined Left - Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
660	662	100%	Pegmatite	Pegmatite	Sil F, Feldspar G, Sericite M, Feox P	Py 1-2% Cpy <1% Fe oxide Tone Oxidation Decreases 1-2% Total Sulfides 1-2%	30° Py Fract 45° C
662	670	100%	Granite	Fractured Coarse Grained Granite with Lenses of Pegmatite from 674 to 678	Sil F, Feldspar G, Sericite M,	Py <1% Trace Cpy. Total Sulfides <1%	30° Py 45° C 30° C
670	690	90%	"	Fractured Coarse Grained Granite with Lenses of Pegmatite from 681 to 684 and Lenses of Schist to 690	Sil F, Feldspar G, Sericite M, Feox P	Py 1-2% Trace Cpy Epidote Some Fracture Oxidation Some Oxidation of Sulfides 5% Total Sulfides 1-2%	30° Py 60° C 30° C 60° C
690	700	100%	"	Fractured Coarse Grained Granite with Lenses of Schist 699 to 700	Sil M, Feldspar G, Sericite M, Feox P.	Py 1-2% Trace Cpy Granite Some Feox in Fractures Some Oxidation of Sulfides 5% Total Sulfides 1-2%	30° 45° C
700	710	100%	"	Fractured Coarse Grained Granite with Lenses of Pegmatite and Porphyritic Schist	Sil M, Feldspar G, Sericite M, Feox P	Py 1-2% Trace Specular Hematite Common Feox in Fracture Total Orientation Specific 1-2% Total Sulfides 1-2%	45° Py 45° C
710	720	100%	"	Fractured Coarse Grained Granite with Lenses of Pegmatite and Schist	Sil M, Feldspar G, Sericite	Py 1-2% Trace Cpy & Pegmatite Total Sulfides 1-2%	30° Py 45° C 45° C
720	730	100%	"	Coarse Grained Granite with Lenses of Pegmatite	Sil M, Feldspar G, Sericite F	Py 1-2% Trace Cpy & Limonite Total Sulfides 1-2%	30° Py 30° C
730	734	100%	"	Porphyritic Granite Water Course 732 to 734	Sil F, Feldspar G, Sericite F	Py <1% Tenor Cpy	45° C
734	742	100%	Schist	Silver Bindoo with Pegmatite End of Hole 9:30 A.M. - 9-4-62	Sil F, Feldspar M, Sericite F	Py 2-3% Trace Cpy.	45° C

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM-6 SHEET NO. 1
COORDINATES 3100N 4600E
TYPE DRILL [illegible] BIT SIZE NX
DATE STARTED Sept. 17, 1963

COLLAR ELEVATION 2889'
TOTAL FOOTAGE
LOGGED BY G.D.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	10	No Core					
10	20	100%	Tuff	Banded Tuff with Rhyolite Inclusions			
20	29	100%	"	Silicified from 24' to 28' "			
29	40	100%	Andesite	Dense Andesite with Water Loss at 32 Some Fractures 34 to 37'			45° (3)
40	53	100%	"	Fractured Andesite.			45° (3) 60° (2)
53	60	100%	Tuff	Yellow Gray Tuff			60° (2)
60	70	100%	"	" " ", Broken.			60° (2)
[illegible]	80	100%	"	" " " "			Broken
[illegible]	90	100%	"	" " " " Rib Steeply Foliated @ 86			Broken
[illegible]	100	95%	"	" " " " " " Throughout	"		Broken
[illegible]	110	100%	"	" " " " " "			Broken

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Silver Mountain

HOLE NO. SM-6 SHEET NO. 2
COORDINATES 3100N 4600E
TYPE DRILL Diamond BIT SIZE N/X
DATE STARTED Sept. 17, 1963

COLLAR ELEVATION 2889'
TOTAL FOOTAGE
LOGGED BY W.L.R.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
110	120	95%	TUFF	White-Gray TUFF with Red Stringers. Gouge @ 113'6"			60°S
120	130	95%	"	" " " to 125.5 Then Tuff Agglomerate			
130	140	95%	"	Tuff Agglomerate			60°S
140	150	100%	Andesite	Fine Andesite with Inclusions of Pyrite			60°S
150	160	100%	"	" " " " " "			70°S
160	170	100%	"	Dark Red-Maroon Andesite, Specks of Calcite			20°S
170	180	100%	"	" " " " With Stringers & Specks Calcite			60°S
180	190	100%	"	" " " " " " " " "			60°S
190	200	100%	"	" " " " " " " " "			20°S 60°S
200	210	100%	"	" " " " " " " " "			10°S 60°S
210	220	100%	"	" " " " " " " " "			60°S
220	230	100%	"	" " " " " " " " "			60°S
							Fault N

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-C SHEET NO. 3
COORDINATES 2100 N Home
TYPE DRILL Diamond Hill BIT SIZE NX
DATE STARTED Sept 19 1962

Alteration Codes
P - Poor
F - Fair
M - Moderate
G - Good

GEOLOGIC LOG

Project Sheep Mt.

Sil - Silicification
Fe Ox - Iron Oxides
Py - Pyrite
Cpy - Chalcopyrite
Cu O - Copper Oxides

COLLAR ELEVATION 2889
TOTAL FOOTAGE
LOGGED BY Cook
DATE COMPLETED

Line Inclined Right ⑤ Basin Fracture
Line Inclined Right ⑥ Fracture, Pyrite & Pyrite Mineralized
Line Inclined Left

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
220	230	100%	Andesite	Red-Maroon Andesite Broken With Calcite Stks			Broken
230	240	"	"	" " " " " "	"		20° S
240	249	"	"	" " " " " "	"		60° S
249	260	100%	Arkose	Light Pink-Red Arkose With Small Granite Inclusions.			60° S
260	270	100%	"	Pink Red Arkose With Small Granite And Schist Inclusions			80° B 60° B 45°
270	280	100%	"	Light Pink Arkose Sparse Granite Inclusions Stringing Turbulous Starting At 274.			45° B 30° B
280	283	90%	"	Gouge Turbulous Siliceous Veins & Sparse Granite Inclusions Starting At 280 Broken Weathered Schist	Fe Ox, Fracturing, Sil. Silicification	Fe Ox	30° B
283	286	30%	Schist				
286	289	90%	Granite	Fractured Weathered Granite With Green Copper And Iron Oxides	Fe Ox, Fracturing, Sil. Silicification	Iron Copper, Fe Ox	
289	300	95%	"	Fractured, Weathered Coarse Grained Granite Sparse 283-0 315 (About 30% Core Recovery) Many Core Pieces Contain Iron Oxides, Small Pockets Green Copper Stained 295-300	Fe Ox, Fracturing, Sil. Silicification Cu O F	Fe Ox Sparse Pockets Of Green Cu.	Broken 0° Fe Ox
300	310	100%	"	Fractured Weathered Coarse Grained Granite Heavily Cemented With Iron Oxides, To 309 Then Fine Grained Granite With Inclusions Of Schist	Fe Ox & Fracturing, Sil. Silicification, Cu O F	Fe Ox, Sparse Green Cu.	Broken Fe Ox
310	317.5	40%	"	Fine Grained Granite To 312 With Schist To 312, Then Coarse Grained Granite To 315, Then Crushed Shattered Granite With Schist 90% Core Lost In [illegible]	Fe Ox & Fracturing, Sil. Silicification, Cu O F	Fe Ox, Green Copper	30° Fe Ox Cu O
317.5	320	20%	Schist	Gouge Schist With Lenses Of Pegmatite Fault Zone Clayey Turbulent Green Copper Oxides In Some Fractures Core Fragments Contain	Fe Ox & Fracturing, Sil. Silicification, Cu O F.	Fe Ox, Green Copper	45° Fe Ox Cu O

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mt.

HOLE NO. SM-6 SHEET NO. 4-
COORDINATES 2100N 4600E
TYPE DRILL Diamond BIT SIZE AX
DATE STARTED Sept 17, 1962

Alteration & Mineralization
P - Poor
F - Fair
M - Moderate
G - Good

Sil - Silicification
FeOx - Iron Oxides
Py - Pyrite
Cpy - Chalcopyrite
Cu O - Copper Oxides
Mos Molybdenum

COLLAR ELEVATION 2829'
TOTAL FOOTAGE
LOGGED BY CLR
DATE COMPLETED

Line Inclined Right = Fracture - Barren
Line Inclined Right (F) Fracture - Partly Mineralized
Line Inclined Left

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
320	341	90%	Pegmatite	Fractured Pegmatite With Lenses Of Schist	FeOx G, Feldspar G, Sil. P, Sericite M, CuO F.	FeOx Stringer Green Copper	10° Cu O; 40° FeOx; 45° FeOx Cu O
341	350	100%	Granite	Broken Fractured Coarse Grained Granite Brecciated From 347 to 350 Local Cemented With Iron Oxides	FeOx G, Feldspar G, Sil. P, Sericite M, CuO F.	FeOx Stringer Green Cu.	30° Cu O; 10° FeOx
350	353	100%	"	Broken Fractured Coarse Grained Granite With White Calcite And Vugs	FeOx G, Feldspar G, Sil F, Sericite M, CuO F.	FeOx, Green Copper	10° FeOx; 40° FeOx Cu O
353	369	100%	Pegmatite	Broken Fracturing With Lenses Of Schist Core Of Pyrite Casts Contain Pyrite 365.5 to 366	Feox G, Feldspar M Sil F, Sericite F Cu O F	FeOx, Stringer Sulphides 1% Py Disseminated Pyrite 90% Trace Sulphides 1% Py	45° FeOx; 20° FeOx Cu O; 20° FeOx
369	380	100%	Granite	Fractured Coarse Grained Granite With Minor Lenses Of Schist, Porphyritic Texture, 371 to 374, Grading To Porphyry From 379' Fractured Core	FeOx G, Feldspar G, Sil F, Sericite F, CuO F	FeOx, Green Copper	20° Cu O; 20° FeOx; 45° FeOx
380	390	95%	Porphyry	Strongly Fractured & Broken Porphyry Brecciated No 321, Breccia Zone Min Various Water Cavities And Vugs. Broken Core	FeOx G, Feldspar G, Sil F, Sericite G, CuO P.	FeOx, Green Copper	40° FeOx; 45° FeOx Cu O
390	400	95%	"	Strongly Fractured & Broken Porphyry Water Cavities And Vugs 394 to 400'	FeOx G, Feldspar G, Sil F, Sericite G, CuO P.	FeOx, Green Copper	60° FeOx; 45° FeOx Cu O; 10° FeOx
400	410	100%	"	Fractured Porphyry With Water Cavities And Vugs. Sulfides Seen Up To 1/4 Of 1% Cavity Contain Coating Of Py With Chalcocite Evidence Of	FeOx G, Feldspar G, Sil F, Sericite F Cu O G.	FeOx, Cu O, 1% Py 1% Sulphides Disseminated Pyrite Sulphides 1% Py Trace Sulphides 1%	60° FeOx; 10° Cu O; 10° FeOx F
[illegible]	420	95%	"	Fractured Vuggy Porphyry, Pyrite Disseminated Vugs Completely Mineralized	FeOx G, Feldspar G, Sil F, Sericite F Cu O G.	FeOx, Green Copper Py 1% Some Chalcocite Film Disseminated Sulphides 1% Py	20° FeOx Cu O; 10° FeOx; 45° FeOx
[illegible]	[illegible]	[illegible]	"	Fractured Porphyry	FeOx G, Feldspar G, Sil F, Sericite F Cu O F.	FeOx, Green Copper	45° FeOx; 30° FeOx; 30° FeOx
[illegible]	[illegible]	[illegible]	Granite	Fractured Coarse Grained Granite, Sulfides Seen Up To 1/4 Of 1%	FeOx G, Feldspar G, Sil M, Sericite P.	FeOx, Py 2.3% to Cpy 1% Total Concentration Of Sulphides 2% Trace Cpy Trace	?
430	440	100%	"	Fractured Coarse Grained Granite, Shattered From 438.5' to 439' Vuggy With White Coated	FeOx F, Feldspar G, Sil F, Sericite F, CuO P.	FeOx, Py 2-3%, Cpy 1% Trace Cu O, Trace - Mos Trace	10° FeOx

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-4 SHEET NO. 5
COORDINATES 21004N 4400E
TYPE DRILL DIAMOND A15 BIT SIZE NX 10415 - BX
DATE STARTED SEPT 17, 1963

ALTERATION GRADE: P- POOR, F- FAIR, M- MODERATE, G- GOOD

GEOLOGIC LOG

Project Stream Mt.

SIL - SILICIFICATION
FeOx - IRON OXIDES
Py - PYRITE
Cpy - CHALCOPYRITE
CuO - COPPER OXIDES
Mos - MOLYBDENUM

COLLAR ELEVATION 2389'
TOTAL FOOTAGE
LOGGED BY O.J.S.
DATE COMPLETED

LINE, INCLINED RIGHT (5) FRACTURE - BARREN
LINE INCLINED RIGHT (3) FRACTURES >1 PER FOOT MINERALIZED
LINE INCLINED LEFT

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
340	400	90%	GRANITE	FRACTURED COARSE GRAINED GRANITE WITH A WATER COURSE AT 340.5 AND AT 344.5 - LOST ALL CIRCULATION & STRONG SULFIDE MINERALIZATION	FeOx M, FELDSPAR G, SIL F, SERICITE F, CuO P.	FeOx, Py 2-3% CPy <1% TRACE BORNITE TRACE CHALCOCITE SPOTTY SECONDARY COATS TOTAL OXIDATION OF SULFIDES 50-60% TRACE SULFIDES 2-3%	
400	440	100%	"	STRONGLY FRACTURED, COARSE GRAINED GRANITIC, BRECCIA AND GOUGE 400-440 WITH OPEN WATER COURSES. NEARLY ALL SULFIDES OXIDIZED	FeOx G, FELDSPAR G, SIL F SERICITE F	FeOx Py 1-2% CPy TRACE, TRACE BORNITE, TRACE CHALCOCITE. TOTAL OXIDATION OF SULFIDES 70-80% TRACE SULFIDES 1-2%	
440	471	100%	"	STRONGLY FRACTURED COARSE GRAINED GRANITE 5-10% WATER COURSES 461 TO 468 OXIDATION OF SULFIDES DECREASING	FeOx G, FELDSPAR G, SIL F SERICITE F, CuO P.	FeOx, Py 2-3% CPy <1% TRACE BORNITE, TRACE CHALCOCITE SPOTTY SECONDARY SULFIDES TOTAL OXIDATION OF SULFIDES 40-50% TRACE SULFIDES 1-2%	
471	490	100%	PORPHYRY	STRONGLY FRACTURED GRANITE PORPHYRY WITH BANDS OF SERICITE & VUGGY WITH NUMEROUS Py & CPy COATED SULFIDES STRONGLY OXIDIZED	FeOx G, FELDSPAR G, SIL F SERICITE F, CuO P.	FeOx Py 1-2% TRACE CPy, TRACE BORNITE, TRACE ACCESSORY CHALCOCITE, SPOTTY SECONDARY COATS TOTAL OXIDATION OF SULFIDES 60-70% TRACE SULFIDES 1-2%	
490	500	100%	"	FRACTURED GRANITE PORPHYRY, VUGGY WITH WATER COURSES 491 & 490 Py & CPy COATED THROUGHOUT. SULFIDES STRONGLY OXIDIZED	FeOx G, FELDSPAR G, SIL F, SERICITE F, CuO P.	FeOx, Py 1-2%, TRACES CPy, TRACE BORNITE, TRACE CHALCOCITE, TRACE SECONDARY COATS TOTAL OXIDATION OF SULFIDES 60-70% TRACE SULFIDES 1-2%	
500	510	100%	"	FRACTURED GRANITE PORPHYRY, VUGGY WITH WATER COURSES TO 499.5 OXIDATION OF SULFIDES DECREASING.	FeOx M, FELDSPAR G, SIL F, SERICITE F	FeOx Py 2-3% CPy <1% TRACES BORNITE TRACE CHALCOCITE TOTAL OXIDATION OF SULFIDES 40% TRACE SULFIDES 1-2%	
510	520	100%	"	FRACTURED SILICIOUS GRANITE PORPHYRY, VUGGY WITH WATER COURSES 510 TO 520. MINOR OXIDATION OF SULFIDES.	FeOx F, FELDSPAR G, SIL G, SERICITE P	FeOx Py 2-3% CPy <1% BORNITE <1% FLAKING OF CHALCOCITE TOTAL OXIDATION OF SULFIDES 5-10% TRACE SULFIDES 2-3%	
520	540	100%	"	FRACTURED GRANITE PORPHYRY			
540	560	90%	GRANITE	FRACTURED COARSE GRAINED GRANITE PORPHYRY WITH A FAINT PORPHYRITIC TEXTURE SERICITE & Py ALONG FRACTURES	FeOx M, FELDSPAR G, SIL G, SERICITE P, CuO P.	FeOx Py 1-2% TRACES CPy TRACE BORNITE TRACE CHALCOCITE SPOTTY SECONDARY COATS TOTAL OXIDATION OF SULFIDES 60-70% TRACE SULFIDES 1-2%	
560	580	95%	"	FRACTURED COARSE GRAINED GRANITE TO 570 WITH SERICITE AND Py COATED FRACTURES. 570 TO 580 LOSING ALL SULFIDES, HAVE BEEN STRONGLY OXIDIZED	FeOx M, FELDSPAR G, SIL G, SERICITE F	FeOx Py <1% TRACES CPy TRACES BORNITE, TRACE CHALCOCITE TOTAL OXIDATION OF SULFIDES 90% TRACE SULFIDES <1%	
580	620	80%	"	FRACTURED, COARSE GRAINED GRANITE TO 590 WITH FRACTURES OPEN. BRECCIATED WITH GOUGE GRANITE TO 600. FRACTURES	FeOx G, FELDSPAR G, SIL F, SERICITE F, CuO P.	FeOx Py <1% TRACES CPy, TRACE BORNITE, TRACE CHALCOCITE	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. CM4 SHEET NO. 6
COORDINATES 21100N 1400E
TYPE DRILL [illegible] BIT SIZE 3X
DATE STARTED [illegible]

Project Santa Rita

Alteration Grade: P- Poor, F- Fair, M- Moderate, G- Good

Sil - Silicification; Fe Ox - Iron Oxides; Py - Pyrite; Cpy - Chalcopyrite; CuO - Cupric Oxides; Mos - Molybdenum

COLLAR ELEVATION 2959
TOTAL FOOTAGE
LOGGED BY [illegible]
DATE COMPLETED

Line Inclined Right 3 - Fractures/Foot
Line Inclined Right (5) - Fractures/Foot
Line Inclined Left - Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
500	530	95%	Granite	Fractured And Severely Broken Coarse Grained Granite, Schist Lenses, From 511 Through 557 Feldspar Intensely Altered, Sulfides Oxidized Deepest Chalcopyrite.	FeOxG, Feldspar G, Sil F, Sericite F	FeOx, Traces Py	Broken
560	570	95%	"	Fractured, Broken Coarse Grained Granite With A Lens Of Pegmatite From 561 To 564 Then Schistic, Broken Coarse Grained Granite To 570 Then Schist. Feldspar Intensely Altered, Sulfides Mostly Oxidized Deepest Chalcopyrite.	FeOxG, Feldspar G, Sil M, Sericite F	FeOx, Traces Py	Fe Ox
570	590	60%	"	Severely Fractured & Broken Coarse Grained Granite, Fault Zone 571 To 573 With Limonite Veins And Calcite Cements & With Gouge And Iron Oxides. Feldspar Intensely Altered, Sulfides Mostly Oxidized, Deepest	FeOxG, Feldspar G, Sil F, Sericite F	FeOx, Traces Py, Cpy And Bornite, Few Specks Green Copper.	Fe Ox, Cpy, Bn
590	590	90%	"	Several Fractured & Broken Coarse Grained Granite Fault Zone Continues To 594 Then Lenses Of Schist. Silicified Zone 594 To 601. Feldspar Intensely Altered. Sulfides Increase From 585.	FeOxG, Feldspar G, Sil F, Sericite F	FeOx, Traces Py, Cpy And Bornite,	
590	601	95%	"	Fractured And Broken Coarse Grained Granite With Lenses Or Schist Veins With Water & Quartz Feldspar Alteration Decreasing, Sulfides Increasing	FeOxG, Feldspar G, Sil F, Sericite F	FeOx Py 1-2% Cpy 1% Bornite 1% Traces Chalcocite From Oxidation Of Sulfides 50% Total Sulfides 1-2%	5° Fe Ox
601	606	100%	Pegmatite	Fractured Pegmatite, All Fractures Contain Sulfides Causing Alteration Angles 45°	FeOxP, Feldspar P, Sil G, Sericite P	Py 2-3% Cpy 1% Covellite, Traces Chalcocite, Oxidation Of Sulfides 5 & 10% Total Sulfides 2-3%	
606	610	100%	Granite	Fractured Medium To Coarse Grained Granite	FeOxF, Feldspar F, Sil G, Sericite P	Py 2-3% Cpy 1% Covellite, Traces Chalcocite, Oxidation Of Sulfides 5-10% Total Sulfides 2-3%	
610	630	100%	"	Fractured Medium To Coarse Grained Granite With Lenses Of Schist From 617.	FeOxF, Feldspar M, Sil G, Sericite M	Py 2-3% Cpy 1% Covellite, Traces Chalcocite On Sulfides Total Oxidation Of Sulfides 5-10% Total Sulfides 2-3%	
630	636	100%	"	Fractured & Altered To Coarse Grained Granite With Lenses Of Schist And Pegmatite From 633 To 636 Alteration Of Feldspar Intense Total Oxidation Of Sulfides 20% Total Sulfides 2-3%	FeOxF, Feldspar G, Sil G, Sericite M	Py 2-3% Covellite 1% Cpy 1% Sulfides Total Oxidation Of Sulfides 20% Total Sulfides 2-3%	20° Fe Ox
636	640	100%	"	Fractured Medium To Coarse Grained Granite With Lenses Of Schist And Pegmatite From 633 With Intense Alteration Of Feldspar 20% Oxidation Of Sulfides.	FeOxM, Feldspar G, Sil G, Sericite M	Py 2-3% Covellite 1% Cpy 1% Sulfides Total Oxidation Of Sulfides 50-75% Total Sulfides 2-3%	
640	644	100%	Pegmatite	Fractured Pegmatite With Schistic Inclusions From 643 To 644	FeOxM, Feldspar G, Sil G, Sericite P		
644	650	100%	"	Fractured, Broken Coarse Grained, Brecciated To 647 Then Schist To 650	FeOxF, Feldspar G, Sil M, Sericite P	Py 2-3% Covellite 1% Cpy 1% Sulfides	5°
644	650	75%	Granite	Fractured Severely Altered Coarse Grained Granite With Lenses Of Schist And Pegmatite	FeOxF, Feldspar G, Sil M, Sericite F	Py 2-3% Covellite 1% Cpy 1% Sulfides	
				Fractured Severely Altered Coarse Grained Granite With Lenses Of Schist And Pegmatite	FeOxP, Feldspar G, Sil F, Sericite F	1% 2-3% Covellite 1% Cpy 1% Sulfides Including Sulfides	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-6 SHEET NO. 7
COORDINATES 2100 N 1400 E
TYPE DRILL Dominion 44 BIT SIZE BX
DATE STARTED Sept 17, 1963

Alteration Grades
P - Poor
F - Fair
M - Moderate
G - Good

GEOLOGIC LOG

Project Sheep Mt.

Sil. - Silicification
Fox. - Iron Oxides
Py. - Pyrite
Cpy. - Chalcopyrite
CuO - Copper Oxides
Mos. - Molybdenum

COLLAR ELEVATION 2859'
TOTAL FOOTAGE
LOGGED BY C. R.
DATE COMPLETED

LINE INCLINED S - Fractures, Barren
LINE INCLINED (S) - Fractures & Pegfam.
UNC INCLINED - Mineralized.

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
645	647			No Core to 647 - Drillers failed to get core barrel back on bottom - Ground 7' of Core on Night Shift			
647	670	100%	Granite	Fractured Oxidized Chloritized Granite - Vuggy toward bottom	Fox 6, Feldspar 6, Sil M, Sericite F	Py 2-3%, Bornite 1/2%, Cpy 1/2%, Some Oxidation of Sulfides 20-40%	10° Fox Py
670	680	100%	"	Fractured, Oxidized, Granite - Brecciated Lost & Cemented with Fox. Vuggy with Open Water Courses Throughout	Fox 6, Feldspar 6, Sil M, Sericite F	Py 2-3%, Bornite 1/2%, Cpy 1/2%, Chalcocite Film. Total Oxidation of Sulfides 20-40% Total Sulfides 2-3%	60° C 10° Fox Py
680	692	100%	"	Fractured, Oxidized, Granite Vuggy Water Courses Throughout -	Fox 6, Feldspar 6, Sil M, Sericite F	Py 2-3%, Granite 1/2%, Cpy 1/2%, Chalcocite Film. Total Oxidation of Sulfides 20-40% Total Sulfides 2-3%	10° Fox Py 30° Fox 30° C Fox Py
692	709	96%	Granite	Granite Breccia Cemented with Iron Oxides & Fault Gouge Throughout.	Fox 6, Feldspar 6, Sil M, Sericite F	Py 2-3%, Bornite 1/2% Cpy 1/2% Chalcocite Film. Total Oxidation of Sulfides 20-30% Total Sulfides 2-3%	
709	710	90%	Schistose Gouge	Dioritic Gouge Fault Material with a very small incidence in Sulfides - Oxidation Sharply Defined. Silica Stringers Throughout	Fox P, Feldspar 6, Sil F Sericite M.	Py 1-2%, Cpy 1/2%, Bornite 1/2% Some Chalcocite Film. Total Oxidation of Sulfides 5-7% Total Sulfides 1-2%	
710	711	75%	"	Dioritic Gouge Fault Material	Fox P, Feldspar 6, Sil F Sericite M	Py 1-2%, Cpy 1/2%, Bornite 1/2% Some Chalcocite Film. Total Oxidation of Sulfides 5-7% Total Sulfides 1-2%	
711	729	90%	"	" " " " Brecciated Fox 725' to 729'	Fox P, Feldspar 6, Sil F, Sericite M	Py 1-2%, Cpy 1/2%, Bornite 1/2% Some Chalcocite Total Oxidation of Sulfides 3-5% Total Sulfides 1-2%	
729	740	100%	Granite	Fractured Oxidized Granite Vuggy, With Water Courses. to 738 Thin Basic Dioritic Dykes 730-740'	Fox P, Feldspar 6, Sil F, Sericite M.	Py 1-2% Cpy 1/2% Trace Chalcocite Film/Mos. Total Oxidation of Sulfides 10-15% Total Sulfides 1-2%	45° Py Fox 45° Cpy Fox
740	750	100%	"	Fractured, Oxidized, Granite	Fox P, Feldspar 6, Sil F, Sericite M	3-5% Cpy 1/2% Trace Bornite, Some Chalcocite 1/2% Total Oxidation of Sulfides 10-15% Total Sulfides 3-5%	10° Py 60° Py Fox 45° Py
750	760	90%	"	Fractured, Broken, Oxidized Granite, Severly Broken From 756 to 760	Fox F, Feldspar 6, Sil F, Sericite P	Py 2-3% Cpy 1/2% Trace Bornite and Mos. Some Enrichment & Supergene	
				Fractured Oxidized Fine Grained Granite	Fox P, Feldspar 6, Sil F,	Py 2-3% Cpy 1/2% Trace	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sweep Mountain

HOLE NO. SM-6 SHEET NO. 2
COORDINATES 3100 N 4600 E
TYPE DRILL [illegible] BIT SIZE BX
DATE STARTED Sept 17, 1963

Alteration Grades:
P- Poor
F- Fair
M- Moderate
G - Good

Sil-Silicification
Py-Pyrite
Fe ox - Iron Oxides
Mos - Molybdenum
Cpy - Chalcopyrite

COLLAR ELEVATION 2889
TOTAL FOOTAGE
LOGGED BY Cook
DATE COMPLETED

Fine Inclined Right ⑤-Fracture % / Per Foot
Line Inclined Right
Line Inclined Left - Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
770	780	100%	Granite	Fractured Oxidized Fine Grained Granite to 777' then Fault Breccia and Gouge to 779 then Cemented Breccia	Fe ox P, Feldspar G, Sil F, Sericite F	Py 2-3 % Cpy 1/4 % Traces Covellite Bornite, Mos, and Chalcocite. Total Oxidation of Sulphides 5-7% Total Sulfides 7-8 %	45° Py Cpy 10° Py 15° 10° ⑤
780	790	100%	"	Fault Breccia and Gouge to 782 then Oxidized Fine Grained Gray-White Granite to 788 then Coarsely Broken Highly Altered Feldspar in Medium Grained Granite	Fe ox P, Feldspar G, Sil F, Sericite F	Py 2-3 %, Cpy 1/4 % Traces Covellite Mos and Chalcocite Total Oxidation of Sulfides 3-5% Total Sulfides 2-3 %	10° Cpy Cpy 60° S
790	800	100%	"	Fine Grained Gray-White Granite to 792 then Broken with Gouge Probable Fault. Feldspar Severely Altered.	Fe ox P, Feldspar G, Sil F Sericite F	Py 1-2 % Trace Cpy, Trace Covellite Mos and Chalcocite. Total Oxidation of Sulfides 1-2 % Total Sulfides 1-2 %	10° S 20° S 95° Py
800	810	100%	"	Broken Highly Fine Grained Granite With Calcite Cementing Material. Feldspars Are Severely Altered.	Feldspar G, Sil F, Sericite F	Py 1-3 % Cpy 1/4 % Traces Covellite Mos and Chalcocite. Total Sulfides 1-3 %	10° ⑤
810	820	100%	"	Fault Gouge to 812 then Siliceous, Pyritic Medium Grained Fractured Granite. Intense Alteration of Feldspar.	Fe ox P, Feldspar G, Sil M, Sericite P.	Py 3-4 % Cpy 1/4 % Traces Covellite Mos and Chalcocite. Total Oxidation of Sulfides 5-8% Total Sulfides 3-5 %	45° Py Cpy 45° 60° Py Cpy 10°
820	830	100%	"	Fractured Medium Grained Granite. Feldspar Alteration Intense. Breccia from 826 to 830'	Feldspar G, Sil M, Sericite P.	Py 3-4 % Cpy 1/4 % Traces Covellite Mos and Chalcocite Total Sulfides 3-5 %	10° S 45° S 45°
830	840	100%	"	Fractured Medium Grained Granite, Feldspar Alteration Intense.	Feldspar G, Sil M, Sericite F.	Py 3-4 % Cpy 1/4 % Covellite 1/4 % Traces Cerrite and Chalcocite. Total Sulfides 3-5 %	45° Py Cpy 30° Py Cpy 45°
840	850	100%	"	Fractured Medium Grained Granite, Feldspar Alteration Intense.	Feldspar G, Sil M, Sericite F	Py 2-3 % Cpy 1/4 % Traces Covellite, and Chalcocite Total Sulfides 2-3 %	60° Py Cpy 45° Py 10°
850	860	100%	"	Fractured Medium Grained Granite, Feldspar Alteration Intense	Feldspar G, Sil M, Sericite F	Py 2-3 % Cpy 1/4 % Traces Covellite and Chalcocite. Total Sulfides 3-4 %	60° Py Cpy 10° S 10° Py Cpy
860	870	100%	"	Fractured Medium Grained Granite, Feldspar Alteration Intense.	Feldspar G, Sil M, Sericite F	Py 2-3 % Cpy 1/4 % Traces Covellite and Chalcocite Total Sulfides 2-3 %	45° Py Cpy 45° Py Cpy 10° Py Cpy
870	880	100%	"	Fractured Medium Grained Granite to Coarse Grained Granite Porphyritic Intensely Altered Silicification	Feldspar G, Sil G, Sericite F	Py 1-2 %, Cpy 1/4 % Traces of Covellite and Chalcocite	45° Py Cpy

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-6 SHEET NO. 9 — Alteration Grades
COORDINATES 3100 N — 4600 E — P - Poor
TYPE DRILL Diamond Hole BIT SIZE BX — F - Fair
DATE STARTED Sept 17, 1963 — M - Moderate
G - Good

Project Silver Mountain

Sil - Silicification
Py - Pyrite
FeOx - Iron Oxides
Mos - Molybdenum
Cpy - Chalcopyrite

COLLAR ELEVATION 2947
TOTAL FOOTAGE
LOGGED BY Cole
DATE COMPLETED

Line Inclined Right 5 - Fracture - Broken
Line Inclined Right (5) - Fractures 7 Per Foot
Line Inclined Left . Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
879	890	75%	Diabase & Fault Material	Crushed, Shalake, Gouge, Fault Material With Minor Quartz Veinlets: Feldspar Intensely Altered, Sulfides Oxidized Moderately	Feldspar G, Sil P, FeOx P	Py 2-3% Trace Cpy And Chalcocite. Scale 1"=40' Total Oxidation Of Sulfides=15% Top of Sulfide Zone	Broken 45° Py Cpy Trace 60° Py Cpy Trace
890	900	80%	Fractured Diabase Fault Material	Crushed, Diabase, Gouge Fault Material With A Pyritic Quartz Lens From 893 to 895.5. Feldspar Intensely Altered. Some Sulfides Oxidized Moderately	Feldspar G, Sil M, FeOx P	Py 2-3%, Cpy <1%, Trace Of Chalcocite Total Oxidation Of Sulfides=10% Top of Sulfide Zone=2-3%	Broken Zone 0° Py Cpy Rock 30° Py Cpy Mos
900	910	75%	Diabase & Fault Material	Fractured Broken Diabase Some Epidote	Feldspar G, Sil M, FeOx P	Py 3-4% Cpy <1% Trace Of Chalcocite Total Oxidation Of Sulfides=10% Top of Sulfides=2-3%	45° Py Cpy Trace 15° Py Cpy Trace
910	920	95%	Diabase & Fault Material	Fractured, Broken, Shaded, Fault Gouge 7/8 To 9/8" Calcite In Fractures. Some Epidote	Feldspar G, Sil Fe Ox P	Py 3-4% Traces Of Bornite And Chalcocite Total Oxidation Of Sulfides 5-8% Top of Sulfide Zone	20° Py Cpy 60° Py
920	930	90%	Diabase & Fault Material	Fractured, Broken Diabase, Fault Gouge Intermittent Throughout.	Feldspar G, Sil P, FeOx P.	Py 2-4% Traces Cpy And Chalcocite Total Oxidation Of Sulfides 5-8% Top of Sulfide Zone 2-3%	Broken 20° 45°
930	940	95%	Diabase	Fractured Diabase With Lens Of Granite 735.5 to 736.5	Feldspar G, Sil F, FeOx P	Py 2-3% Cpy <1% Traces Bornite, Covellite Mos & Chalcocite Total Oxidation Of Sulfides 5-8% Top of Sulfide Zone 2-3%	45° Py Cpy 60° Py Cpy
940	950	95%	"	Fractured Diabase	Feldspar G, Sil P,	Py 2-3% Cpy <1% Traces Bornite, Mos & Chalcocite Top of Sulfide Zone 2-3%	45° S
950	960	100%	"	" "	Feldspar M, Sil P	Py 2-3% Cpy <1%, Traces Mos. And Chalcocite	60° Py 30° Py
960	970	100%	"	" " Fault 969-970'	Feldspar M, Sil P.	Py 2-3%, Cpy <1% Traces And Chalcocite Top of Sulfide Zone	30° Py
970	971	50%	"	" "	Feldspar M, Sil P.	Py 2-3%, Cpy <1% Traces Mos And Chalcocite Top of Sulfide Zone 2-3%	30° Py 45° Py 60° Py
				End Of Hole 971 Oct. 23, 1961			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM-6 SHEET NO. 10
COORDINATES 5100N 4600E
TYPE DRILL Diamond BIT SIZE AX WL
DATE STARTED June 17, 1963
RECORD Dec. 29, 1963

Alteration Grades
P - Poor
F - Fair
M - Moderate
G - Good
I - Intense

Py - Pyrite
Cpy - Chalcopyrite
Fe ox - Iron Oxides
Sil. - Silicification
Sec. - Secondary Copper
Mos. - Molybdenum

COLLAR ELEVATION 2889
TOTAL FOOTAGE
LOGGED BY CWG
DATE COMPLETED
LINE INCLINED RIGHT -(2) - FRACTURES, PHOENIX
LINE INCLINED RIGHT -(3) - FRACTURES, TITLE FOOT MINERALIZED.
LINE INCLINED LEFT

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
981	991	70%	DIABASE	FRACTURED DIABASE WITH JOINTS OF SIL.	FELDSPAR G, SIL G, SERICITE P, CHLORITE F, FE OX G.	Py 3-4%, Cpy <1%, FE OX 1-2% TRACE OXIDATION OF SULFIDES 50-75% TOTAL SULFIDES 3-4%	60° Py Cpy 45° Py Fe ox 45° Py Cpy Fe ox
991	1000	70%	GRANITE	MEDIUM TO COARSE GRAINED GRANITE WITH BANDS OF SIL.	FELDSPAR I SIL G, SERICITE P, CHLORITE P.	Py 2-3% Cpy <1% TRACE Mos	AS Py 45° Py Cpy Fe ox
1000	1004	90%	"	MEDIUM TO COARSE GRAINED GRANITE	FELDSPAR I SIL G, SERICITE P CHLORITE P.	Py 2-3% Cpy <1% TRACE Mos TOTAL SULFIDES 2-3%	100° 60° (3) 30° Py Fe ox
1004	1010	10%	DIABASE	FRACTURED DIABASE WITH A LENS OF GRANITE	FELDSPAR I SIL G, SERICITE P CHLORITE F	Py 2-3% TRACE Cpy TOTAL SULFIDES 2-3%	
1010	1020	96%	GRANITE	FRACTURED MEDIUM TO COARSE GRAINED GRANITE WITH SIL. BANDS. WATER COURSES INTERMITTANTLY. LOSING WATER.	FELDSPAR I, SIL G, SERICITE P, CHLORITE P, FE OX P	Py 1-2% Mos <1% TRACE Cpy, Fe ox TOTAL OXIDATION OF SULFIDES 10% 15% TOTAL SULFIDES 1-2%	10° Py Mos 60°
1020	1030	98%	"	FRACTURED MEDIUM TO COARSE GRAINED GRANITE WITH BANDS OF SIL. WATER COURSES INTERMITTANTLY. LOSING WATER	FELDSPAR I, SIL G, SERICITE P, CHLORITE P, FE OX P,	Py 1-2% Mos <1% TR Cpy, Fe ox TOTAL OXIDATION OF SULFIDES 10-15% TOTAL SULFIDES 1-2%	10° Py Fe ox 20° Fe ox 45° Py
1030	1035	100%	"	FRACTURED MEDIUM TO COARSE GRAINED GRANITE WITH BANDS OF SIL.	FELDSPAR I, SIL G, SERICITE P CHLORITE P. Fe ox P.	Py 2-3% Mos <1% TR Cpy, Fe ox TOTAL OXIDATION OF SULFIDES 10-15% TOTAL SULFIDES 2-3%	35° Py Mos (2)
1035	1038	100%	PEGMATITE	FRACTURED SILICEOUS PEGMATITE	FELDSPAR I SIL G, SERICITE P CHLORITE P.	5 FEET 0% Mos <1% TR Cpy TOTAL SULFIDES 1-2%	
1038	1050	96%	GRANITE	FRACTURED MEDIUM TO COARSE GRAINED GRANITE WITH SIL. BANDS.	FELDSPAR I SIL G, SERICITE M, CHLORITE P	Py 2-3% Cpy <1% Mos <1% TR BOCNITE & COVELLITE TOTAL SULFIDES 2-3%	60° Py Mos 60° Py Cpy 60° Py Cpy Mos
1050	1060	100%	"	FRACTURED MEDIUM TO COARSE GRAINED GRANITE WITH BANDS OF SILICIFICATION	FELDSPAR I, SIL G, SERICITE M, CHLORITE P, FE OX P	Py 2-3% Cpy <1% Mos <1% Fe ox TOTAL OXIDATION OF SULFIDES 5% TOTAL SULFIDES 2-3%	30° Py Cpy
1060	1070	100%	"	MEDIUM TO COARSE GRAINED GRANITE WITH BANDS OF SILICIFICATION AND PEGMATITE LENSES	FELDSPAR G, SIL G, SERICITE M CHLORITE P, FE OX P	Py 2-3% Cpy <1% Mos <1% TR Fe ox TOTAL OXIDATION OF SULFIDES 5% TOTAL SULFIDES 2-3%	20° Py Cpy Fe ox 45° Py Cpy
1070	1080	95%	"	MEDIUM TO COARSE GRAINED GRANITE WITH BANDS OF SILICIFICATION	FELDSPAR I SIL G, SERICITE P CHLORITE F	Py 2-3% Cpy <1% Mos <1% TOTAL SULFIDES 2-3%	45° Py 60° Py Cpy
1080	1090	95%	"	MEDIUM TO COARSE GRAINED GRANITE, STRONGLY BANDED WITH SILICIFICATION	FELDSPAR I SIL G, SERICITE M CHLORITE M.	Py 2-3% Cpy <1% TRACE Mos TOTAL SULFIDES 2-3%	60° Py Cpy 45° Py Cpy

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Silver Mountain

HOLE NO. SM-6 SHEET NO. 11
COORDINATES 31800N 4600E
TYPE DRILL Diamond BIT SIZE AXWL
DATE STARTED Sept 17, 1963
Finished Dec. 29, 1963

Alteration Grades
P - Poor
F - Fair
M - Moderate
G - Good
I - Intense

Py - Pyrite
Cpy - Chalcopyrite
Fox - Iron Oxides
Sil - Silicification
Cor - Bornite / Covellite
Mos - Molybdenite

COLLAR ELEVATION 2989
TOTAL FOOTAGE
LOGGED BY
DATE COMPLETED

LINE Inclined Right - S - Fracture, Shaded
LINE Inclined Right ☺ Fractures > 1 Inches Mineralized.
LINE Inclined Left

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1090	1100	90%	GRANITE	Medium to Coarse Grained Highly Altered Granite Fractured Banded With Silicification. Fault Material 1092 to 1094. Mole Increasing.	Feldspar I, Sil G, Sericite M, Chlorite M.	Py 2-3%, Cpy 1%, Mos 1/8% Total Sulfides 2-3%	35° Py Cpy 60° Py Cpy 60° Py Cpy 45° Py Cpy
1100	1110	70%	"	Medium to Coarse Grained Highly Altered And Fractured Granite	Feldspar I, Sil G, Sericite M Chlorite M Fox P	Py 2-3% Cpy 1% Traces Mos. Fox. Total Oxidation Of Sulfides 5-10% Total Sulfides 2-3%	30° 45° Py Cpy 45° Py Cpy
1110	1117	96%	"	Medium to Coarse Grained Highly Altered And Fractured Granite. Fault Material 1112 to 1114	Feldspar I, Sil G, Sericite M, Chlorite M, Fox F.	Py 2-3% Cpy 1% Traces Mos Fox. Total Oxidation Of Sulfides 10-15% Total Sulfides 2-3%	10° Fox 45° Py Cpy 45° Py Cpy
1117	1130	96%	"	Medium to Coarse Grained Highly Altered And Fractured Granite With Bands Of Silicification	Feldspar I, Sil G, Sericite F, Chlorite M Fox P	Py 2-3% Cpy 1% Traces Mos Fox Total Oxidation Of Sulfides 5-10% Total Sulfides 2-3%	10° Py Cpy 50° Py Cpy 45° Py Cpy
1130	1139	95%	"	Medium to Coarse Grained Fractured Granite With Bands Of Silica	Feldspar I Sil G, Sericite F Chlorite F Fox P.	Py 1-2% Traces Cpy & Mos Total Oxidation Of Sulfides 5-10% Total Sulfides 1-2%	30° Py Cpy 60° Py Cpy 45° Py Cpy
1139	1147	95%	Pegmatite	Hard Siliceous Pegmatite With Lenses Of Granite.	Feldspar G, Sil G, Sericite Chlorite F	Py 1% Traces Cpy & Mos.	30° Py Cpy
1147	1150	70%	Granite	Fractured Medium Grained Granite	Feldspar M Sil G. Sericite P	Py 1-2% Traces Cpy & Mos	
1150	1160	100%	"	Medium to Fine Grained Granite With Bands Of Silicification And Lenses Of Pegmatite	Feldspar G, Sil G, Sericite P. Chlorite F Fox P	Py 1-2%. Traces Cpy & Mos Traces Of Fox Total Sulfides 1-2%	30° Py Cpy 15° Py Cpy 15° Py Cpy
1160	1170	96%	"	Medium Grained Granite With Lenses Of Pegmatite And Bands Of Silicification	Feldspar I, Sil G, Sericite P, Chlorite F, Fox P.	Py 2-3% Cpy 1% Traces Mos & Fox Traces Fox Total Sulfides 2-3%	45° 30° 45°
1170	1171	96%	"	Medium Grained Granite With Bands Of Sil.	Feldspar F Sil G, Sericite P, Chlorite P Fox P	Py 2-3% Cpy 1% Traces Mos Fox Traces Fox Total Sulfides 2-3%	45° S 45° Py
1171	1180	100%	Pegmatite	Pegmatite With Lenses Of Granite.	Feldspar G, Sil G Sericite F	Py 1-2% Traces Cpy & Mos	
1180	1193	100%	" "	Pegmatite With Lenses Of Granite	Feldspar G, Sil G, Sericite F.	Py 1-2% Traces Cpy & Mos.	45° S
1193	1197	100%	Granite	Medium Grained Siliceous Granite	Feldspar G, Sil G, Sericite F. Chlorite F	Py 1-2% Traces Cpy & Mos Py 2-3% Cpy 1% To Mos Total Sulfides 2-3%	30° Py Cpy 30° Py Cpy 45° S
1197	1201	100%	Pegmatite	Pegmatite	Feldspar G, Sil G.	Py 1-2% Tr Cpy & Mos	100° Py.

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM-9 SHEET NO. 1
COORDINATES 16600N 19800E
TYPE DRILL [illegible] BIT SIZE NX coil
DATE STARTED Jan 28, 1964

COLLAR ELEVATION 2885
TOTAL FOOTAGE 250
LOGGED BY DSH.
DATE COMPLETED
Line Inclined Right - 5 - Fractures, Broken
Line Inclined Right (5) Fractures/Foot
Line Inclined Left Alignment

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	10	—	No Core				
10	20		Andesite	Grey Red Andesite to 15' then Red Porous Andesite			
20	26		"	Porous Red Andesite With Specks of Calcite To 26 then Fractured Red Andesite Breccia			
26	30			Porous As 29			
30	40		"	Porous Red Andesite With Calcite In Broken Seepages			
40	50		"	Andesite Breccia With Fragments of Buff & Red Andesite Well Healed.			
50	57		"	Andesite Breccia With Fragments of Buff & Red Andesite Well Healed			
57	60		"	Sandy Conglomeratic Andesite Fine Grain			
60	67		"	With Angular Fragments of Andesite			
67	70			Porous Red Andesite With Calcite Seams			
70	80		"	Various Red Andesite With Calcite Seams to 78 then Buff Tuffaceous Andesite to 76 then Porous Red Andesite With Angular Fragments of Red Andesite			
80	90		"	Porous Red Andesite With Specks of Calcite			
90	96		"	Porous Light Red Andesite to 96 then Fractured Red Andesite With Silica Inclusions.			
96	100			Dark Red Andesite With Silica Inclusions			
100			"	Dark Red Andesite With Silica Inclusions			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM-9 SHEET NO. 2
COORDINATES 11,600N 19800E
TYPE DRILL Diamond DRILL BIT SIZE N/X
DATE STARTED Jan 29, 1964

COLLAR ELEVATION 7885'
TOTAL FOOTAGE
LOGGED BY CWL
DATE COMPLETED
LINE/INCLINED RIGHT - S- FRACTURE Y JOINT
LINE INCLINED RIGHT ⑤ FRACTURES Y RELIEF
LINE INCLINED LEFT MINERALIZED.

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
110	120		Andesite	Red Andesite With Siliceous Inclusions And Laths Of Feldspar			
120	130		"	Fractured Red Andesite With Siliceous Inclusions And Laths Of Feldspar			
130	140		"	Ditto			
140	147		"	"			
147	150		Andesite	Light Red Andesite With Porphyritic Grain			
152	160		"	" " " " " "			
160	167		"	" " " " " "			
167	170		Andesite	Red Porous Andesite With Laths Of Feldspar			
170	180		"	" " " " " " "			
180	190		"	" " " " " " "			
190	202		"	" " " " " " "			
202	210		Andesite	Fractured Dense Gray Andesite			
210	220		"	" " " "			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM-5 SHEET NO. 3
COORDINATES 116000N 19800E
TYPE DRILL DIAMOND BIT SIZE NXWL
DATE STARTED JULY 24, 1961

COLLAR ELEVATION 2885'
TOTAL FOOTAGE
LOGGED BY GUDE
DATE COMPLETED
LINE INCLINED RIGHT - 2 - FRACTURE, BARREN
LINE INCLINED RIGHT (3) FRACTURES 71 PER FOOT.
LINE INCLINED LEFT MINERALIZED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
220	231		ANDESITE	FRACTURED GRAY ANDESITE.			
231	240		ANDESITE	HARD DENSE RED MAROON ANDESITE WITH CALCITE LINED GROWTH IN VUGS AND FRACTURES			
240	250		"	HARD RED MAROON ANDESITE WITH QUARTZ IN FRACTURES			
250	260		"	✓ ✓ ✓ ✓ ✓ ✓			
260	270		"	✓ ✓ ✓ ✓ ✓ ✓			
270	280		"	✓ ✓ ✓ ✓ ✓ ✓			
280	287		"	✓ ✓ ✓ ✓ ✓ ✓			
287	290		ANDESITE	GRAY PORPHYRITIC ANDESITE PORPHYRY			
290	301		"	" " " " "			
301	310		ANDESITE	LIGHT PINK TO BUFF ANDESITE			
310	320		"	" " " " "			
320	330		"	" " " " "			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM-9 SHEET NO. 4
COORDINATES 16400 N 19800 E
TYPE DRILL Diamond BIT SIZE BXWL
DATE STARTED January 24, 1964

COLLAR ELEVATION 2885'
TOTAL FOOTAGE 0000.
LOGGED BY
DATE COMPLETED
LINE INCLINED RIGHT FRACTURE, BARREN
LINE INCLINED RIGHT (S) FRACTURES, >1 PER FOOT
LINE INCLINED LEFT MINERALIZED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
330	340		Andesite	Light Pink to Buff Andesite.			/
340	343		"	" " " " " Fract zone 342 to 345			
343	350		Andesite	Red Banded Andesite with Calcite in Fractures		/	
350	360		"	" " " " " " " "			
360	370		"	" " " " " " " "			
370	380		"	" " " " " " " "			
380	390		"	" " " " " " " "			
390	399		"	" " " " " " " "			
399	410		Andesite	Andesite with Inclusions of Granite & Quartz			
410	410		"	" " " " " " " "			
410	420		"	" " " " " " " "			
420	427		"	" " " " " " " "			
427	430		Andesite	Gray Andesite Andesite from 427-431			
430	440		"	" " "			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM-9 SHEET NO. 5
COORDINATES 16600N 19800E
TYPE DRILL Diamond BIT SIZE EKWL
DATE STARTED Jan. 23, 1964

COLLAR ELEVATION 2385
TOTAL FOOTAGE
LOGGED BY C.W.L.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
440	450		Andesite	Gray Andesite Agglomerate, Boulder & Gouge			
450	460		"	" " " " " "			
460	470		"	" " " " " "			
470	480		"	" " " " " "			
480	490		"	" " " " " "			
490	500		"	" " " " " "			
500	510		"	" " " " " "			
510	520		"	" " " " " "			
520	527		"	" " " " " "			
527	540		"	Black Gouge Andesite Agglomerate Vein Fault Material			
540	550		"	" " " " " "			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sleeper Mountain

HOLE NO. SM 9 SHEET NO. 6
COORDINATES 11,600 N 19,500 E
TYPE DRILL [illegible] BIT SIZE BXWL
DATE STARTED [illegible] 1964

COLLAR ELEVATION 2385'
TOTAL FOOTAGE
LOGGED BY O.H.R.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
550	570		Andesite	Black Gouggy Andesite With Calcite Veinlets.			
570	570		"	" " " " " "			
570	580		"	" " " " "			
580	591		"	" " " " " "			
591	600		"	Gray Red Andesite With Granite Inclusions			
600	610		"	Brick Red Andesite Mud.			
610	612		"	Gray Red Andesite Breccia.			
612	620		Granite				
620	630		"				
630	640		"				
640	650		"				
650	660		"				

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM-9 SHEET NO. 7
COORDINATES 16600N 19800E
TYPE DRILL Diamond DIT SIZE BXWL
DATE STARTED Jan 28, 1964

Mineralization Grades:
P- Poor
F- Fair
M- Moderate
G- Good.
I. - Intense (Clay)

Py- Pyrite
Cpy-Chalcopyrite
Cu-Co- Green Copper
Fe ox - Iron Oxides.

COLLAR ELEVATION 2885'
TOTAL FOOTAGE
LOGGED BY C.S.K.
DATE COMPLETED

Line Inclined Right ⤵ Fracture - Broken
Line Inclined Right ⤵ Fractures > 1 Per Foot
Line Inclined Left ⤴ Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
660	666		Granite	Oxidized Granite With Moderate Fracturing With Schist Inclusions	Argillic, Sericitic - Mod to Strong.	Limonite, Minor Sulfides 2-4% Tr Cu, Py, Cpy. Sulfide Mineralization Minor Fracture Coatings - Some Diss. Mineralization - Leu. and Feldspar Alteration Cu 1 ± 1596	10° (S)
666	670						
670	680	90%	"	Oxidized Granite Moderately Fractured	Feldspar G, Sericite G, Fe Ox G.	Fe Ox 3-5%. Py Casts Diss. Thru. Tr. Strong Fox In Fractures Fox After Cpy 1% Or Less Cu 1 ±	20° Fox 10° (S)
680	690	95%	"	" " " " Siliceous Zone	Feldspar I, Sericite G Fe Ox G.	Fe Ox 3-5%. Py Casts Diss. Thru. Strong Fox In Fractures Fox After Cpy 1% Of Iron Oxides	45° Fox 60° (S)
690	700	95%	"	" " " "	Feldspar I, Sericite G, Fe Ox G.	Fe Ox 3-5%. Py Casts Diss. Thru. Strong Fox In Fractures. Fox After Cpy 1-2% Green Cu 690 To 698	60° Fox 45° Fox Fox Fracs 100 Fox
700	707	95%	"	Oxidized Severely Fractured Granite Becoming Breccia 703 to 707.5.	Feldspar I, Sericite G, Fe Ox G.	Fe Ox 3-5% Py Casts Diss. Thru. Fox After Cpy, 1-2% Of Iron Oxides	45° Fox
707	710	20%	Andesite	Andesite Dike - Red to Grey White			
710	718	75%	"	Andesite Dike With Severely Altered Granite Inclusion 712 to 713 Fracture Altered to Clay.			
718	730	40%	Granite	Oxidized Brecciated Granite	Feldspar I Sericite G, Fe Ox G.	Fox 3-5% Strong In Fractures	60° Fox
730	750	93%	"	Oxidized Brecciated Granite Severely Fractured.	Feldspar I Sericite G, Fe Ox G, Silf	Fox 3-5% Strong In Fractures Trace Chalcocite 720 to 721 Fox, Alter Cpy 1-2% Of Iron	45° Fox 60° Fox 90° Fox 70° Fox
750	780	95%	"	Oxidized Moderately Fractured Granite	Feldspar I Sericite M Fe Ox G.	Fox 5-10% Strong In Fractures And Diss. Casts. Fox After Cpy 1-2% Of Iron Oxides.	45° Fox 60° Fox 60° Fox
780	790	95%	"	" " " "	Feldspar I, Sericite M, Fe Ox G, Silf	Fox 5-10% Strong In Fractures Some Diss. Casts Fox After Cpy 1-2% Of Iron Oxides Trace Chalcocite & Bornite 787-793	60° Fox 45° Fox 150 Fox
790	800	95%	"	" " " " Brecciated 795-798	Feldspar M, Sericite M, Fe Ox G, Silf	Fox 5-10% Moderately Strong In Fractures, Good In Diss. Fair Fox After Cpy 1-2% Trace Chalcocite & Bornite 795-798	60° Fox 45° Fox 150 Fox
					Feldspar I Sericite M Fe Ox G, Silf	Fox 5-10% Strong In Fractures Good Diss. Of Casts.	60° Fox 45° Fox

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM-5 SHEET NO. 8
COORDINATES 11600N 19800E
TYPE DRILL Diamond #2 BIT SIZE BXWL
DATE STARTED January 1964

COLLAR ELEVATION 2885'
TOTAL FOOTAGE
LOGGED BY DWR
DATE COMPLETED

Alteration Grades: P - Poor; F - Fair; M - Moderate; G - Good; I - Intense

Py - Pyrite; Cpy - Chalcopyrite; Gr Cu - Green Copper; Iron Oxides; Sil - Silicification

Line Inclined Right; Line Inclined Right; Line Inclined Left; (5) Fracture Number; Fractures Per Foot Minimized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
770	777	96%	Granite	Fractured & Brecciated Oxidized Granite Fault Material 772 to 779.	Feldspar I, Fox G, Silicified. Fox G.	Fox 5-8% Sulfide In Fractures And Disseminated. Good Showing Cpy In Core. Traces Of Green Cu & Chalcocite Throughout.	60° (Fox) 60° (Fox) 60° (Fox) 45° (Fox) 45° (Fox)
780	790	40%	Diorite Dike	Broken Fractured Diorite Dike With Fault Material	Fox G,	Native Copper & Crystals Of Cuprite Traces Chalcocite And Fox In Fractures.	30° (Fox) 45° (Fox) 30° (Fox)
790	800	95%	" "	" " " " " " " "	Fox G,	Native Copper & Cuprite Or Chalcocite Traces Of Chalcocite And Fox In Fractures.	45° Fox
800	810	95%	" "	" " " " " " " "	Fox G.	Fox 3-5% Native Copper Occasional Sample, Some Traces Of Cuprite & Chalcocite	45° (Fox) 30° (Fox)
810	820	60%	" "	Severely Broken & Fractured Diorite Dike With Fault Material	Fox G,	Fox 5-8% Traces Of Chalcocite.	45° (Fox)
820	826	60%	" "	" " " " " " " "	Fox G,	Fox 5-8% Traces Of Chalcocite & Green Cu 82H.88	45° (Fox) 30° Fox (Fox)
826	830	70%	Granite	Crushed & Brecciated Oxidized Granite	Feldspar I, Fox G & Silicite F	Fox 2-4% Of Fine Chalcocite	
830	840	80%	"	Fractured & Fractured Oxidized Granite Fault 828.	Feldspar I, Fox G, Silicite F Sil F.	Fox 1/2-5% Trace Chalcocite Fox After Chalcopyrite 1-2%.	60° (Fox) 15° (Fox) 45° (Fox)
840	850	70%	"	Fractured Oxidized Granite	Feldspar I, Fox G, Silicite P. Sil F	Fox 3-5% Fox After Chalcopyrite 1-2% Of Oxides.	60° (Fox)
850	860	95%	"	" " "	Feldspar I, Fox G, Silicite F, Sil F	Fox 3-5% Chalcocite 85% Red Cu Some Specks Native Cu Fox After Chalcopyrite 1-2% Of Iron Oxides	60° Fox 30° (Fox) 30° (Fox)
860	870	90%	"	" " "	Feldspar I, Fox G, Silicite F	Fox 2-3% Chalcocite & Cu Oxides With Specks Native Cu Fox After Cpy Chalcocite & Fe Iron Oxides	15° (Fox) 45° (Fox)
870	880	95%	"	" " "	Feldspar I, Fox G, Silicite F Sil F	Fox 2-3% Chalcocite And Green Copper. 871 To 875.	30° Fox (Fox)

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-9 SHEET NO. 9
COORDINATES 11,600N 19,600E
TYPE DRILL [illegible] BIT SIZE BXWL
DATE STARTED Nov. 20, 1964.

Alteration Grade
P: Poor
F: Fair
M: Moderate
G: Good
I: Intense

Project Sierrita Mountains

GEOLOGIC LOG

Py-Pyrite
Cpy-Chalcopyrite
Grc. Green Copper
Fe Ox Iron Oxides
Sil Silicification
Mic. Molybdenite

COLLAR ELEVATION 2885'
TOTAL FOOTAGE
LOGGED BY C.S.L.
DATE COMPLETED

Ling Inclined Veins & Fractures Healed
Ling Inclined Veins & Fractures Healed
Ling Inclined Vein Mineralized.

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2850	2890	75%	Granite	Oxidized Moderately Fractured Granite	Feldspar I, Fe Ox M, Sil F. Sericite M.	Fe Ox 1-3%, Py <1%, Traces Cpy, Chalcocite, Ling Grc Cu. Cpy Vein In Fracture. Trace Mic. In Grc & Sulfide Inclusions	45° Cpy Vein; 45° Ling Grc; 75° Ling Grc
2890	2900	75%	"	" " " "	Feldspar I, Fe Ox G, Sil M, Sericite M.	Fe Ox 2-3% Py 1-2% Traces Of Cpy Chalcocite In Grc & Cpy Stringers In Fracture. Traces Mic. Oxidation Of Sulfides 40-50%	45° Fe Ox; 45° Fe Ox
2900	2910	95%	"	" " " "	Feldspar I Fe Ox G, Sil M, Sericite M.	Fe Ox 2-3%. Py 2-3% Chalcocite 1/2% Traces Cpy And Mos. Total Oxidation Of Sulfides.	45° Fe Ox; 60° Fe Ox
2910	2930	95%	"	" " " "	Feldspar I Fe Ox G, Sil M, Sericite F.	Fe Ox 4-5% Py 2-3% Chalcocite 1/2% Trace Cpy And Mos. Cuprite And Green Copper. 311 6914 Nonmineralized 3920 Total Oxidation Of Sulfides.	45° Fe Ox; 45° Fe Ox
2930	2950	95%	"	Moderately Oxidized Fractured Granite	Feldspar I, Fe Ox G, Sil G, Sericite P.	Fe Ox 2-3% Py 1-2% Chalcocite 1/2% Trace Cpy & Mos. Native Cu 920 to 921 Total Oxidation Of Sulfides 50-60% Silicification Throughout.	60° Fe Ox; 45° Fe Ox
2950	2990	95%	"	" " " "	Feldspar I, Fe Ox G, Sil G, Sericite P.	Fe Ox 2-3% Py 1-2% Trace Cpy, Mos. & Chalcocite Total Oxidation Of Sulfides 50-60%	45° Fe Ox; 60° Fe Ox
2990	3050	75%	"	Moderately Oxidized, Fractured Granite With Lenses Of Schist	Feldspar I, Fe Ox G, Sil G, Sericite F	Fe Ox 1-2% Py 2-3% Trace Cpy, Mos & Chalcocite Total Oxidation Of Sulfides 50-60% Total Sulfides 2-3%	45° Fe Ox; 60° Fe Ox
3050	3081	45%	"	Moderately Oxidized, Fractured Granite With Lenses Of Schist. Fault Materials At 3061 Shows Oxidation Partly Brecciated From 3054 to 3061	Feldspar I, Fe Ox G, Sil G, Sericite M.	Fe Ox 2-3% Py 1-2% Trace Cpy, Mos & Chalcocite Total Oxidation Of Sulfides 50-60% Total Sulfides 1-2%	45° Fe Ox; 45° Fe Ox; 60° Fe Ox
3081	3110	70%	Schist	Partly Oxidized Fine Grey Schist & Fine Grained Porphyry Dike Cpy, Massive Pyrite Fault Material 3110 to 3120	Feldspar G, Fe Ox F Sil P Chlorite F.	Fe Ox 1-2% Py 3-4% Traces Chalcocite. Total Oxidation Of Sulfides 50-60% Total Sulfides 3-4%	45° Fe Ox; 45° Fe Ox
3110	3176	95%	"	Partly Oxidized Siliceous Fine Grained Porphyry Dike Rock Fractured Cpy, Massive Pyrite Fault Material 3120 to 3176 Porphyry Dike Cut By Quartz Veinlets Of Schist	Feldspar G, Fe Ox F Sil P Chlorite F. Sericite Fe Ox G Sil M Kaolin M	Fe Ox 2-3% Py 3-4% Trace Chalcocite Total Oxidation Of Sulfides 50-60% Total Sulfides 3-4% Fe Ox 2-3% Py 1-2% Trace Chalcocite	45° Fe Ox; 45° Fe Ox
3176	3217		Diorite	Strongly Fractured Dark Schist Fault Material 3183 to 3187	Feldspar M, Fe Ox P Sil F, Chlorite F	Fe Ox 1-2% Py 2-3% Trace Chalcocite	60° Cpy Fe Ox

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PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SM-6 SHEET NO. 10
COORDINATES 11,600N 19,900E
TYPE DRILL Sullivan 55 BIT SIZE BXWL
DATE STARTED Jan 28, 1964

Alteration Grades: P- Poor; F- Fair; M- Moderate; G- Good; I- Intense

GEOLOGIC LOG

Project Superior Mountain

Py- Pyrite; Cpy- Chalcopyrite; Fe ox- Iron Oxide; Sil- Silicification; Mos- Molybdenite

COLLAR ELEVATION 2895
TOTAL FOOTAGE
LOGGED BY (illegible)
DATE COMPLETED

Line Inclined Right (S) Fracture Broken
Line Inclined Right (S) Fractures >1 Per Foot
Line Inclined Left Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1000	1010	100%	Granite	Fractured Granite, Oxidation is Strong Along Some Fractures	Feldspar I, Fe ox M, Silicification P, Sil G.	Fe ox 1-2% Py 2-3% Tr Cpy & Mos & Chalcocite, Total Oxidation of Sulphides 2-3% Total Sulfides 2-3%	60° Fe ox Py; 45° Fe ox Py
1010	1019	96%	"	Fractured Granite, Oxidation is Strong Along Some Fractures	Feldspar I, Fe ox M, Silicification Sil G.	Fe ox 1-2% Py 2-3% Cpy 1/4% Tr. Mos & Chalcocite, Total Oxidation of Sulphides 20-30% Total Sulfides 2-3%	45° Fe ox Py; 10° Flat; 20° Fe ox Py
1019	1024	100%	Granite	Fractured Brecciated Granite Fine Molybdenite Mineralization	Feldspar I, Fe ox M, Silicification Sil G.	Fe ox 1-2% Py 2-3% Cpy 1/4% Tr Mos & Chalcocite, Total Oxidation of Sulphides 40-50% Py 1-2% Total Sulfides 3-5%	10° Fe ox
1024	1030	85%	"	" " " " " " At 1024 Feet.	Feldspar I, Fe ox P, Silicification Sil G. Chlorite P.	Py 1-2% Tr Cpy, Mos & Chalcocite, Total Oxidation of Sulphides 10-20%	45° Fe ox Py
1030	1036	100%	Granite	Moderately Fractured Granite	Feldspar M, Fe ox P, Silicification Sil G	Py 1-2% Tr Cpy, Mos, Chalcocite, Total Oxidation of Sulphides 10-20% Total Sulfides 1-2%	60° Py Fe ox; 60° Fe ox
1036	1046	100%	"	" " "	Feldspar G, Fe ox P, Silicification Sil G	Py 1-2% Tr Cpy, Mos, Chalcocite, Total Oxidation of Sulphides 10-20% Total Sulfides 2%	60° Py Fe ox; 60° Fe ox
1046	1050	100%	"	" " "	Feldspar M, Fe ox P, Silicification Sil G,	Py 1-2% Tr Cpy, Mos & Chalcocite, Total Oxidation of Sulphides 10-20% Total Sulfides 1-2%	60° Cpy Fe ox
1050	1061	95%	Granite	Moderately Fractured Granite Lenses of Schist from 1059	Feldspar M, Fe ox P, Silicification Sil G, Chlorite P.	Py 1-2% Tr. Cpy, Mos & Chalcocite, Total Oxidation of Sulphides 5-10% Total Sulfides 1-2%	60° Py Fe ox
1061	1071	95%	"	" " " " " "	Feldspar I, Fe ox P, Silicification Sil G, Chlorite P	Py 1-2% Tr Cpy, Mos, Chalcocite, Total Oxidation of Sulphides 10-20% Total Sulfides 1-2%	45° Cpy Fe ox
1071	1081	100%	Granite	Moderately Fractured Granite	Feldspar I, Fe ox P, Silicification Sil G,	Py 2-3% Cpy 1/4% Tr Mos, Total Oxidation of Sulphides 10-20% Total Sulfides 2-3%	10° Fe ox
1080	1090	100%	"	" " "	Feldspar I, Fe ox P, Silicification Sil G.	Py 2-3% Cpy 1/4% Tr Mos, Total Oxidation of Sulphides 10-20% Total Sulfides 2-3%	10° Fe ox Py
1090	1097	90%	Diorite	Severely Fractured Diorite Fine Molybdenite 1093 to 1095		Py 3-4% Tr Cpy	

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. [illegible] SHEET NO. 11
COORDINATES 11,600 N 19,600 E
TYPE DRILL Davis No. 1 BIT SIZE RKNL
DATE STARTED Jan 25, 1964

Alteration Grade:
P - Poor
F - Fair
M - Moderate
G - Good
I - Intense

GEOLOGIC LOG

Project Silver Mountain

Py-Pyrite
Cpy-Chalcopyrite
Fe-ox - Iron Oxides
Sil - Silicification
Mos - Molybdenite

COLLAR ELEVATION 2965'
TOTAL FOOTAGE
LOGGED BY C.W.
DATE COMPLETED
LINE INCLINED RIGHT 3 FRACTURE PATTERN
LINE INCLINED RIGHT & FRACTURES PERP.
LINE INCLINED LEFT MINERALIZED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
[illegible]	1110	100%	Schist	Moderately Fractured Schist With Lenses of Granite	Fe-ox F Chlorite F Feldspar M	Py 2-3% Cpy Li% Tr Mos. Total Oxidation of Sulfides 5-10% Total Sulfides 10%	45° Py Fe-ox 45° Py Fe-ox
1110	1114	100%	"	" " " " " " "	Fe-ox F Chlorite F. Feldspar M.	Py 2-3% Cpy Li% Tr Mos. Total Oxidation of Sulfides 5-10% Total Sulfides 2-3%	45° Cpy Fe-ox
1114	1120	95%	Granite	Fractured Granite With Lenses of Schist	Feldspar M, Sil G, Fe-ox P.	Py 1-2% Tr Cpy & Mos. Total Oxidation of Sulfides 1-3% Total Sulfides 1-3%	45° (5)
1120	1130	95%	"	" " " " " "	Feldspar M, Sil G, Fe-ox P.	Py 1-2% Tr Cpy & Mos. Total Oxidation of Sulfides 1-5% Total Sulfides 1-3%	60° Py 45° Py
1130	1140	100%	"	" "	Feldspar M, Sil G, Fe-ox P.	Py 2-3% Tr Cpy & Mos. Granite Total Oxidation of Sulfides 1-2% Total Sulfides 2-3%	45° Py 70° Py 100° Py Fe-ox
1140	1150	100%	"	" " With 2 1/4" Andesite Dike At 1149'	Feldspar M, Sil G, Fe-ox P.	Py 2-3% Tr Cpy & Mos. Total Oxidation of Sulfides 1-5% Total Sulfides 2-3%	60° Cpy Fe-ox 90° Py Fe-ox
1150	1160	100%	Granite	Granite	Feldspar F Sil G, Fe-ox P.	Py 2-3% Cpy Li% Tr. Mos Total Oxidation of Sulfides 1-5% Total Sulfides 2-3%	60° Fe-ox 45° Py
1160	1170	95%	"	Granite Fracturing Increasing From 1165' Vuggy	Feldspar F, Sil G, Fe-ox P.	Py 2-3% Cpy Li% Tr Mos. Granite. Total Oxidation of Sulfides 1-5% Total Sulfides 2-3%	45° Py Fe-ox Fe-ox Vuggy
1170	1174	95%	"	Fractured Granite	Feldspar M, Sil G, Fe-ox P Feldspar F, Sil M, Fe-ox P	Py 2-3% Cpy Li% Tr Mos. Total Oxidation of Sulfides 2-3% Cpy 1-2% Tr Cpy & Mos Total Oxidation of Sulfides 1-5% Total Sulfides 1-3%	45° Py 10° Py Fe-ox Vuggy
1174	1180	95%	Granite	Moderately Fractured Granite With Lenses of Pegmatite			
1180	1190	100%	"	" " " " " " "	Feldspar M, Sil M, Fe-ox P. Schist	Py 1-2% Cpy Li% Mos Li% Total Oxidation of Sulfides 1-5% Total Sulfides 1-2%	15° Py 45° Py Fe-ox
1190	1200	100%	"	" " " " " " "	Feldspar M, Sil M, Fe-ox P. Schist P.	Py 2-3% Cpy Li% Mos Li% Total Oxidation of Sulfides 1-5% Total Sulfides 2-3%	45° Py 45° Py
1200	1210	100%	"	" " " " " " "	Feldspar M, Sil M Fe-ox P.	Py 2-3% Cpy Li% Mos Li% Total Oxidation of Sulfides 1-5%	45° Py 15° Py

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. S-81-G SHEET NO. 12
COORDINATES 11-1600 N 1980 E
TYPE DRILL [illegible] BIT SIZE BX WL
DATE STARTED Jan 28 1964

Project Silver Mountain

Alteration Grades
P - Poor
F - Fair
M - Moderate
G - Good
I - Intense

Py - Pyrite
Cpy - Chalcopyrite
Frox - Iron Oxides
Sil - Silicification
Mos - Molybdenite

COLLAR ELEVATION 5825'
TOTAL FOOTAGE 1537'
LOGGED BY C. R. Y.
DATE COMPLETED April 8, 1964

Line Inclined Right - Fractures Dragged
Line Inclined Right - Fractures & Veins Mineralized
Line Inclined Left

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1217	1219	100%	Granite	Granite	Feldspar M, Sil G, Frox P.	Py 1-2% Cpy <1% Traces. Trace Oxidation of Surface 1-5%. Trace Sulfides 1-2%.	30° (Frac Py) 90° S.
				End Of Hole At 1219 March 20, 1964 Drilling Resumed April 11, 1964			
1219	1230	95%	Granite	Moderately Fractured Granite Fault 1225 +01221 Frox Recemented Hairlines Slightly Bigger Fault Surfaces Clay Filled Fractures Rare.	Feldspar G, Sil G, Frox M, Sericite P	Py 1-2% Cpy <1% Traces. Trace Oxidation of Surface 20-40%. Trace Sulfides 1-2%	20° Frac 90° 60° Frac 45° S 45° Frac 90°
1230	1240	95%	"	Moderately Fractured Granite Strong Frox Silicified Products In Fractures	Feldspar F, Sil G, Frox M, Sericite P.	Py 1-2% Cpy <1% Traces Sil And Chalcocite Trace Oxidation of Surface 10-20%. Trace Sulfides 1-2%	60° 45° 45° 90°
1240	1250	95%	"	Moderately Fractured Granite Frox Alteration Products Falling Off Rapidly Some Shearing Or Recemented Hairlines	Feldspar F, Sil G, Frox F, Sericite P.	Py 1-2% Cpy <1% Traces Sil & Chalcocite Trace Oxidation of Surface 10-20%. Trace Sulfides 1-2%	45° Py 60° 45° 90°
1250	1257	95%	"	Moderate To Strongly Fractured Granite With Minor Lenses Of Pegmatite	Feldspar F, Sil G, Frox P. Sericite P.	Py 1-2% Cpy <1% Traces Sil & Chalcocite Trace Oxidation of Surface 1-3%. Trace Sulfides 1-2%	45° 60° 90°
1257	1270	100%	"	Moderate To Strongly Fractured Granite With Minor Lenses Of Pegmatite. Hairline Fractures Strongly Oxidized Or Filled With Frox.	Feldspar I, Sil M, Frox P. Sericite G	Py 2-3% Cpy <1% Molybdenite Trace Oxidation Of Surface 1-3%. Trace Sulfides 2-3%	45° 90°
1270	1287	100%	"	Strongly Fractured Granite With Minor Fault At 12 1/2°. And 12th Foot. Minor Lenses Of Pegmatite	Feldspar I Sil M, Frox P. Sericite G	Py 2-3% Cpy <1% Molybdenite Trace Oxidation Of Surface 1-3%. Trace Sulfides 2-3%	45° Py 90°
1287	1295	100%	"	Moderately Fractured Granite With Strong Veining Of Silica, Pyrite Strong In Fractures	Feldspar I, Sil G, Frox P. Sericite G, Chlorite P	Py 3-5% Cpy <1% Molybdenite, Trace Oxidation Of Surface 5-10%. Trace Sulfides 3-5%	45° Py 90°
1295	1301	100%	"	Moderately Fractured Granite With Strong Veinlets Of Silica Py Strong In Fractures	Feldspar I Sil G, Frox P. Sericite G, Chlorite P	Py 2-3% Cpy <1% Mos <1%. Trace Oxidation Of Surface 5-10%. Trace Sulfides 2-3%	45° Py 90°

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

HOLE NO. SMA-1 SHEET NO. 13
COORDINATES 16600N 19800E
TYPE DRILL Reverse Circ BIT SIZE 6 5/8 L
DATE STARTED Jan 29, 1960

Alteration Grades:
P- Poor
F- Fair
M- Moderate
G- Good
I- Intense

GEOLOGIC LOG

Project Sierrita Mountain

Py - Pyrite
Cpy - Chalcopyrite
Fe Ox - Iron Oxides
Sil - Silicification
Mos - Molybdenite

COLLAR ELEVATION 2805'
TOTAL FOOTAGE
LOGGED BY C.W.K.
DATE COMPLETED

Line Inclined Right - Fracture Plane
Line Inclined Right (10) Fractures > 1 per foot
Line Inclined Left - Mineralized

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1310	1320	96%	Granite	Medium Grained Granite With Lenses Of Pegmatite	Feldspar I, Sil G, Sericite M. Fe Ox P.	Py 1-2 % - Traces Cpy, Mos, Traces Of Oxidation Of Sulfides — Total Sulfides 1-2 %	60° Py Fract; 45° Py Fract
1320	1330	100%	"	Medium Grained Granite With Lenses Of Pegmatite. Py Increasing In Fractures. Mos	Feldspar G, Sil G, Sericite P Chlorite F Fe Ox P	Py 2-3 % Mos 1/4 % Tr Cpy Traces Of Oxidation Of Sulfides — Total Sulfides 2-3 %	60° Py
1330	1340	95%	"	Medium Grained Granite With Lenses Of Pegmatite	Feldspar G, Sil G, Sericite F Chlorite F Fe Ox P	Py 2-3 % Mos 1/4 % Tr Cpy Traces Of Oxidation Of Sulfides — Total Sulfides 2-3 %	45° Py Fract; 20° Py Fract
1340	1350	100%	"	Medium Grained Granite With Lenses Of Pegmatite	Feldspar G, Sil G, Sericite F Chlorite P Fe Ox P	Py 1-2 % Mos 1/4 % Tr Cpy Total Oxidation Of Sulfides 1-2 % — Total Sulfides 1-2 %	45° Py Fract
1350	1360	100%	"	Medium Grained Granite With Lenses Of Pegmatite	Feldspar G Sil G, Sericite P Fe Ox P	Py 1-2 % Mos 1/4 % Tr Cpy Total Oxidation Of Sulfides Est. — Total Sulfides 1-2 %	45° Py Fract; 20° Py Fract; 60° Py Fract
1360	1368	100%	"	Medium Grained Granite With Lenses Of Pegmatite	Feldspar G, Sil G Sericite P Fe Ox P	Py 2-3 % Mos 1/4 % Tr Cpy Total Oxidation Of Sulfides Est. — Total Sulfides 2-3 %	60° Py Fract; 45° Py Cpy Fract
1368	1380	100%	"	Medium to Fine Grained Granite With Lenses Of Pegmatite Moderately Fractured,	Feldspar G, Sil G, Sericite F Fe Ox P,	Py 2-3 % Mos 1/4 % Cpy Tr Total Oxidation Of Sulfides Est. — Total Sulfides 2-3 %	20° Fract; 30° Fract
1380	1390	100%	"	Porphyritic Feldspar Medium Grained Granite With Pegmatite Lenses	Feldspar G, Sil G, Sericite F Fe Ox P	Py 2-3 % Mos 1/4 % Cpy Tr Total Oxidation Of Sulfides Est. — Total Sulfides 2-3 %	20° Fract; Py
1390	1400	100%	"	Porphyritic Feldspar Medium to Coarse Grained Granite With Pegmatite Lenses	Feldspar G, Sil G, Sericite P Fe Ox P	Py 2-3 % Mos 1/4 % Cpy Tr Total Oxidation Of Sulfides Est. — Total Sulfides 2-3 %	20° S
1400	1410	100%	"	Medium Grained Granite With Pegmatite Lenses Of Pegmatite	Feldspar G, Sil G Sericite P Fe Ox P	Py 2-3 % Mos 1/4 % Cpy Tr Total Oxidation Of Sulfides Est. — Total Sulfides 2-3 %	
1410	1420	100%	Granite	Weak fracturing, sul. in veinlets and disseminations of mineralized host rock	Argillic - Mod Silicification - mod to strong	Tot. Sul. 3-4 % Py Cpy Mos 1/4 % Tr, trace of oxid.	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mtn

HOLE NO. SM 9 SHEET NO. 14

COORDINATES

TYPE DRILL BIT SIZE

DATE STARTED

COLLAR ELEVATION

TOTAL FOOTAGE

LOGGED BY

DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1405	1425.5	95%	Granite complex	Granite with weakly assimilated basic rock inclusions relict inclusions now of schistose biotite gneiss; occ. pegs. lenses. Mod. frac. sulfs. white [illegible]	Argillic - weak silicification - mod chloritic - weak	tot. sul. 4-5%, Py, cpy, moly cpy <1%, <1.5% moly. ox of sul. <5%.	
1425.5	1425.8	"	Andesite porph. dike				
1425.8	1441	95%	Granite	Granite with pegs. lenses. strongly assimilated inclus. [illegible] frac. sul in white and dim. wk gr. matrix.	Argillic - weak silicification - mod.	tot sul. 3-4%, Py, cpy, moly, cpy <1%, <1.5% moly ox of sul. 5-10%	
1441	1463	"	Granite complex	Gr. with assimilated basic rock inclusions. Relict inclusions now of schistose biotite gneiss: [illegible] pegs. lenses, wk. green chloritic matrix. [illegible]	Argillic - weak silicification - mod. chloritic - weak sericitic - tr - wk.	Tot. Sul. 4-5%, Py, cpy, moly. cpy <1%, moly <1.5% ox of sul. <5% of tot. sul.	
1463	1513.5	"	Granite	Gr. with strongly assimilated inclusions - only ghost relict structure left - and peg. lenses. wk gry white - cloudy feldspar. Sul fine & in white wk fracturing	Argillic - weak silicification - mod sericitic - tr to wk.	Tot. sul. 4-6%, Py, cpy, moly cpy <1%, moly <1.5% ox of sul. <3% of tot. sul	
1513.5	1519	"	Granite complex	Gr with weakly assimilated basic rock inclusions Other characteristics same as above. [illegible] fracturing	chloritic - tr Argillic - weak silicification - tr to weak	tot. sul. 3-4%, Py, cpy, moly cpy <1%, moly <0.5% 10-20% of sul. oxidized	
1519	1537	"	Granite	Gr with strongly assimilated basic rock inclusions and peg lenses. Gr white - wk - cloudy sul. [illegible] - mod at 1520-21. Gr white - wk. cloudy sul. Frac. - weak.	Argillic - weak silicification - mod. sericitic - tr - wk.	Tot. sul. 4-5%. Py, cpy, moly cpy <1%, moly <1.5% ox of sul <5%	
	[illegible]						
				Rock: strongly assimilated basic inclusions has been weakly all altered weakly assimilated from the contact. [illegible]			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 14 SHEET NO. 1
COORDINATES 22600 N 22006
TYPE DRILL ____ BIT SIZE BXWL
DATE STARTED ____

Project SHEEP MOUNTAIN, ARIZONA

COLLAR ELEVATION 2799
TOTAL FOOTAGE 2058.9
LOGGED BY RSP
DATE COMPLETED 12/15/64

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1842	1871	100%	pC gneiss, schists.	Well altered, flooded by grey quartz. Sulfides in qtz veinlets, or disseminated. Rock is not oxidized. Upper 2 in. is volcanic rock, probably material that fell down the hole. The volcanic - pre-mineral rock contact lies between 1730 and 1842	silicification: extreme argillization: strong - of plagioclase chloritization: extreme - of plagioclase, k-feldspar	Total sulfides: 4% Cu: tr py, MoS_2, ccpy	
1871	1892.2	100%	pC pegmatite	Fractured + brecciated. Ferruginous silica seals joints.	silicification: strong argillization: weak	Total sulfides: 5% Py, MoS_2, ccpy (?)	
1892.2	1889	100%	pC diorite gneiss	Well altered, flooded by silica; qtz veining. Few scattered biotite flakes	silicification: strong argillization: very strong - of plagioclase chloritization: strong - of alt. plgioclase.	Total sulf: 3% Py, MoS_2	
1889	1893.5	100%	pC pegmatite	Fractured, sealed by silica, ferruginous silica. locally brecciated	silicification: moderate sericitization: wk chloritization: wk-mod, - of feldspar argillization: weak	Total sulfides: 3% Py.	
1893.5	1895	100%	pC complex	Diorite-gneiss, mica-pegmatite complex. Fractured, sealed by silica & ferruginous silica cement. Minor FeO_x on joints	silicification: moderate argillization: strong - of plagioclase chloritization: strong sec k-feldspar: wk-mod.	Total sulf: 1% Py, MoS_2	
1895	1902.5	100%	Breccia Zone	Brecciated gneiss - pegmatite complex. Healed by ferruginous silica cement. Pre-mineral bx zone.	silicification: moderate	Total sulfides: 1% Py.	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SIERRA MOUNTAIN, ARIZONA

HOLE NO. SM 11 SHEET NO. 2
COORDINATES 22400 N 20600E
TYPE DRILL _____ BIT SIZE EXNL
DATE STARTED _____

COLLAR ELEVATION 2799
TOTAL FOOTAGE 2058.4
LOGGED BY RSP
DATE COMPLETED 12/15/64

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1902.5	1906	100%	Andesite dike	Dark gray, fine-gr rock. Well fractured. Ferruginous siliceous cement, chloritized matrix too. Core is locally pulverized	Chloritization: heavy	Total sulfides: 2% py.	
1906	1916.5	100%	Breccia Zone	Pre-mineral breccia zone. Cemented by ferruginous siliceous, and andesitic cement. Bx zone is frags of pC pegmatites, gneiss, schists.	silicification: moderate	Total sulfides: 2-3% py, MoS_2 sulfides in bx frags, cement	
1916.5	1934	100%	pC biotite-garnet-qtz-gneiss	First large amounts of ccpy. Foliation is about 45° to core axis. Sec. qtz veins. Generally not fractured. Strong ccpy in interval (1917-20)	silicification: moderate Chloritization: heavy - of feldspars, and garnets (local)	Total sulfides: 4% py, ccpy, MoS_2 ccpy: 0.9% Cu: 0.3 (1917-20) ccpy: 03%	
1934	1937.5	100%	Diorite gneiss	Well altered. Alignment of biotite gives weak linear feature. Unfractured	chloritization: extreme, of feldspars. silicification: moderate	Total sulfides: <1% py.	
1937.5	1953	100%	garnet-feldspar-biotite schist	Moderate alteration: chloritization, qtz veining. Unfractured.	silicification: moderate - qtz veining chloritization: strong, of feldspars. sec. biotite.	Total sulfides: 3% py, MoS_2 ccpy (tr)	
1953	1959	100%	granite pegmatite	Weak - moderate alteration. Unfractured	silicification: wk-moderate chloritization: moderate - of feldspars.	Total sulfides: 3% py, MoS_2 ccpy (tr)	
1959	1975	100%	Diorite gneiss	Moderate alteration, unfractured.. minor oxidation	Silicification: moderate qtz veining. argillization: strong, of feldspars	Total sulfides: 2% py, ccpy, MoS_2	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN, ARIZONA

HOLE NO. SM 14 SHEET NO. 3
COORDINATES 22600N 20300E
TYPE DRILL _____ BIT SIZE EXWL
DATE STARTED _____

COLLAR ELEVATION 2799
TOTAL FOOTAGE 2058.4
LOGGED BY RSP
DATE COMPLETED 12-15-64

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
FS 1975	2016.5	100%	Metamorphic complex.	Mixed gneisses, schists, pegmatites. Moderate fracturing. Moderate - weak oxidation: FeOx on joints, indigenous limonite boxwork. Prem meral bx at 2008.5 w/ siliceous FeO_x cement	silicification: strong argillization: strong chloritization: moderate. sec. biotite sec K-feldspars.	Total sulfides 2% Py, cpy (?) Orig sulf est: 2½%	
2016.5	2019.5	100%	Breccia Zone.	Pre-mineral (?). Angular fragments of metamorphic rocks. Moderate oxidation Abundant FeOx, limonite boxwork.	mostly oxidation, otherwise, as above.	Tot. sulf: <1% Orig sulf: 2-3%	
2019.5	2020	100%	Basic Dike.	Andesite ?. Well chloritized. Brecciated. Abundant disseminated pyrite.	Chloritization: moderate.	Total sulfides: 3% Py.	
2020	2030	100%	Diorite gneiss	Moderate - strong fracturing. Oxidation: weak-nil. Scattered vugs on joints. Small pyrite-rich basic dikes at 2025, 2028.	Silicification: mod-strong Chloritization: strong - of feldspars. sec. K - feldspars	Total sulfides: ½% basic dikes 5% Py, MoS_2	
2030	2058.4	100%	do.	Well altered, unfractured, minor oxidation	silicification: mod-strong chloritization: wk-mod. argillization: strong - of feldspars.	Total sulfides: 1% Py, MoS_2, cpy (?)	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM-18 SHEET NO. 1
COORDINATES
TYPE DRILL B-C / DD BIT SIZE 4¾" / 3⅞"
DATE STARTED 9/20/64

COLLAR ELEVATION 2429
TOTAL FOOTAGE 2051'
LOGGED BY RBL - CFA
DATE COMPLETED 10/19/64

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	1560	Rotary		Post Mineral Volcanic Rocks - Andesite			
1560	1634	100%	Andesite	Dense, fine grained gray andesite Some porphyritic and fragmental zones	Chlorite on fractures Occas. ± 6" fz. w/ clay gouge	Oxidation banding Calcite vlts & blebs in frags. & interstitial	
1634	1655.5	80%		Gouge, crushed andesite, basic dike material and occasional granitic fragments	Chlorite and clay	Trs. py. in calcite vlt in andesite fragment (1654)	
1655.5	1658	100%	Granite	Oxidized fine grained Gr. Br. - occasional por. frag and siliceous coarse grained granite frag.	Strong clay alt. (gouge) Calcite slickensides Some silicified frags. Trs. Qtz. vlts. in frags.	Abun. FeOx cementing Br and vlts. & specs. in frags. (3-5% FeOx) Some fine ox. on fracs Abun. trs. native Cu on frags. @ 1656.5'	
1658	1659.5	100%		Crushed zone - Basic & granitic material - much gouge & chlorite	Strong clay (gouge) and calcite	Some FeOx vlts.	
1659.5	1665	100%		Breccia same as (1655.5 - 1658) - Pg. stringer @ 1660 w/ coarse muscovite		Do (1655.5 - 1658)	
1665	1667	95%	Basic Dike	Fine grained basic dike - strong fracturing Complete oxidation	Clay (gouge) & chlorite slickensiders	Limonite on fractures 2" qtz. stringer (barren) @ 1667 - 1" qtz. vn @ 1668 w/ trs py & cpy	
1667	1672	95%		Breccia same as (1655.5 - 1658)	Some silicification on fz (1671-1672)	Do (1655.5 - 1658)	

Granite Contact Fault Zone

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-18 SHEET NO. 2
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

Project SHEEP MOUNTAIN

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RBL
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1672	1676	100%	BASIC DIKE	FINE GRAINED, WELL FRACTURED BASIC MATERIAL STRONG SHEARING - GENERALLY OXIDIZED	MOD-STR. CHLORITIC ALT. SOME SILICIFICATION	WEAK-MOD. FeOx (VLTS & FRACS) LOCAL STRONG PYRITE AS VLTS & SOME SPRNG AT VLT BNDRYS - 1" PY VLT @ 1674.5	3-5% tot Sul
1676	1673.5	100%	GRANITE BX	BRECCIATED GRANITE SAME AS (1655.5-1658) SMWT LESS INTENSE BRECCIATION	STRONG SILICIFICATION	00 (1655.5-1658)	
1673.5	1655.5	80%	BASIC DIKE	STRONGLY ALTERED (FINE GRNS of CHLORITE) MATERIAL	STRONG	ROUND. PY. STRINGERS THROUGH CORE - 3-5% PY (TRC. CPY?) ACCS. QTZ. VLT.	
1655.5	1599	90%		PORPHYRITIC VOLCANIC FRAG. (BRAC IN PART)			
1599	1702	100%	BASIC DIKE	FINE GRAINED BASIC MATERIAL - 50% OXIDIZED ROCK STRONGLY CRUSHED	COMPLETE ALTERATION TO CHLORITE	FAINTLY DISSEM. PY WITH OCCAS TRS CPY - 1-3% TOT SUL	
1702	1709	80%		CRUSHED AND SHATTERED MAT. WITH FINE GRAINED GRANITE - 30% OXIDIZED		MOD-ABDN. SULFIDE IN CORE AND CRUSHED MAT. 3-5% TOT. SUL (PY w/TRS CPY)	
1709	1713	75%	CORE	GENERALLY DARK GREEN CORE AND CRUSHED MAT ROCK FRAG. OF FG BASIC ROCK		FINE SUL (PY) SPRNG & VLTS IN BASIC MATERIAL.	
1713	1736	85%	GRANITE	FINE GRAINED GRANITIC ROCK - ROCK IN PLACE (STOCKWK) GENERALLY UNOXIDIZED - LOCAL FeOx (STRNGS & FRACS)	LOCAL PERVASIVE SERICITIZATION & KFELDSPATHIZATION SOME NOT ALTERED SOME CHLORITIZATION & SILICIFICATION (FINE STRINGERS)	MOD-STRONG SULFIDE MINERALIZATION AS VLTS & DISS SPRNG, MINTY PY. WITH TRS CPY & MoS2 2-4% TOT. SULFIDE	BOTTOM GENERAL MINERALIZATION 1713'
1736	1770.8	100%		MIXED ZONE PORPHYRITE - SILICEOUS GRANITE CONTACT ZONE WITH SOME BASIC DIKE MATERIAL. SOFT PYRITE VLTS CPY IN CORE AND CRUSHED MAT			

GENERAL GRANITE-PORPHYRY CONTACT ZONE

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-13 SHEET NO. 3
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RBL
DATE COMPLETED

Project SUGAR MOUNTAIN

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1770S	1803	100%	PRE C SCHIST	PRECAMBRIAN SCHIST COMPLEX - SILICEOUS, BIOTITE-RICH ROCK. STRONGLY SCHISTOSE AND MUCH QUARTZ AS STRINGERS AND GENERAL SILICIFICATION. SHOWS TRANSITIONAL ZONE AT GR. CONTACT (1805 TO 1808).	STRONG SILICIFICATION - SOME CHLORITIZATION OF BIOTITE	MOD SULFIDE MIN. - PY VNTS AND SPKNG - 1-3% OF SUL. RARE TRS. CPY & MoS_2 HEAVIER SUL. AT CONTACT	
1808	1872	100%	GRANITE	PRECAMBRIAN GRANITE - COARSE GRAINED WITH OCCAS. INCLUSIONS OF SCHIST - RARELY PEGMATITIC BROKEN ZONE WITH QTZ. VN (1825-1830) CRUSHED ZONE AT CONTACT (1872) - SOME ARGILLIZATION	INTENSE SILICIFICATION RARELY ABUN. QTZ. STRINGERS.	MOD. SUL. MIN. - PY VNTS & SPKNG - 2-4% TOT. SUL. PY W/ TRS. CPY & MoS_2 (±.1%G)	
1872	1896	100%	SCHIST RELICTS	PRECAMBRIAN SCHIST AS BEFORE (1770-1808)	DO (1770-1808)	DO (1770-1808)	
1896	1898	100%	PEGMATITE	PEGMATITE DIKE - COARSE MICA IN QTZ-FLDS.		TRS. CPY & PY	
1898	1940	100%	SCHIST	PRECAMBRIAN SCHIST COMPLEX AS BEFORE BUT MUCH INTENSE FRACTURING WITH QUARTZ VEINS AND SILICEOUS GRANITE FRAGS.	STRONG SILICIFICATION	STRENGTH OF MIN INCREASES 3-5% TOTAL SULFIDE - MAINLY PY BUT INCREASING AMTS. CPY TRS. MoS_2 - MAYBE INCREASE IN GR	
1940	1948	100%	FAULT ZONE	DARK GRN SOFT (BASIC DIKE) - BROKEN SCHIST & SILICEOUS FRAGS	STRONG SILICIFICATION	3-5% SUL (MAIN CPY)	
1948	1970	88%	GRANITE	MED-FINE GRAINED EQUIGRANULAR GRANITE - GENERALLY LESS FRACTURING THAN ABOVE - CRUSHED ZONE AT CONTACT.	SIL. SILICIFICATION - SOME CHLORITIZATION OF BIOTITE	SPARSE VERY FINE SUL SPKNG & VNTS PY W/ TRS CPY AND MoS_2	1-2% TOT. SUL
1970	2051 BOTTOM	100%	SCHIST	PRECAMBRIAN SCHIST COMPLEX - PREDOM. TRS. QTZ-PORP. AT 2030' - SOME SILICEOUS ZONES AND FINES SHOW 2028' - FRACTURING GENERALLY WEAK WITH LOCAL MOD INTENSE ZONES FILLED WITH QUARTZ.	WK-MOD. SILICIFICATION LOCAL SIL. - SOME CHLORITE SEAMS - SIDES ON SOMEWHAT SILICIFIED & SULFIDE PLANES	WK-MOD. SUL. SPKNG & VNTS ST CHGS AT CONTACTS & IN SILICEOUS ZONES 1-2% TOTAL SULFIDE - P	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN, ARIZ.

HOLE NO. SM 19 SHEET NO. 1
COORDINATES 18982 N 23010 E
TYPE DRILL ____ BIT SIZE BX & NX
DATE STARTED ____

COLLAR ELEVATION 2514' 2541
TOTAL FOOTAGE 2909
LOGGED BY Russell Powers + CFA
DATE COMPLETED 12-21-69
CFA (0-1976)

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	1685	Rotary Drill	Post-mineral volcanics	Variicolored; andesitic, tuffaceous, tuffaceous agglomerates.			
1685	1690	"		Drilling harder, PE granite contact at 1685'±		Native copper; sulfides(?) in cuttings.	
1690	1709	93% 15/19	Younger albite-bio-granite porphyry	Locally brecciated with fragments of biotite-gneiss and basic rocks. Weak breccia zone.	silicification: mod → strong argillization: moderate sericitization: weak, but locally strong	Local native Cu + cc %Cu = 0.1-0.2 Orig sulf est = 0.5% % FeO_x : 3-9%	
1709	1709	100%	da	As above; much more basic-rock frags, locally diabasic	do.	do. 1" cc vein at 1709. Interval 1709-19 assays 2.62% Cu	
1709	1721	50% 4/12	Fault Zone	Well crushed, broken zone of granitic & basic rock fragments.	silicification: weak argillization: strong sericitization: weak, but locally strong	Local native Cu, cc % Cu = 0.2% % orig sulf = 0.25 % FeO_x = 2	
1721	1731	70% 7/10	Younger albite-bio-granite porphyry	Local breccia fragments of biotite-gneiss and basic rocks. A weak breccia zone as interval (1690-1709). Bottom of general oxidation	silicification: Strong argillization: mod-strong sericitization: weak, but locally strong	Local native Cu, cc, MoS_2 % Cu = 0.2 % MoS_2 = tr orig sulf est = 0.5%	
1731	1758	100%	PE biotite granite	Contains gneissic xenoliths, abundant siliceous-rock fragments.	silicification: strong argillization: moderate sericitization: weak, but locally strong	~~% pyrite = 1%~~ 1% FeO_x ~~native Cu = 0.5%~~ Pyr, Cu, cc, MoS_2, azurite. Cu = 0.1-0.2%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN, ARIZ

CLE NO. SM 19 SHEET NO. 2
CORDINATES 18932 N 23010 E
YPE DRILL _____ BIT SIZE NX & BX
ATE STAIRTED _____

COLLAR ELEVATION 2594'
TOTAL FOOTAGE 2609
LOGGED BY CFA + RSP
DATE COMPLETED 12-21-69

FROM	TO	CORE RE-COVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1753	1768	100%	PC. Biotite-Granite	locally porphyritic; strongly fractured; generally silicified. Xenoliths of gneissic & basic rocks.	quartz veinlets seal fracts. silicification: strong argillization: moderate sericitization: strong	Total sulfides: 2% Pyrite CC MoS_2 Native Cu %Cu = 0.3-0.9%	
1768	1770	75% 1½	Fault Zone	Granite; siliceous, locally brecciated; oxidized.	silicification	Native Cu Orig sulf = 2% CC FeO_x = 5% %Cu = 0.2%	
1770	1781	96%	Granite	Generally brecciated; remanants of PC gneiss + basic rocks; locally porphyritic; moderate fracturing;	silicification: strong qtz veinlets seal fracts. argillization: moderate sericitization: mod-strng. Chloritization: mod	Total sulfides: 3% Py, native Cu, CC, MoS_2 %Cu = 0.6-0.7% %Mo = 0.1% As disseminations; in veinlets.	
1781	1792	73 100%	Granite & basic intrusive.	Generally basic-intrusive with some granite. Crushed & brecciated zone. Locally porphyritic	silicification: locally strong flooding of rock by qtz veinlets. argillization: moderate sericitization: loc. strong	Tot sulfides: 2½% dissem. CC, MoS_2. No pyrite. tr cuprite (?) %Cu = 1%.	
1792	1797	100	Granger albite-biporphyry.	Xenoliths of basic intrusive. moderate fracts.	Silicification: moderate qtz veinlets seal fracts. argillization: mod → strong.	Tot. sulf: 1% CC, native Cu. %Cu = 0.3% No pyrite. As disseminations; in veinlets.	

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN ARIZ

HOLE NO. SM 19 SHEET NO. 3
COORDINATES 18982 N 23010 E
TYPE DRILL _____ BIT SIZE NX & BX
DATE STARTED _____

COLLAR ELEVATION 2544'
TOTAL FOOTAGE 2409
LOGGED BY CFA + RP
DATE COMPLETED 12-21-64

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1797	1824	100%	Younger albite-bio-granite porphyry	Locally brecciated, strongly fractured. Ltbrn FeO_x on fractures.	Silicification: strong qtz veinlets seal fractures argillization: moderate	Tot sulfides: 1.5% Py disseminated cc + native Cu MoS_2 %Cu = 0.3-0.4%; %Mo = tr	
1824	1855	100%	do.	Abundant phenocrysts plagioclase (Albite?); abundant phenos biotite. Mod-strong fracturing, generally silica healed. Hematite bearing fracts (1839-39½)	Silicification: mod-strong argillization: strong	Total sulf: 3% Py disseminated cc, native Cu, MoS_2 %Cu = 0.2% %Mo = tr	
1855	1858	81%	do.	As above but well crushed at (1855-55½)(1857½-58)	do.	do.	
1858	1866.5	100%	do.	Same as (1824-55)	Silicification: strong argillization: moderate.	Tot sulf = 2% cc, Py, MoS_2 absence of native Cu. %Cu = 0.1-0.2% %Mo = tr	
1866.5	1876	98%	do.	Core well crushed; FeO_x on joints.	Silicification: mod argillization: mod-strong	Total sulf: 4% cc, Py, native Cu %Cu = 0.6%	
1876	1883.5	100	PE Granite	Mod-strong fracturing. Younger alb.-bio-porphyry dike at (1815-22). Numerous vugs in granite. Much cpy secondary (?), pink K-feldspar. Major joints at 45° to core.	Silicification: strong qtz veins flooded along fractures.	Total sulf: 0.5% Py: 0.5%, MoS_2: tr native Cu: tr - on joint surfaces %Cu: tr Cpy sulf est: <1% Enr: 1-2% - on jointing.	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN, ARIZONA

HOLE NO. SM 19 SHEET NO. 4
COORDINATES 15982 N 23010 E
TYPE DRILL _____ BIT SIZE NX EX
DATE STARTED _____

COLLAR ELEVATION 2599'
TOTAL FOOTAGE 2409
LOGGED BY RSP
DATE COMPLETED 12-21-69

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1583'	1886'	100%	PC granite	Highly siliceous, well fractured. Core ground-up at (883.5-84). Numerous vugs. Many qtz veinlets with pink-k feldspars. Scattered stringers of younger albite-bio-porphyry. Basal breccia	silicification: strong, qtz veins seal fractures argillization: strong, of plagioclase. mod-strong oxidation	Total sulf: tr FeOx: 5% Py native Cu: <.01 %Cu: tr Orig sulf: <1%	
1886'	1892	30% core lost (88.6-89)	Fault Zone	Fault breccia. Fragments of granite & younger porphyry. Poorly metallized.	Ea	Native copper: tr %Cu = tr 2-3% FeOx	
1892	1910	95%	Younger Albite-bio-porphyry.	Well silicified. Local breccias, about 1 every 2 ft. Flooded by sec(?) k feldspars. Poorly oxidized, especially open breccias	Silicification: strong qtz veins seal fractures. argillization: strong alt of plagia phenocrysts.	Total sulf: nil Py Native copper dissem. on joints native Cu: tr %Cu: tr FeOx: <1%	
1910	1925'	100%	do.	Well silicified, laced with qtz veinlets sealing fractures. Numerous xenoliths of meta-diabase and other biotite-rich rock. Flooded by sec(?) pink feldspar. Numerous leached cavities. Major jointing at 60° to core. Minor FeOx.	silicification: strong. argillization: strong. total alt. of plagio.	Tot sulf: tr Py, cc, MoS_2. Cuprite (?) repl cc. native Cu: tr %Cu: tr. Orig sulf: 1% Vfy with sec qtz veins.	
1925'	1995	70%	Fault Zone	Siliceous rock consisting of grey granite + pink sec(?) k feldspars. Porous rock - numerous med-large vugs. Fault breccia at 1929 sealed by siliceous FeOx. Core looks well leached	silicification: strong	Total sulf: tr Py, cc Native Cu <0.1% %Cu: <0.1% FeOx: ½% Orig sulf. est. 2%	

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN, ARIZ

HOLE NO. SM 19 SHEET NO. 5
COORDINATES 18982 N 23810 E
TYPE DRILL ____ BIT SIZE NX SX
DATE STARTED ____

COLLAR ELEVATION 2549'
TOTAL FOOTAGE 2409
LOGGED BY RSP
DATE COMPLETED 12-21-64

FROM	TO	CORE RE-COVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1915	1952	95% 4/1	Quartz	Massive pale-grey to pink quartz. Moderate to poorly fractured	silicification: extreme chlorite, sericite: tr	Total sulfides: tr Py, MoS_2 minor FeO_x on joints	
1952	1965	80% 19/13	do.	As above; but with numerous vugs. Core is locally pulverized. Siliceous FeO_x heals breccia at 1958.	silicification: extreme sericitization: minor	Total sulfides: tr Py, cc, MoS_2 % Cu: <0.1%	
1965	1980	17% 2.5/15	Fault Zone	Crushed core. Fragments of mainly younger albite-biotite-porphyry with minor basic-rocks.	is pre-fault. silicification: moderate argillization: strong - of plagioclase phenocrysts	Total sulfides: tr Py, cc(?) Tr FeO_x on joints	
1980	1996	100%	Younger bio-albite-granite porphyry	Well altered; locally brecciated at top. Flooded by fracture-sealing quartz veinlets. Moderate-heavy FeO_x on joints; often vuggy.	argillization: strong - of plagioclase. silicification: strong chloritization: moderate - of plagioclase. sec. K-feldspar: minor	Total sulfides: 0.1% Py, cc, MoS_2(?) % Cu: tr FeO_x: 1%	
1996	2025	100%	do	Well altered; flooded by sec. qtz veins + sec. K-feldspars. Moderate fracturing. Scattered vugs. Biotite-plagioclase rock (diorite xenolith?) at (2023-29)	silicification: strong argillization: strong - of plagioclase chloritization: moderate - of plagioclase sericite: tr sec. K-feldspar: moderate	Total sulfides: 0.3% Py MoS_2 (tr)	

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SIERP MOUNTAIN, ARIZONA

HOLE NO. SM 19 SHEET NO. 6
COORDINATES 15982 N 23010 E
TYPE DRILL _____ BIT SIZE BX WL
DATE STARTED _____

COLLAR ELEVATION 2544'
TOTAL FOOTAGE 2109
LOGGED BY RSP
DATE COMPLETED 12-21-64

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2025	2087	100%	Younger bio-albite-granite porphyry.	As above, but more siliceous and less sec. k-feldspar. Xenoliths of biotite schist, plagioclase-biotite (diorite?) rock. Breccia at 2063.	as above	Total sulfides: 0.1% py, MoS_2 increase in overall MoS_2 content	
2087	2090	90%	Basic Rock	Fine-gr. biotite-plagioclase rock. (Diorite). Numerous qtz veins. Breccia zone. May be xenolith.	silicification: moderate argillization: extreme - of plagioclase.	Total sulfides: 0.1% py, MoS_2 - mostly on joint surfaces	
2090	2112.5	100%	Younger bio-albite-granite porphyry	Well altered; qtz veins flood rock. Xenoliths of above basic rock + pC schists. Well fractured, FeOx on joints. A few vugs. Brecciated at: 2097, 2099, 2101.	silicification: strong argillization: strong sec. k-feldspars: mod	Total sulfides: 0.3% py, MoS_2 Orig. sulfide est: <1%	
2112.5	2131	100%	do.	Extremely siliceous; flooded by sec. grey qtz numerous xenoliths of pC metamorphics, + basic rocks. Small breccia at (2112-15). Moderate fracturing, scattered vugs.	silicification: extreme argillization: strong - of plagioclase. sec. k-feldspar: wk-mod	Total sulfides: 0.2% py, copy, MoS_2 % Cu: tr	
2131	2143	100%	do.	Well altered; less siliceous, but more flooding by large amounts k-feldspar. Scattered xenoliths.	silicification: mod-strong argillization: strong - of plagioclase. sec. k-feldspar: very strong. chloritization: weak.	Total sulfides: 0.5% py, MoS_2, cov, copy, bor(?) % Cu: tr.	
2143	2166.5	83%	Breccia Zone	Younger biotite-albite-granite porphyry. As above. Core is pulverized & splintered. Minor amounts FeOx on joints	as above.	as above	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN, ARIZONA

HOLE NO. SM 19 SHEET NO. 7
COORDINATES 15992N 23010E
TYPE DRILL ____ BIT SIZE 3XWL
DATE STARTED ____

COLLAR ELEVATION 2594 ft
TOTAL FOOTAGE 2409
LOGGED BY RSP
DATE COMPLETED 12-21-69

FROM	TO	CORE RE-COVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2166.5	2185	100%	Younger biotite-albite-granite porphyry	Well altered. Moderate fracturing, FeOx on joints. General flooding of silica, pink feldspars.	silicification: qtz veining very strong argillization: strong - of plagioclase sec. K-feldspars: moderate	Total sulfides: ½% Py, MoS_2, ccpy(?)	
2185	2211	90% rec'd	Fault Zone.	Pulverized core. Younger biotite-albite-granite porphyry. Porphyry as above. Minor FeOx on joints.	as above	as above	
2211	2259.7	90%	Younger biotite-albite-granite porphyry	Well altered. Well fractured. Tr FeOx General flooding of silica + pink feldspars	silicification: very strong qtz veining argillization: strong - of plagioclase. sec. K-feldsp: moderate.	Total sulfides: trace py, MoS_2	
2259.7	2270	100%	Fault Zone.	Broken & shattered core. Younger biotite-albite-granite porphyry fragments. Ferruginous silica cement at 2262	as above	as above	
2270	2335	100%	Younger biotite-albite-granite porphyry	Well altered: flooding by quartz veins, sec. K feldspars. Moderate fracturing. Tr FeOx on joints	Silicification: very strong qtz veining argillization: strong - of plagioclase phenos. sericitization: weak sec K-feldspars: moderate	Total sulfides: <1% Py, MoS_2, ccpy (tr)	
2335	2394 2379	95%	do.	as above, but shows evidence of leaching. Moderate FeOx on joints, Leaching cavities from sulphides or ferromagnesians. Note: Shattered core	as above, but with heavier sericitization.	Total sulfides: <1% Py, MoS_2	

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN, ARIZONA

HOLE NO. SM 19 SHEET NO. 8
COORDINATES 18982 N 23010 E
TYPE DRILL _____ BIT SIZE RXWL
DATE STARTED _____

COLLAR ELEVATION 2544
TOTAL FOOTAGE 2909
LOGGED BY RSP
DATE COMPLETED 12-21-64

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2349	2351	100%	Younger biotite-albite granite porphyry.	Moderate fracturing. Well altered. FeO_x stains after ferromagnesians.	silicification: very strong - pervasive flooding + veining chloritization: strong - of altered plagioclase and K-feldspars.	Total sulfides: < ½% py, MoS_2	
2351	2358	100%	do.	Well fractured; minor fault zone. Minor FeO_x on joints. Scattered leach(?) cavities. Well altered.	as above.	Total sulfides: < 1% py, ccpy, MoS_2, cc Cu: tr.	
2358	2406.5	100%	do.	Moderate to locally strong fracturing. Traces of FeO_x on joints. Minor oxidation of py along joints. Well altered.	as above	Total sulfides: < ½% py, MoS_2	
2406.5	2909	66%	Fault Zone.	Core extremely pulverized. Fragments of younger biotite-db albite-granite porphyry			

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 20 SHEET NO. 1
COORDINATES
TYPE DRILL Diamond Core BIT SIZE NXWL
DATE STARTED

Project SHEEP MOUNTAIN, ARIZONA

COLLAR ELEVATION 2513
TOTAL FOOTAGE 2825
LOGGED BY RSP
DATE COMPLETED 3-2-65

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	1630	Rotary Drill	Volcanics	Tuffs, agglomerates, andesites, surface flows			
1630	1661	100%	Kunger porphyry [Qtz-bio-gr porph]	Xenoliths of schist. Well fractured. Well altered: qtz veining, flooding. Strongly oxidized: abundant FeO_x, MnO_x, leached cavities w/ indigenous limonite	oxidized Silicification: strong argillization: moderate-of feldspars Sericite: moderate.	Original sulfides: 2-3% Native Cu, green Cu minerals (?) Cu: tr	
1661	1673	100%	Granite	Well altered: silica flooding. Well fractured. Well oxidized: abundant FeO_x, MnO_x, especially on fractures, leached cavities w/ indigenous limonite Xenoliths of schists.	oxidation Silicification: silica flooding strong sericite: moderate - on fractures	Original sulfides: 2-3% Native Cu, cc Cu: <0.1%	
1673	1697	100%	White-buhite-granite porphyry	Kunger porphyry with xenoliths of schists, Basic dikes at 1685, 1693. Well fractured with fault zone at (1687.9 - 93.7). Well altered: silica flooding. Strongly oxidized: Abundant FeO_x, MnO_x on fractures, leached cavities with indigenous limonite.	oxidation Silicification: strong - flooding argillization: strong - of plagioclase. sericite: moderate - on joints	Original sulfides: 3% Native Cu, cc Cu: <0.1%	
1697	1733.6	95%	Granite (?)	Xenoliths of schists. Small basic dike at 1705 Moderate fracturing, locally brecciated. Strongly altered: strong silica flooding. Moderate to strong oxidation: Abundant FeO_x, MnO_x, leach cavities with indigenous limonite	oxidation silicification: strong - flooding argillization: strong of feldspars sericitization: mod-weak.	Original sulfides: 1-5% local conc. of cc. Native Cu, cc, green Cu minerals. Cu: 0.1%	
1733.6	1747.3	92%	Kbiotite-Bio-granite porphyry (?)	Well altered porphyry: groundmass altered to dk red, no feldgs. Well fractured. Minor oxidation, tr FeO_x, MnO_x. Scattered leached cavities.	silicification: mod-strong qtz veining argillization: strong - of plagioclase.	Original sulfides: <1% Total sulfides: 0.6% cc, py, native Cu % Cu: 0.5%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 20 SHEET NO. 2
COORDINATES
TYPE DRILL Diamond Core BIT SIZE NXIVL
DATE STARTED

Project SHEEP MOUNTAIN, ARIZONA

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY B.S.P
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1747.3	1754.5	100%	Fault Zone	Fragments of younger biotite-albite-granite porphyry. Minor FeO_x, MnO_x on joints. Abundant dendritic native Cu on joints.	Minor oxidation	Total sulfides: 0.1% cc, py, MoS_2(?) Native Cu: 1% Cu: 1.2%	
1754.5	1767.5	54%	Fault Zone	As above. Locally abundant sulphides, but with overall decrease in metallization	As above.	Total sulfides: 0.1% cc, py, green Cu minerals, native Cu Cu: tr	
1767.5	1771	100%	Biotite-albite-granite porphyry	Well fractured. Strong alteration: silicification Weak oxidation: minor FeO_x, MnO_x	silicification: strong silica flooding argillization: moderate - of plagioclase phenocrysts. sericitization: wk-mod.	Total sulfides: 1% cc, py native Cu Cu: 0.5%.	
1771	1782	100%	do.	as above, but more oxidized: scattered leached cavities with indigenous limonite. Inclusions of schist gneisses	as above. strong flooding of sec. K-feldspars.	Original sulfides: 1% Total sulfides: tr Native Cu, py, cc, green Cu stains. Cu: tr	
1782	1790.5	100%	do.	Zone of strong alteration: silica + sec. K feldspar flooding. Well fractured. Moderate oxidation: FeO_x, MnO_x on joints, leached cavities.	silicification: strong qtz veining, silica flooding sec. K-feldspar - strong flooding argillization: strong sericitization: wk-moderate	Original sulfides: <1% Tot sulf: tr Cu: tr	
1790.5	1811	100%	do.	Well altered - silica flooding. Moderate - locally strong oxidation: minor transported FeO_x MnO_x; scattered leached cavities of indigenous FeO_x.	as above, but without sec. K-feldspar.	Original sulfides: 1½% Tot sulf: tr Native Cu, py, cc, green Cu minerals	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN, ARIZONA

HOLE NO. SM 20 SHEET NO. 3
COORDINATES
TYPE DRILL Diamond Core BIT SIZE XX WL
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1811	1820.5	100%	Kunger biotite-albite-gran. porphyry	Well fractured. Well altered: extensive silica veining. Minor oxidation. Locally abundant cc, native copper.	Silicification: strong veining & flooding. argillization: strong - of plagioclase phenos. Sericitization: weak	Total sulfides 1-2% cc, py, native Cu Cu: 1%	
1820.5	1826	100%	do.	Well fractured. Well altered: strong silica flooding. Xenoliths(?) of diorite. Moderately oxidized: FeO_x, MnO_x, indigenous FeO_x boxwork in leached cavities.	as above	Original sulfides: 1-2% Total sulfides: tr py, cc Cu: tr	
1826	1843	30%	Fault Zone	Well pulverized biotite-albite-granite porphyry Minor oxidation GENERAL BASE OF OXIDATION		Total sulfides: <1% (?) Native Cu: tr	
1843	1846	100%	Kunger bio-albite-granite porphyry	Moderate fracturing. Well altered: silica veining, locally, alteration of groundmass. Locally oxidized: leach cavities, FeO_x, MnO_x. Well mineralized: disseminated + veinlets of py, supergene cc Xenoliths(?) of diorite	as above.	Total sulfides: 3-4% cc, py Cu: 2%	
1846	1872	100%	do.	Granite porphyry - metadiorite complex. Moderate - poorly fractured. Generally well altered: silica + secondary K-feldspar flooding. Local oxidation. Abundant sulfides: veinlets, disseminated.	Silicification: strong fine veining, silica flooding argillization: total - of plagioclase secondary K-feldspar: strong flooding Sericitization: moderate chloritization: of feldspars.	Total sulfides: 5% cc, py, cov, MoS_2 native Cu, malachite. Cu: 1.5-2.0%	

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 20 SHEET NO. 4
COORDINATES
TYPE DRILL Diamond Core BIT SIZE NX to SIS BX: 1915 –
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

Project SHOOP MOUNTAIN, ARIZONA

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1592	1928.5	100%	Younger bio-alb-granite porphyry	Porphyry with diorite xenoliths. Moderate fract., locally bx. Generally well altered: silica, sec. k-feldspar flooding, sericitization. Minor oxidation: FeOx films Py, native Cu	Silicification: qtz veining, silica flooding strong argillization: strong: of plagioclase sec. k-feldspar: strong flooding sericitization: moderate	Total sulfides: 4-6% Py, cc, MoS_2, native Cu Cu: 1.5%	
1928.5	1932.5	90%	Fault Zone.	As above, but well broken. Basic dike at 1929.5 Post-mineral	as above	as above.	
1932.5	1947	100%	Younger bio-alb-granite porphyry	As interval (1592 – 1928.5)	as above	Total sulfides: 4% cc, Py, MoS_2 Cu: 2%	
1947	1954.5	80%	da	Generally as above, but with with less sulphides.	as above.	Total sulfides: 1.5% Py, cc, native Cu Cu: 0.9%	
1954.5	1964.2	60%	Fault Zone	Frags of younger porphyry or diorite. Minor oxidation. Post mineral.	as above.	Total sulfides: ~~5%~~ 5% Py, cc, native Cu. Cu: 1.0%	
1964.2	2040	95%	Meta-diorite.	Hornfelsic + gneissic fabric. Moderate fracturing, locally brecciated. Well-altered: horizons of qtz veining	locally strong silica veining. sec. k-feldspar flooding complete argillization of plagioclase.	Total sulfides: 4% Py, cc, MoS_2, azy Cu: 0.2 – 0.7%	
2040	2098	32%	Fault Zone	As above, but highly fragmented	as above	as above.	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 20 SHEET NO. 5
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

Project SHEEP MOUNTAIN

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2078	2079	100%	Meta-diorite.	Poorly fractured, locally bx. Basic dike @ 2057.5 Diorite is med-gr with hornfelsic + gneissic tex. Generally well altered. Minor oxidation.	strong qtz veining destruction of ferro-mags. sec. k-feldspar flooding argillization of plagioclase.	Total sulfides: 2.5% py, ccpy, MoS_2, born, cc(?) Cu: ~~0.4 – 0.5%~~ 0.2 – 0.4	
2079	2091	90%	Fault Zone	Highly fragmented metadiorite. Post mineral	do.	Cu: 0.4 – 0.5%	
2091	2146	100%	Meta-diorite	Moderate to well fractured. Bx zone at (2091 – 98.2) Pre mineral bx at 2105. Well altered. Minor oxidation	strong quartz veining argillization of plagioclase sec. k-feldspar floods qtz veins.	Total sulfides: 3% py, ccpy, MoS_2 Cu: 0.3 – 0.4%	
2146	2151.8	83%	Fault Zone	Highly fragmented metadiorite Post-mineral	as above	as above	
2151.8	2191.5	100%	Meta-diorite	Moderate fracturing, locally bx. Bx (premineral?) with ferruginous silica cement at (2159-60) Well altered.	strong quartz veining argillization of plagioclase chloritization of altered plagioclase	Total sulfides: 4% py, ccpy, MoS_2 Cu: 0.3 – 0.6% ccpy replaces py	
2191.5	2193.5	100%	Fault Zone	Highly fragmented metadiorite. Post-mineral	do.	do.	
2193.5	2200	90%	Meta-diorite	Moderate fracturing, locally brecciated. Well altered	do.	Total sulfides: 2% py, ccpy Cu: 0.4%	
2200	2205.5	100%	Fault Zone	Fragmented metadiorite, fault gouge.			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 20 SHEET NO. 6
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

Project SILVER MOUNTAIN, ARIZONA

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2205.5	2226	60%	Meta-diorite	Contains fragments of basic dikes. Poorly fractured. Strong alteration. 5% core recovery (2205-16)	Strong quartz veining chloritization & argillization of plagioclase	Total sulfides: 4% py, ccpy, MoS_2 Cu: 0.3% Mo: tr	
2226	2254	60%	Meta-diorite	As above but with more copper metallization Locally bx	do.	Total sulfides: 4% py, ccpy, MoS_2 Cu: 0.6-0.8% Mo: tr	
2254	2309	100%	Meta-diorite	Basic dikes at 2297, 2306. Moderate-poor fracturing. FeOx abundant in bx at 2271. Moderate oxidation around same. Well altered.	strongly silicified sec. K-feldspars in qtz veins. argillization & chloritization of plagioclase	Total sulfides: 3% py, ccpy, MoS_2 Cu: 0.4%	
2309	2313	0%	Fault Zone	Fragments of metadiorite			
2313	2334.5	100%	Meta-diorite	Basic dike at [2315.6-16] Moderate fracturing. Well altered. FeOx fault gouge at 2322, 2326.	strong quartz veining argillization & chloritization of plagioclase $CaCO_3$ vein	Total sulfides: 2½% py, ccpy Cu: 0.3%	
2334.5	2345	60%	Fault Zone	Minor oxidation			
2345	2411	100%	Meta-diorite	Poorly fractured. FeOx on joints. Moderate to strong alteration	strong quartz veining weak chloritization of plagioclase.	Total sulfides: 5% py, ccpy, MoS_2, cc Cu: 0.4%	

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 20 SHEET NO. #7
COORDINATES
TYPE DRILL BIT SIZE 5X1¼
DATE STARTED

Project SHEEP MOUNTAIN

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2411	2414.5	100%	Meta-diorite	Contains angular fragments of basic dikes. Poorly fractured. FeOx on joints. Well altered.	intense quartz veining with sec. K-feldspars. argillization & chloritization of plagioclase.	Total sulfides: 5-7% py, ccpy, MoS_2, cc Cu: 0.3%	
2414.5	2467	100%	Meta-diorite.	Generally as above, but contains numerous fragments of basic dikes. Locally bx	do.	do.	
2467	2479	90%	Fault Zone	fragments of above metadiorite			
2479	2492	100%	Meta-diorite	Contains fragments of basic dikes. Poorly fractured. Well altered. Tr. FeOx on joints	strong quartz veining with sec. K-feldspars moderate-weak sericitization. wk chloritization of argillized plagioclase	Total sulfides: 2-3% py, ccpy, MoS_2, cc(?) Cu: 0.2%	
2492	2493.8	100%	Andesite dike	Well fractured. Abundant fe-sulfide vonlets and fissures. Weak alteration.	quartz veining weak chloritization	Total sulfides: 2% py, ccpy, MoS_2 Cu: tr	
2493.8	2502	90%	Fault Zones	Fragmented andesite & metadiorite			
2502	2509.5	100%	Meta-diorite	Contains fragments of basic dike. Moderate fracturing. Well altered.	strong silica veining & bleaching	Locally abundant MoS_2. Total sulfides: 2% py, ccpy, MoS_2	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-20 SHEET NO. 8
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

Project SILVER MOUNTAIN, ARIZONA

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2508.5 casing	2512	100%	Andesite Dike	Well fractured. Similar to aforementioned andesite dike.	Strong quartz veining weak chloritization	Total sulfides: 1% Py	
2512	2527	100%	Meta-diorite	Well fractured. Strong alteration. FeOx on joints.	strong qtz veining + flooding. sec K-feldspar flooding along qtz veins destruction of ferro-mags.	Total sulfides: 4% Py, cpy, MoS_2 Cu: 0.2% MoS_2: tr+	
2527	2632	100%	Meta-diorite	Moderate-poorly fractured Strong alteration. Noticable decline in copper metallization.	intense silica flooding & quartz veining sec-K feldspar flooding destruction or sericitization of most biotite	Total sulfides: 5% Py, MoS_2, cpy. Cu: tr-0.1%	
2632	2660	100%	Meta-diorite	As above, but more siliceous. Porphyry dike (albite-bio-porphyry?) at (2633.8-36). Marked decrease in total sulfide values.	as above, but more intensly silicified.	Total sulfides: 1% Py, cpy, MoS_2 Cu: < 0.1%	
2660	2806.6	100%	Granite.	Poorly fractured. Moderately altered. Transported FeOx on joints.	Silica veining & flooding with sec K-feldspars. chloritization near adjacent andesite.	Total sulfides: 1% Py, cpy, MoS_2 Cu: tr	
2806.6	2828.6	100%	Andesite Dike	Well fractured. Moderate alteration.	quartz veining	Total sulfides: 1-2%	
2828.6	2835	100%	Granite	as above interval but moderate to well fractured.	as above interval	Total sulfides: 1% Py, cpy Cu: tr	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM 21 SHEET NO. 1
COORDINATES 17257 N 25779 E
TYPE DRILL Diamond Core BIT SIZE BXWL
DATE STARTED November 27, 1963 1964

COLLAR ELEVATION 2561
TOTAL FOOTAGE 2192
LOGGED BY RSP
DATE COMPLETED Feb 4, 1965

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1963.5	2006	75%	Biotite-granite gneiss	Med-fine gr pink-grey gneiss. Well fractured, locally bxd (1992.5-98). FeOx, MnOx on joints, oxidation of sulphide veins	very weak qtz veining	Est. of orig sulf: 0.5% Tot. sulf: tr cc(?)	
2006	2025	90%	Biotite-clinzonite gneiss	Medium grained yellow grey gneiss. Poorly fractured, but locally bx. Oxidation of sulphide veins: FeOx in sulphide casts	weak qtz veining weak argillization of plagioclase.	Est. of orig. sulfides: 0.5% Total sulf: tr cc Cu: tr	
2025	2044	90%	Gneiss	Gneiss of monzonitic to granodioritic composition Moderate fracturing. Minor oxidation of sulfide veins. weakly altered. 10% core recovery @(2035-44) could be Fo gouge.	minor qtz veining argillization of plagioclase.	Est of orig sulfides: 0.5% Total sulfides: tr py, cc(?). Cu: tr	
2044	2052	95%	Granite	Coe-gr pink granite w/ biotite schist. Poorly fractured. Minor oxidation. Moderate alteration	moderate silica flooding chloritization of biotite argillization of feldspar	Original sulfides: <1% Total sulfides: 0.5% Py.	
2052	2071.6	95%	do.	as above, but locally brecciated, well oxidized	strong silica flooding moderate argillization of plagioclase.	Original sulfides: 1.5%	
2071.6	2079.2	90%	Garnet-qtz-diorite gneiss	Moderate fracturing. Sulfides in qtz bands.	qtz veining; moderate strong argillization of plagioclase.	Original sulfides: tr	
2079.2	2085.5	95%	Gneiss	FAULT ZONE			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 21 SHEET NO. 2
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

Project SIERRA MOUNTAIN

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2085.5	2126	95%	Granite + diorite complex	Alternating bands of diorite + granite. Well fractured. Most orig. sulfides in granitic rx.; moderate to well oxidized: FeOx in sulfide casts. Well altered.	Silicification: strong argillization of plagioclase weak flooding by sec. K-feldspars.	Total sulfides: tr Py, cc Cu: tr Original sulfides: 1% (in granite)	
2126	2135	90%	Gneiss	FAULT ZONE			
2135	2155.5	90%	Quartz-diorite gneiss	Well fractured, locally brecciated. Oxidation of qtz-sulfide veins, but NOT pyrite veins in gneiss. Moderate alteration.	Moderate quartz veining argillization of plagioclase sec. K-feldsp flooding.	Total sulfides: 0.5% Py Original sulfides: 1%	
2155.5	2159	95%	Gneiss + Granite	FAULT ZONE			
2159	2192	95%	Granite.	Contains lenses of schist. Well fractured. Moderate oxidation: FeOx + MnOx on joints, FeOx in sulfide casts. Moderate alteration.	moderate to weak quartz veining. mod. argillization of feldspars.	Original sulfides: <1% Total sulfides: tr Py, cc, green Cu minerals Cu: tr	
				END OF HOLE			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM 22 SHEET NO. 1
COORDINATES
TYPE DRILL Mayhew 4F BIT SIZE RXWL
DATE STARTED 11-28-64

COLLAR ELEVATION 3034
TOTAL FOOTAGE 2820
LOGGED BY RSP
DATE COMPLETED 1-23-65

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	2296.5	Rotary Drill	Tertiary volcanics	Andesites, tuffs, conglomerates, agglomerates, surface flows.			
2296.5	2332.5	90%	Diorite	Well fractured - a fault zone. Extreme alteration Oxidized: FeOx on joints	Strong quartz veining and sec K feldspar flooding. argillization of plagioclase.	Original sulfides: tr	
2332.5	2336	100%	Bottle-albite-granite porphyry	Well fractured. Alteration of feldspar phenocrysts	argillization of feldspars. silica flooding	Total sulfides: tr PY	
2336	2415	75%	Diorite	Well fractured. Extreme alteration. Well oxidized: sulfide casts, FeOx.	strong quartz veining and silica flooding destruction of ferromags argillization of plagioclase.	Original sulfides: tr Total sulfides: tr PY, MoS_2, green Cu.	
2415	2417	100%	Bottle-albite-granite porphyry.	as above interval of same.			
2417	2480	95%	Diorite	as above interval of same. Contains a basic dike (2414-79)			
2480	2486	100%	Fault Zone.	Post-mineral. ~~Contains a basic dike~~			
2486	2510	100%	Bottle-albite-granite porphyry	Well fractured. FeOx on joints Well altered	quartz veining - strong sec. K-feldspar flooding sericitization chloritization argillization of plagioclase.	Total sulfides: 4% PY	
2510	2564	30%	Fault				

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SWEEP MOUNTAIN, ARIZONA

HOLE NO. SM 22 SHEET NO. 2
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2524	2534	95%	biotite-albite-granite porphyry	Well fractured and locally brecciated. Oxidation: FeOx on joints and around pyrite. Well altered.	strong quartz veining and sec K-feldspar flooding argillization of plagioclase albitization & sericitization	Total sulfides: tr Py, MoS_2	
2534	2538	90	Fault Zone	Fragmented "younger" granite porphyry			
2538	2583	100	biotite-albite-granite porphyry	As Above interval of same			
2583	2588	100%	Granite (?)	Well fractured. Strong alteration	Silica and feldspar flooding chloritization	Total sulfides: tr Py	
2588	2605	85%	Fault zone	Well fragmented "younger" granite porphyry			
2605	2618	80%		Well fragmented basic dike (diorite?) with quartz veining.		copy Cu: tr	
2618	2769	100%	biotite-albite-granite porphyry	moderate - strongly fractured. Strongly altered.	argillization of plagioclase sec K-feldspar flooding quartz veining locally chloritized.	Total sulfides: tr Py, cc, MoS_2	
2769	2770	50%	Andesite	Well fractured	quartz veining		
2770	2820	100%	biotite-albite-	as above interval of same			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM-24 SHEET NO. 1
COORDINATES 23025N 23309E
TYPE DRILL ____ BIT SIZE BXWL
DATE STARTED 1-21-65

COLLAR ELEVATION 2616
TOTAL FOOTAGE 2606
LOGGED BY RSP
DATE COMPLETED 5-12-65

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	2134	Rotary		Tuffs, andesitic lavas, agglomerates, conglomerates.			
2134	2159	100%	Biotite-garnet-gneiss	Contains granite dikes. Moderately fractured. Moderately fractured altered.	Chloritization of biotite & plagioclase. sec. biotite (?)	Total sulfides: 1% Py. ccpy. Cu: 0.1%	
2159	2164	100%	Granite & pegmatite.	Moderately fractured. Weakly altered.	quartz veins.	Total sulfides: tr Py.	
2164	2173	100%	Garnet-biotite-gneiss	Moderately fractured. Moderately altered.	quartz veining Chloritization of ferro-mags and garnet.	Total sulfides: 1% Py.	
2173	2177.5	100%	Granite	Moderately fractured, weakly altered	quartz veining	Total sulfides: 4% Py	
2177.5	2194	100%	Rhyolite Porphyry	Grey fine-grained porphyry. Well fractured with bx at top. Moderately altered.	quartz veins.	Total sulfides: 5% Py, ccpy Cu: 0.1%	
2194	2224	100%	Garnet-biotite-gneiss	Contains small granite dikes. Moderately fractured, Well altered.	Chloritization of ferro-mags. quartz veining	Total sulfides: 3-5% Py, copy, bornite, MoS_2 Cu: tr-0.1%	
2224	2235	90%	Fault Zone				

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM 24 SHEET NO. 2
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2235	2242	100%	Gneiss & Granite	Well-moderately fractured. Well altered.	quartz veining Chloritization of ferromags	Total sulfides: 1% py, ccpy, MoS_2 Cu: tr	
2242	2313.7	100%	Andesite Dike	Poorly fractured, weakly altered.	quartz & veins.	Total sulfides: 5-10% py.	
2313.7	2353	100%	Garnet-biotite-gneiss	Well to moderately fractured. Weakly altered.	quartz veins	Total sulfides: 1% py.	
2353	2389	100%	Granite	Contains pegmatites, garnet gneiss. Moderately fractured, locally brecciated. Well altered.	quartz veining Sec. K-feldspar flooding Chloritization.	Total sulfides: 1% py, ccpy Cu: tr-0.3%	
2389	2373	100%	Garnet-biotite-gneiss	With granite dikes. Poorly fractured, locally bx, Moderately altered.	Chloritization of ferro-mags. quartz veining	Total sulfides: 1% py, ccpy. Cu: tr-0.3%	
2373	2405	100%	Diabase	Well to poorly fractured, local breccia with silicified gauge. Well altered.	quartz veining Calcite veining Chloritization of ferromags	Total sulfides: 5% py, ccpy, MoS_2 Cu: tr-0.2%	
2405	2417	70%	Fault Zone.	Fragmented & gouge material		Cu: tr	
2417	2422	100%	Garnet-biotite-gneiss.	Well fractured. Moderate to strong alteration	quartz veining	Total sulfides: tr py.	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-3 SHEET NO. 3

COORDINATES

TYPE DRILL DIT SIZE BXWL to 2453
AXWL from 2453-2606

DATE STARTED

Project SHEEP MOUNTAIN

COLLAR ELEVATION

TOTAL FOOTAGE

LOGGED BY RSP

DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2422	2426	90%	Andesite Dike	Well fractured, locally bx. Moderately altered.	quartz veins calcite veins	Total sulfides: 1% Py	
2426	2435	100%	Garnet-biotite-gneiss	similar to previous intervals of same		Cu: 0.2%	
2435	2449	90%	Andesite Dike	in a fault zone. Also with diabasic fragments. Well altered.	quartz veins calcite veins chloritization	Total sulfides: 2% Py, ccpy, bornite Cu: 0.1-0.3%	
2449	2454	100%	Dabase	Poorly fractured, well altered.	quartz veins calcite veins chloritization	Total sulfides: tr py, ccpy Cu: 0.1%	
2454	2506	30%	Fault Zone	Diabasic fragments and gouge.	da	Cu: 0.1-0.2%	
2506	2568	30-50%		Diabasic and granitic fragments.		Cu: tr	
2568	2606	90%	Granite	With pegmatites, gneiss. Well to moderately fractured. Poorly altered.	quartz veins	Total sulfides: tr py, ccpy	
				End of the hole.			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM-26 SHEET NO. 1
COORDINATES
TYPE DRILL BIT SIZE 3 3/8"
DATE STARTED 25-Feb 1965

COLLAR ELEVATION 6113
TOTAL FOOTAGE 2493
LOGGED BY RSP
DATE COMPLETED 9-April, 1965

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	2170	Rotary Drilled		Conglomerates, tuffs, agglomerates, basalt, andesite flows.			
2170	2212	100%	Granite.	Top of pC at 2160. No core from (2188-98) Moderately fractured. Well oxidized. FeO_x and MnO_x on joints, in sulfide casts, pitting of feldspars. Well altered.	quartz veining destruction of ferro-mags argillization of feldspars.	Original sulfides: 2-3% Total sulfides: <1% cc Cu: tr	
2212	2221	100%		Well fractured. Minor oxidation. Moderately altered.	quartz veins, silica flooding	Total sulfides: 0.5% Py, cov, bornite. Cu: tr	
2221	2273	100%		as above, but with pegmatites. Well altered. Locally oxidized.	quartz veins sec. K-feldspar flooding argillization of primary feldspars. sericitization	Total sulfides: <1% Py, copy, MoS_2, green Cu	
2273	2314.5	100%	Granite (?) Porphyry	feldspar phenocrysts in a blue-grey groundmass. some ferromag phenocrysts Moderate to poor fracturing. Well altered.	abundant quartz veining zones of silica flooding chloritization sec. K-feldspar flooding	Total sulfides: 5% py, copy, cc Cu: tr	
2314.5	2457	100%	Granite	Poorly fractured. Well altered.	Silica flooding argillization of feldspar destruction of biotite chloritization of feldspar	Total sulfides: 5% Py, copy, MoS_2, cc, cov. Cu: tr.	
2457	2462	100%	Andesite Dike	Well fractured. Moderately altered.	Quartz veining Chloritization	Total sulfides: 0.5-1% Py	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SWEET MOUNTAIN

HOLE NO. SM-26 SHEET NO. 2
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2162	2491	100%	Granite	Well to moderately fractured. Well altered. Oxidized at base: FeOx stains.	quartz veining Sec K-feldspar flooding	Total sulfides: 1% Py, CCPy, MoS_2	
2491	2493	100%	Andesite Dike.	Well fractured. Moderate alteration.	quartz veining	Total sulfides: 3% Py	
				END OF THE HOLE.			

5-11-65

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN, ARIZONA

HOLE NO. SM-27 SHEET NO. 1
COORDINATES 20,000N 5,000E 5 of 135E
TYPE DRILL _____ BIT SIZE 7 7/8 IN
DATE STARTED March 15, 1965

COLLAR ELEVATION 2538 2521
TOTAL FOOTAGE 2277 ft
LOGGED BY RSP
DATE COMPLETED April 30, 1965

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	1350	Rotary Drilling		Post-mineral tuffs, agglomerates and basic volcanics.			
1350	1498	100%	Granite Porphyry	Younger albite-biotite granite porphyry. Moderately fractured. Well oxidized: FeOx & MnOx on joints and in leached cavities, pitted plagioclase. Well altered.	argillization of plagioclase quartz veining secondary K-feldspar flooding.	Original sulfides: <1%	
1498	1506	100%	Breccia	Breccia of younger granite porphyry. Oxidized. Calcareous FeOx cement.	moderate to weak quartz veining	native copper Cu: tr	
1506	1562	100%	Granite porphyry	Moderately fractured. Well oxidized: FeOx on joints, in sulfide casts. Well altered. Base of widespread oxidation	argillization of plagioclase quartz veins calcite veins sericite	Original sulfides: 1-2% Total sulfides: tr cc, native Cu Cu: tr	
1562	1727	100%		Moderately fractured. Oxidation mostly local. Appearance of native copper-sulfide assemblage. Native Cu often rims sulfides.	argillization of plagioclase quartz veining sec. K-feldspar flooding sericite.	Original sulfides: 1% Total sulfides: 1/2% cc, Py native Cu Cu: 01-0.3%	
1727	1758	100%		Well fractured. Locally oxidized. Predominantly sulfide assemblage. Well altered	argillization of plagioclase quartz veining sec. K-feldspar flooding	Original sulfides <1% Total sulfides: 1/2% cc, Py Cu: 0.1-0.3%	
1758	1757	100%	Breccia	Brecciated Younger granite porphyry.			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain, Ariz.

HOLE NO. SM 37 SHEET NO. 2
COORDINATES
TYPE DRILL BIT SIZE BX w/L
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1759	1783	100%	Granite Porphyry	as above interval of same.	as above	as above.	
1783	1796	100%		Well fractured. Well oxidized: FeOx on joints and sulfide casts. Well altered.	quartz flooding sec K-feldspars.	Original sulfides: <1% native Cu: tr	
1796	1820	100%		Well fractured. Moderately to strongly oxidized. Well altered.	quartz flooding sec K-feldspars argillization of plagioclase.	Original sulfides: 1-2% Total sulfides: ½% py, cc Cu: tr	
1820	1887	100%		Well fractured. Locally strong oxidation. Well altered. FeOx on joints.	flooding by quartz veins and sec. K-feldspars. argillization of plagioclase.	Original sulfides: tr-2% Total sulfides: tr. cc, py Cu: tr	
1887	1894	90%	Fault Zone.				
1894	1914	100%	Granite Porphyry.	Well fractured. FeOx on joints. Well altered.	argillization of plagioclase quartz veins Secondary K-feldspar flooding	Total sulfides: trace py, MoS_2	
1914	1928	90%	Fault Zone.				
1928	2014	100%	Granite Porphyry.	Well to moderately fractured. Locally oxidized. Breccia at 2014.5-2045. Well altered	argillization of plagioclase quartz veining Sec K-feldspar flooding.	Total sulfides: <1% py, cc, MoS_2, native Cu. Cu: tr 1970-1980	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM 27 SHEET NO. 3
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2074	2097	90%	Fault Zone	fragmented granite-porphyry			
2097	2103	100%	Granite Porphyry	as above interval of same.	as above interval of same.	as above interval of same	
2103	2114	90%	Fault Zone.	fragmented granite-porphyry. Andesite dike as (2105-08).			
2114	2277	100%	Granite Porphyry	Well to moderately fractured. Weakly oxidized. Well altered.	argillization & chloritization of plagioclase. quartz veins Sec. K-feldspar flooding		
				END OF THE HOLE			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

CLE NO. SM-28 SHEET NO. 1
COORDINATES N 19,993 W 19,976 N 20,000 E 25,000 E
PE DRILL Joy BIT SIZE BXNL
TE STARTED 3-19-65

COLLAR ELEVATION 2131 + 2170
TOTAL FOOTAGE 2145 2145
LOGGED BY RSP
DATE COMPLETED 4-20-65

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	1319	Rotary Drilled.		Tuffs, agglomerates, conglomerates, basalt, andesites			
319	1364.5	100%	Granite & Gneiss	Basic dike at [1328-30] Well fractured. Well oxidized and leached: FeO_x and H_2O_x on joints and in sulfide casts, cellular limonite. Well altered.	quartz veining argillization of feldspar destruction of ferro-mags.	Original sulfides: 2-3% blue & green Cu stains tr py, cc Cu: tr	
364.5	1369	90%	Fault Zone.	Well fragmented oxidized granite			
369	1403	100%	Gneiss	Contains dikes of granite-pegmatite. Moderately fractured. Well oxidized: FeO_x on joints, in sulfide casts. Moderately altered.	quartz veining argillization of feldspars.	Original sulfides: <1%	
403	1438	90%	Fault Zone.	Fragmented granite and pegmatite. Well oxidized.		Original sulfides: 1%	
438	1477	100%	Granite	Well to moderately fractured. Contains pegmatitic intervals. Well oxidized: FeO_x on joints, in sulfide casts. Moderately altered.	quartz veining	Original sulfides: 2% Tr cc (locally abundant) Cu: tr	
477	1496	100%	Granite	As above, but locally well fragmented.	quartz veining	Original sulfides: 1% Tr cc Cu: <0.1%	
96	1491	100%	Andesite	Well fractured, locally brecciated.	chloritization	Native copper on joints, in veins	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SG-38 SHEET NO. 2
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

Project SLEEP MOUNTAIN

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1491	1517	100%	Granite & gneiss	Well fractured. Moderately oxidized. Moderately altered.	quartz veining. Sec. K-feldspar flooding along quartz veins. argillization of feldspars of gneiss.	Original sulfides: 2%. Total sulfides: 1%. cc, py, native Cu. Cu: 0.4-0.6%	
1517	1519	100%	Andesite Dike	Well fractured. Moderate-weak alteration.	chloritization	nil	
1519	1523	90%	Fault Zone.	Base of oxidation		cc, native Cu. Cu: 0.3%	
1523	1595	100%	Granite.	Well to moderately fractured. Well altered.	quartz veining. Sec. K feldspars flooding along quartz veins. argillization of primary feldspars. destruction of ferromags.	Total sulfides: 1%. py, cc. Cu: 0.09-0.2%	
1595	1677	100%		Contains pegmatitic intervals. Moderately fractured. Well altered, more siliceous than above interval. Base of oxidation.	quartz veining, flooding. Sec. K-feldspars. argillization of primary feldspars. dest. of ferro-mags.	Total sulfides: 4%. py, cc, ccpy, MoS_2, born. Cu: tr-0.5%	
1677	1680	90%	Fault Zone.				
1680	1735	100%	Granite, pegmatite	Moderately fractured. Well altered.	quartz veining. Sec. K-feldspars	Total sulfides: 1%. py, MoS_2	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 28 SHEET NO. 3
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

Project Sierra Mountain

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1735	1745	90%	Fault zone				
1745	1802	100%	Granite	Contains pegmatites and dioritic phases. Moderately fractured. Well altered. FeOx on joint surfaces.	quartz veining & flooding sec. K-feldspars. Chloritization & argillization of dioritic phases.	Total sulfides: 1% Py, MoS_2	
1802	1810	80%	Fault Zone.				
1810	1840	100%	Granite	as above interval of same.	as above	Total sulfides: 1.5% Py, MoS_2	
1840	1854	90%	Fault Zone	with ferruginous clay gouge.			
1854	1876	100%	Tourmaline-mica-pegmatite	moderately fractured. Weakly altered	argillization of feldspars.	Total sulfides: tr Py	
1876	1965	100%	Granite	Contains pegmatitic intervals. Well to poorly fractured. Small breccia with FeO_x cement. Well altered. FeO_x on jointing	Quartz veining & flooding Weakly chloritized.	Total sulfides: 1% Py, MoS_2	
1965	1987	100%	↓	as above, but contains more molybdenite. Interval with "blue-cast"	as above, but has sec. K-feldspar flooding.	Total sulfides: 1% Py, MoS_2, bornite Cu_3FeS_4	
1987	1989	90%	Fault Zone.				

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG.

Project SHEEP MOUNTAIN, ARIZONA

HOLE NO. SM-23 SHEET NO. 4
COORDINATES
TYPE DRILL DIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1963	2002	100%	Granite Gneiss.	Moderately fractured, locally brecciated. Moderately altered.	quartz veining Chloritization calcite veining	Total sulfides: 1% Py, cepy, MoS_2 Cu: tr	
2002	2010	90%	Fault Zone.				
2010	2049	100%	Gneiss	Contains granite & pegmatite dikes. Moderately fractured, locally brecciated. FeOx on joints, tr oxidation. Moderately altered.	quartz veining	Total sulfides: 1% Py.	
2049	2052	90%	Fault Zone.				
2052	2105	100%	Granite.	Contains pegmatites. Moderate to poorly fractured. Moderate to weakly altered.	quartz veining wk sericitization.	Total sulfides: 1% Py, MoS_2	
2105	2132.5	100%	Granite Gneiss.	Moderately fractured. Moderately altered.	quartz veining	Total sulfides: 1% Py, MoS_2	
2132.5	2132	100%	Epidote - chlorite schist.	Contains granite dikes. Moderately fractured. Moderately - well altered.	quartz veining secondary biotite. chlorite (?)	Total sulfides: 2% Py, bornite Cu: tr	
2132	2145	100%	Granite & Gneiss	Moderately fractured. Moderately to weakly altered. End of the hole.	quartz veins.	Total sulfides: <1% Py.	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM 32 SHEET NO. 1
COORDINATES 2295 N 2549 E
TYPE DRILL _____ BIT SIZE RXWL
DATE STARTED _____

COLLAR ELEVATION 2496
TOTAL FOOTAGE 2729
LOGGED BY RSP
DATE COMPLETED June 8, 1965

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	1704	Rotary Drilling	Vole.	andesites, rhyolitic tuffs, agglomerates, conglomerates.			
1704	1739	100% except 3% (core mix)	Granite + younger granite porphyry(?)	Well fractured, locally faulted. Almost complete oxidation (90%): sulfide casts, abundant FeOx, MnOx, maroon & brick-red limonite. Well altered: quartz veining, argillization of primary feldspars, sec. K-feldspars, sericite	quartz veining sec. K-feldspars sericite argillization of feldspars. oxidation of ferromags.	Original sulfides: 5% Total sulfides: native Cu, cc, py Cu: tr-0.3%	
1739	1768	90%	Fault Zone.	fragments of granite, granite-porphyry, and a ferruginous breccia. Complete oxidation	as above	Original sulfides: 1%	
1768	1797.5	100%	Granite-diorite complex.	Well fractured, local FeOx gouge. Completely oxidized: yellow, brown, red FeOx, indigenous limonite, sulfide casts, MnOx. Well altered.	quartz veins destruction of ferromags sericite sec. K-feldspars argillization of primary felsp.	Original sulfides: 5%	
1797.5	1810.2	100%	Younger granite porphyry	Well-moderately fractured, with fault at upper contact. Almost complete (90%) oxidation: FeOx, sulfide casts. Moderately altered.	quartz veins sericite argillization of feldspar phenocrysts.	Original sulfides <1% Total sulfides: tr cc Cu: tr	
1810.2	1931	100%	Biotite Gneiss.	Diorite?. Moderately to well fractured. Completely oxidized. Moderately altered. Sulfides in qtz vein.	argillization of feldspars quartz veins	Original sulfides <1% Cu: 0.1%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 32 SHEET NO. 2

COORDINATES

TYPE DRILL BIT SIZE

DATE STARTED

Project SM

COLLAR ELEVATION

TOTAL FOOTAGE

LOGGED BY

DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1831	1859.5	100%	Diorite-granite complex	Moderately fractured. Ferruginous breccia at (1832-34) Almost complete oxidation (90%): Varicolored FeO_x, MnO_x, sulfide casts Well altered.	quartz veining. sec K-feldspars in granite argillization of diorite sericite local destruction of ferromag.	Original sulfides: 2-3% Total sulfides: tr cc, native Cu Cu: tr	
1859.5	1965[2]	60%	Fault Zone.	fragments of diorite & granite.		Cu: <0.1%	
1965[2]	1955	100%	Diorite-granite complex	Well-moderately fractured. Completely (95%) oxidized: sulfide casts, abundant FeO_x, MnO_x FeO_x = brown, yellow, maroon, brick-red. Well altered.	quartz veins sec K-feldspars sericite destruction of ferromags argillization of diorite.	Original sulfides: tr-5% Total sulfides: tr cc, ~~native Cu~~. Cu: <0.1%	
1955	1962	100%	Diorite-granite complex	Well fractured. As above interval, but with native Cu, ferromags.	as above but no dest. of ferromags.	Original sulfides: 1% Total sulfides: tr Cu: 0.3%	
1962	1972	100%	Granite(?) Porphyry	Could be a rhyolite porphyry. Moderately to well fractured. Completely oxidized. Native Cu in clots, veins. Moderately altered.	argillization of feldspar phenocrysts. sericite. quartz veins - weak.	Original sulfides: 3% native copper Cu: 0.5%	
1972	1995	100%	Diorite	Well fractured. Almost total oxidation of sulfides. Well altered.	argillization of feldspars & destruction of ferromags quartz veins sericite	Original sulfides: 1-3% Cu: 0.1-0.5% native Cu, cc.	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SM

HOLE NO. SM 32 SHEET NO. 2 of 3
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
1995	2028	100%	Diorite	Well fractured - Moderately (50% or less) oxidized. Mixed supergene - oxide minerals. Well altered. BASE OF OXIDATION @ 2009	quartz veins. sericite local destruction of ferromags. argillization of feldspars.	Original sulfides: 5% Total sulfides: 2-3% cc, py, cc >>> py Cu: 1-2%	
2028	2044	100%	Granite-diorite complex.	Well - moderately fractured. Well altered.	quartz veins sec k-feldspars argillization of diorite unit	Total sulfides: 5% py, cc, MoS_2 py > cc Cu: 0.3-0.4%	
2044	2067.5	60%	Fault Zone.	Andesite at (2046-47) and fragments of granite & diorite.		cc, py Cu: 0.5-0.8%	
2067.5	2073	100%	Granite	Well fractured Well altered.	quartz veins sec - k feldspars sericite.	Total sulfides: 2% py, cc, bornite, cupy, MoS_2 Cu: 0.3% Cu minerals = 1%	
2073	2083	100%	Diorite	Well fractured, well altered.	argillization of feldspars destruction of ferromags. quartz veins.	Total sulfides: 1½% py, cupy, bornite, MoS_2 Cu: 0.4% py > Cu minerals.	
2083	2090	80%	Fault Zone.	Andesite at (2083-85) with diorite & granite fragments		Cu: 0.5%	
2090	2112	100%	Diorite	Well fractured. Moderately altered. FeOx on joints	quartz veins argillization of feldspars	Total sulfides: 1% py, cupy, MoS_2	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SM

HOLE NO. SM 32 SHEET NO. 4
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RST.
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2112	2119.5	90%	Andesite	Well fractured. Fault at upper contact Wet Weakly altered.	quartz veins.	Total sulfides: 1-2% Py.	
2119.5	2155	100%	Diorite-granite complex	Moderately fractured. Moderate to strong alteration. FeOx on joints	quartz veins argillization of feldspars Sec K-feldspars local destruction of ferromags.	Total sulfides: 1% Py, ccpy, MoS_2 Cu: 0.2% Cu minerals < 1%	
2155	2157.3	100%	Granite porphyry	Moderately fractured. Wak to moderate alteration. Rock has bleached appearence.	quartz veins chlorite.	Total sulfides <1% Py, ccpy Cu: 0.2%	
2157.3	2217	100%	Diorite	Poorly fractured. Weakly altered. Sulfides are in veinlets, replace ferromags, as disseminated blebs.	chlorite argillization of feldspars.	Total sulfides: 1-2% Py, ccpy, MoS_2 Cu: 0.2-0.3% ccpy: <1%	
2217	2258	100%	Diorite-granite complex	Moderately fractured, Moderately altered. Most sulfides are in diorite intervals.	quartz veins Sec K-feldspars argillization of feldspars chloritization of ferromags.	Total sulfides: 1-2% Py, ccpy, MoS_2 Cu: tr-<1% Cu minerals <1%	
2258	2263	90%	Andesite	Well fractured: a fault zone. Weakly altered.	quartz veins	Total sulfides: 1% Py.	
2263	2471	100%	Granite-diorite complex	Moderate to poorly fractured. Moderately to weakly altered. Copper sulfides mainly in dioritic intervals	quartz veins Sec K-feldspars chloritization local destruction of	Total sulfides: 1% Py, ccpy, MoS_2 Cu: 0.1% Cu minerals: <1%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 32 SHEET NO. 5
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

Project SM

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2471	2480	90%	Fault Zone	fragmented granite-diorite complex			
2480	2514.5	100%	Diorite granite complex	Well to moderately fractured. FeOx on joints, but otherwise, as previous intervals of same		Total sulfides: 1% Py, ccpy, MoS_2 Cu: tr	
2514.5	2525	90%	Fault Zone	fragments of granite-diorite complex			
2525	2612	100%	Diorite-granite complex	Moderate to poorly fractured. Moderately to well altered.	quartz veins Sec. K-feldspars destruction of ferro-mags local argillization of feldspars.	Total sulfides 1½% Py, MoS_2, ccpy Cu: tr.	
2612	2627	100%	Andesite & diabase.	Basic dike with andesite borders, diabasic core. Poorly fractured. Moderately altered:	quartz veins Calcite veins	Total sulfides: 1-2% Py, ccpy Cu: tr Cu minerals: tr	
2627	2659	90%	Fault Zone.	fragments of granite-diorite complex. Basic dike at (2640-58) FeOx on joints	chloritization of basic dike (weak)	Total sulfides: <1% py, ccpy, MoS_2 Cu: tr	
2659	2671.8	100%	Granite diorite complex	as above intervals	as above intervals	Cu: tr	
2671.8	2677	90%	Fault Zone	Andesite with fragments of granite	weak chloritization of andesite.	Cu: tr	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SH 32 SHEET NO. 6
COORDINATES
TYPE DRILL BIT SIZE EXIUL
DATE STARTED

Project SM

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2677	2695	90%	Granite diorite complex	Weakly faulted, otherwise, as previous intervals	as above	Cu: tr	
2695	2699	90%	Fault Zone.	Andesite fragments.		Cu: tr	
2699	2705	100%	Andesite	Poorly fractured weakly altred	quartz veins calcite veins	Total sulfides: 2-3% Py, MoS_2, ccpy Cu: tr	
2705	2710	90%	Fault Zone.	fragments of above andesite.		Cu: tr	
2710	2729	100%	Granite.	Fine-gr leucogranite. Poorly fractured. Weakly altered.	quartz veins Sec K-feldspars	Total sulfides: <1% Py, MoS_2, ccpy. Cu: tr	
				* End of the hole *			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM 37 SHEET NO. 1
COORDINATES
TYPE DRILL DIT SIZE BX Wire
DATE STARTED May 26 1965

COLLAR ELEVATION 2437
TOTAL FOOTAGE 2998
LOGGED BY RSP
DATE COMPLETED July 12, 1965

% Cu taken from assays

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	1995	Rotary	Volcanics	Post mineral andesites, agglomerates, tuffs, conglomerates.			
1995	2008[3]	90%	Andesite & Diabase.	Well fractured. Moderately altered. Fresh sulfides	Calcite veins quartz veins with black halos.	Total sulfides: 1% Py, copy, MoS_2 Cu: 0.25%	
2008[3]	2015[5]	100%	Granite	Contains pegmatites. Well fractured. Local calcareous breccia. Moderately to well altered.	quartz veining sec k-feldspars.	Total sulfides: <1% Py, copy, MoS_2 Cu: 0.1% Cu minerals: 0.3%	
2015[5]	2018	90%	Fault Zone.	Fragments of granite		Cu: 0.1%	
2108	2082[5]	100%	Granite.	A fine-gr leucogranite. Moderately fractured. Breccias have CO_3 cement. Moderately to weakly altered.	quartz veins sec k-feldspar veins Chlorite	Total sulfides: <1% Py, MoS_2, copy Cu: tr - 0.2% Cu minerals: tr - ½%	
2082[5]	2090	100%[1]	Breccia	Moderately fractured. Post-mineral breccia of angular fragments of granite & andesite in a grey aphanitic calcareous cement.	zone of breccia	Total sulfides: 2-3% Py, copy Cu: 0.2% copy: ½%	
2090	2117	90%	Andesite	A fault zone: fragments, gouge. Well altered.	Calcite veins quartz veins (wk) with hab Chloritization	Total sulfides: 3-4% Py, copy Cu: 0.2% Cu minerals: ½%	
2117	2125	100%	Breccia	Moderately fractured. Angular fragments of andesite in grey calcareous matrix	none	Total sulfides: up to 1% Py, copy Cu: ± 0.1%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SM

HOLE NO. SM 37 SHEET NO. 2
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2126	2136	100%	Andesite	Moderately to poorly fractured. Well altered.	Very abundant calcite veins & clots. quartz veins	Total sulfides: 5% Py, copy, bornite Cu: 0.7% Cu minerals = 2%	
2136	2226	100%	Diabase.	Poorly fractured. Moderately to well altered. Fault zone at (2149-55). Locally abundant copy.	Chloritic groundmass calcite veins quartz veins	Total sulfides: 5-6% Py, copy, MoS_2, bornite Cu: 0.2-0.6% Cu minerals: ½-2%	
2226	2236	90%	Fault Zone	Well fractured & gouge diabase.		Cu: 0.3%	
2236	2302.5	100%	Diabase	As above, but well fractured at base.	as above	Total sulfides: 2-3% Py, copy Cu: 0.2-0.3% Cu minerals: 0.5-1%	
2302.5	2315.5	100%	Granite	Well fractured, moderately altered. Most metallization within 6 ft typ contact.	quartz veining sec K-feldspars chlorite (hvy at top)	Total sulfides: 1.5% Py, copy, MoS_2 Cu: 0.2-0.3% Cu minerals: 1% or less	
2315.5	2318	100%	Andesite porphyry.	Well fractured. Weakly altered.	quartz veins	Total sulfides: 1% Py, copy Cu: 0.1%	
2318	2361.3	100%	Granite	Well to moderately fractured. Moderate to weak alteration	quartz veins sec K-feldspars chlorite.	Total sulfides: 4% Py, copy, MoS_2 Cu: tr-0.1% Cu minerals: ~½%	
2361.3	2381	100%	Andesite	Well fractured. Weakly altered.	quartz veins calcite veins	Total sulfides: ½-1% Py copy bornite?	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 37 SHEET NO. 3
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

Project SM

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2364	2375	90%	Fault Zone	Well fractured, gougy granite fragments		ccpy Cu: 0.1%	
2375	2395±	100%	Granite.	Well-moderately fractured. Moderately to weakly altered.	quartz veins See K-feldspars local chlorite	Total sulfides: 0.5%. py, ccpy, MoS_2 Cu: tr-0.1% Cu minerals < ½%	
2395±	2407	95%	Andesite	Well fractured. Weakly altered.	quartz veins calcite veins	Total sulfides 1% py, ccpy Cu: tr	
2407	2424	80%	Fault Zone.	Fragments of above andesite.	do	py, ccpy Cu: tr-0.2%	
2424	2431	95%	Andesite Porphyry.	POST MINERAL DIKE. Poorly fractured, weakly altered (deuteric?)	calcite veins chlorite	NONE	
2431	2445±	20%	Fault Zone	as above fault zone		py, ccpy Cu: 0.2%	
2445±	2491	100%	Diabase.	Moderately to poorly fractured. Well altered Traces Felx (transported)	Chloritization of ferromags Calcite veins See K-feldspars quartz veins	Total sulfides: 2-3% py, ccpy, bornite(?) Cu: 0.3% Cu minerals: tr-1%	
2491	2491	100%	Fault Zone.	Fragments of granite, and minor amounts of andesite. Well mineralized contact granitic rock is well altered.	chlorite argillization	Total sulfides 2-3% py, ccpy, MoS_2 Cu: 0.2-0.3% Cu minerals ~ ½%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 37 SHEET NO. 4
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

Project SM

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2491	2500 6	100%	Granite	Moderately fractured. Weakly altered.	quartz veins sec K-feldspars	Total sulfides: 1% py, ccpy, MoS_2 Cu: 0.2% Cu minerals ≈ ½%	
2500 6	2503	100%	Andesite	Well fractured. Weakly altered	quartz veins calcite veins	Total sulfides: tr py, ccpy (?) Cu: tr	
2503	2537 2	100%	Granite.	Generally pegmatitic. Moderately fractured. Weakly altered.	qtz veins chlorite sec K-feldspars	Total sulfides: <1% py, ccpy, MoS_2, bornite Cu: 0.1-0.2% Cu minerals ≈ ½%	
2537 2	2555 3	100%	Gneiss	Dioritic(?) Moderately to poorly fractured. Weakly altered.	quartz veins Chloritization of feldspars	Total sulfides: <1% py, ccpy, MoS_2 Cu: 0.2% Cu minerals ≈ ½%	
2555 3	2556 5	100%	Andesite Porphyry	POST MINERAL DIKE. Moderately fractured.			
2556 5	2573	100%	Gneiss - granite complex	Gneiss (as above) with granite dikes.	do	Total sulfides: 1% py, ccpy, MoS_2 Cu: 0.1-0.2% Cu minerals < ½%	
2573	2613	100%	Gneiss?	Moderately fractured. Unit has aligned feldspars. Very well altered (?). Breccia near base.	destruction of ferromags (?) quartz flooding sec. K-feldspars chlorite.	Total sulfides: py, ccpy, MoS_2 Cu: tr-0.1% Cu minerals: < ½%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 37 SHEET NO. 5
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

Project SM

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2613	2621 S	100%	Breccia	Fragments of andesite, granite, and gneiss in a black carbonate matrix. Post-mineral. Moderately fractured. Sulfides in fragments.	of breccia: none.	Total sulfides py, ccpy, MoS_2 Cu: 0.2% Cu minerals: ½%	
2624 S	2632	100%	Granite	Poorly fractured. Well altered locally abundant molybdenite	quartz flooding see K-feldspars.	Total sulfides: MoS_2, py, ccpy. Cu: 0.2% Cu minerals: ½%	
2632	2648 S	100%	Biotite Schist	Moderately fractured. Moderately altered. Majority of sulfides as very fine disseminations.	quartz veins local chlorite	Total sulfides: 3-4% py, ccpy, MoS_2 Cu: 0.2% Cu minerals = ½%	
2649 S	2659	100%	Granite	Well fractured, fault zone @ (2651-53) Moderately altered.	quartz veins see K-feldspars	Total sulfides 1% py, ccpy, MoS_2 Cu: 0.2% Cu minerals ≈ ½%	
2659	2667 S	100%	Gneiss	Poorly fractured. Weakly altered.	quartz veins see. K-feldspars sericite	Total sulfides: 1% py, ccpy, MoS_2 Cu: 0.2% Cu minerals: ½%	
2667 S	2688	100%	Granite	fine-grained. Poorly fractured. Well altered. Abundant pyrite at base.	quartz flooding see K-feldspars.	Total sulfides: <1% py, ccpy, MoS_2 Cu: tr-01% Cu minerals: <½%	
2688	2697 S	100%	Yerington Granite Porphyry	Feldspar + biotite phenocrysts in an aphanitic, black groundmass. Moderately altered.	see K-feldspars quartz veins Calcite veins	Total sulfides: 2% py, ccpy, MoS_2 Cu: tr Copper minerals: tr	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 37 SHEET NO. 6
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

Project SM

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2697[5]	2761	100%	Granite-gneiss complex	Alternating intervals of granite & gneiss Tr. garnet. Most sulfides in gneiss. Weak to moderate alteration.	granite: quartz veins Sec K-feldspar gneiss: quartz veins Sec. chloritization	Total sulfides: overall: <1% gneiss: 2% Py, ccpy, MoS_2 Cu: 0.1-0.2% Cu minerals: 0.5%	
2761	2778	100%	Leuco-granite.	Similar to previous interval of granite	Sec. K-feldspars quartz veins	Total sulfides: < ½% Py, ccpy, MoS_2 Cu: tr Cu minerals: tr	
2778	2807[5]	100%	Biotite-chlorite schist	Poorly fractured. Weakly altered.	quartz veins chlorite (?)	Total sulfides: 3% py, ccpy, MoS_2, bornite Cu: 0.3-0.9% Cu minerals: 1-1.5%	
2807[5]	2824	100%	Granite	Poorly fractured. Locally well altered.	quartz veins Sec K-feldspars chlorite.	Total sulfides: 1-2% Py, ccpy, MoS_2 Cu: 0.1% Cu minerals: < ½%	
2824	2833[3]	100%	Andesite	Well fractured. Poorly altered.	locally bleached carbonate veins quartz veins	Total sulfides: 3% Py, ccpy Cu: 0.4% Cu minerals: 1.5%	
2833	2909	100%	Granite	locally well fractured, otherwise, poorly fractured. Local breccias. Weakly altered. Some pegmatitic and schist intervals. Increase in molybdenite-qtz veins. ccpy abundant relative to pyrite	quartz veins Sec K-feldspars Chlorite (local)	Total sulfides: 1% or less Py, ccpy, MoS_2 Cu 0.1-0.2% Cu minerals.	½%
[illegible]	5	[illegible]	[illegible]	[illegible]	leaching	Total sulfides: <1%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SM 2

HOLE NO. SM 37 SHEET NO. 7
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2916 S.	2918 S.	100%	Schist(?)	Poorly fractured. Relict schistose texture. Very well altered. Bleached.	Chlorite quartz veins carbonate veins	Total sulfides: Py, ccpy Cu: 0.2%	
2918 S.	2921	100%	Andesite	Moderately fractured. Poorly altered.	quartz veins	Total sulfides Py, ccpy, MoS_2 Cu: 0.2-0.3%	
2921	2923	100%	Schist-Breccia complex	Well fractured and faulted. Poorly altered.	Chlorite carbonate veins	Total sulfides: 2% Py. Cu: 0.2-0.3%	
2923	2936 S.	100%	Granite	Moderately fractured, locally faulted. Moderately altered.	quartz veins Sec. K-feldspars Chlorite	Total sulfides: <1% Py, ccpy, MoS_2, bornite Cu: tr - 0.1%	
2936 S.	2939 S.	100%	Br.-and.-schist complex	Breccia, andesite, schist. Moderately altered. Moderately to well fractured. Andesite(?) has strong metallization. Breccia = granite frags in black CO_3 matrix	qtz vens in andesite(?)	Total sulfides: 5-6% Py, ccpy, MoS_2 Cu: 1% Cu mineral: 3%	
2939 S.	2949	100%	Granite	Inclusions of schist, diorite. Well altered. Moderately fractured, locally faulted.	quartz veins Sec. K-feldspars Chlorite (local)	Total sulfides: 1% Py, ccpy, MoS_2 Cu: 0.2%	Cu mineral: ½%
2949	2951	90%	Fault zone	fragments of above granite		Cu (a)	
2951	2991	100%	Granite	as above, normal but without inclusions		Cu: 0.2%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 37 SHEET NO. 8
COORDINATES
TYPE DRILL BIT SIZE BXWL
DATE STARTED

Project SMn.

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2956	2964	90%	Fault Zone	leached fragments of granite		Cu: 0.1	
2964	2998½	100%	Granite-schist complex	Alternating intervals of biotite schist and granite. Moderately to poorly fractured. Weakly clay altered. Most pyrite in schist.	quartz veins sec. K-feldspars	Total sulfides: Py, ccpy, MoS_2 Cu: 0.1-0.2% ccpy = ½%	
				* END OF THE HOLE *			

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SHEEP MOUNTAIN

HOLE NO. SM 39 SHEET NO. 1
COORDINATES
TYPE DRILL Joy BIT SIZE BX
DATE STARTED

COLLAR ELEVATION 2601
TOTAL FOOTAGE 2173', 2163
LOGGED BY R.S.P
DATE COMPLETED August 13, 1965

% Cu assay tr = <0.1%

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	% Cu assay	GRAPHIC LOG
0	1985	Rotary Drill	Volcanics	Rhyolitic tuffs, agglomerates, arkosites, sandstone, lacustrine deposits.				
1985	2006	100%	Granite	Well fractured. Complete oxidation: leaching, sulfide casts, indigenous limonite, abundant yellow, red, maroon FeOx. Well altered.	oxidation products, quartz veins sericite. destruction of ferromags.	Original sulfides: 1-1½%	tr	
2006	2019.5	100%	Younger Granite Porphyry	with granitic inclusions. Well fractured. Completely oxidized: as above, purple staining of groundmass. Well altered.	quartz veins argillization of phenos. sericite destruction of ferromags	Original sulfides: 1-2% $CuCO_3$ Cu: tr - 0.2%	tr - 0.2	
2019.5	2095	90%	Fault Zone	As above, but well fractured. Local FeOx gouge. Completely oxidized.	as above.	Original sulfides: 1% or less $CuCO_3$ stains Cu: tr - 0.1%	tr - 0.1	
2095	2108	100%	Younger Granite Porphyry	Moderately to well fractured. Almost complete (80%) oxidation. Well altered. Zone of persistent basic copper oxides. Base of oxidation @ 2108.	quartz veins argillization	Original sulfides: 1% Total sulfides: 0.2% cc, py, $CuCO_3$, native Cu Cu: 0.5%	0.1 - 0.5	
2108	2141	100%	Younger Granite Porphyry	Moderately to well fractured. Enriched supergene sulfides. Sulfides become weak at base of interval. Well altered. Locally oxidized	quartz veins argillization of phenos. sec K-feldspars local sericite	Total sulfides: 2-4% cc, py, MoS_2 Cu: 1-3% Cu minerals: 1.5-4%	0.5 - 3%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM-39 SHEET NO. 2

COORDINATES

TYPE DRILL BIT SIZE

DATE STARTED

COLLAR ELEVATION

TOTAL FOOTAGE

LOGGED BY RSP

DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG (% Cu from assay)
2141	2211	100%	Granite?	Moderately fractured, Locally oxidized Well altered. Fault zone at (2205-07). Local supergene chalcocite	argillization of feldspars quartz veins Sericite Chlorite sec. K-feldspars	Total sulfides: ≤1% Py, ccpy, cc, MoS_2 Cu: 0.1-0.2% cc + ccpy = ½%	0.1-0.5
2211	2239.5	100%	Gneiss	Moderately fractured, locally faulted. Contains abundant cse biotite. Moderately altered FeOx on jointing	quartz veins Chlorite sec. K-feldspars	Total sulfides: 2% Py, ccpy, MoS_2 Cu: 0.2% Cu minerals: ½%	0.2-0.3%
2239.5	2274	100%	Granite-Metamorphic Complex.	Alternating intervals of granite & metamorphics. Poorly fractured. Well altered. Pyrite & Chalcopyrite predominantly in biotitic zones. FeOx on joints. Andesite & Fault Zone (2272-73)	quartz veins Argillization + chlorite local destruction of ferromags.	Total sulfides: 2% Py, ccpy, cc, MoS_2 Cu: 0.2% ccpy + cc = ½%	0.2-0.3
2274	2281	100%	Munger Granite(?) Porphyry	Contains 6" andesite at base. Poorly fractured. Moderately altered Has black groundmass.	quartz veins Chlorite	Total sulfides ≤1% Py, ccpy, MoS_2 Cu: tr	0.3%
2281	2301.3	100%	Diorite Gneiss	Contains a granite dike. Moderately fractured. Moderately altered. Copper & iron sulfides in biotitic intervals. FeOx on joints	quartz veins sec. K-feldspars Chloritization of Plagioclase.	Total sulfides: 2% Py, ccpy, MoS_2 Cu: 0.1-0.2% ccpy = ½%	0.3
2301.3	2304	95%	Andesite	Well fractured. local fault zone. Weakly altered.	quartz veins	Total sulfides: <1% Pyrite	0.3%

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

OLE NO. SM 39 SHEET NO. 3
COORDINATES
YPE DRILL BIT SIZE
ATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	% Cu from assay GRAPHIC LOG
2301	2321.5	100%	Granite.	Moderately fractured. Moderately to well altered. FeOx on joints.	quartz veins argillization + chloritization of feldspars. sec. k-feldspars.	Total sulfides: 2% py, ccpy, MoS_2 Cu: 0.1 - 0.2% ccpy ≈ ½%	0.1%
2321.5	2323.5	90%	Fault Zone	granite fragments with 2' andesite at base.			0.1-0.2
2323.5	2345.5	100%	Granite-gneiss complex	Well to moderately fractured. Moderate to weak alteration	quartz veins argillization chlorite (wk)	Total sulfides: 1% py, ccpy, MoS_2 Cu: tr	0.1-0.2%
2345.5	2357	100%	Younger Granite Porphyry Dike	Well fractured. FeOx on joints. Well altered.	quartz veins argillization of phenos. chlorite sec. k-feldspars (?)	Total sulfides <1% py, ccpy, MoS_2 Cu: tr.	0.1-0.2
2357	2369.5	100%	Granite & Gneiss	Moderate to locally well-fractured. FeOx on joints. Moderate to weak alteration	quartz veins argillization of plagio. sec k-feldspars calcite veins	Total sulfides: <1% py, ccpy, MoS_2 Cu: tr	0.2-0.3
2369.5	2384.5	95%	Andesite	Fault zone at top contact. Moderately fractured. Well altered	Chloritization quartz veins	Total sulfides: 1% py, ccpy, MoS_2 Cu: 0.1% ccpy ≈ <½%	0.3%
2384.5	2396	90%	Fault Zone.	fragments of above andesite	do.	Cu: 0.2%	0.3-0.5%
2396	2403.5	100%	Granite	Well fractured. FeOx on joints. Well altered.	quartz veins Chlorite	Total sulfides: 2% py, ccpy, MoS_2	0.5%

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM 39 SHEET NO. 4
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2403 S	2416	100%	Diorite	Contains schistose interval (digested dike?) Generally, a fault zone. Oxidation along joints. Moderately altered.	Total sulfides: 1% py, ccpy. Cu: 0.1% ccpy < ½%	quartz veins chloritization of plagio.	0.4
2416	2442	100%	Diorite & Granite gneiss complex	Moderately fractured. FeOx on joints Moderately to strongly altered. Iron, copper sulfides common to pyritic zones.	quartz veins chloritization of plagio. argillization of feldspars sec. K-feldspars (local)	Total sulfides: 1-2% py, ccpy, MoS_2, bornite Cu: 0.1-0.2% ccpy + born < ½%	0.2-0.5
2442	2505	80-90%	Fault Zone.	Fragments of Granite-diorite with: younger granite porphyry at (2449 S-59) andesite at (2466-72)	do.	Total sulfides: 2% py, ccpy, MoS_2 Cu: 0.1	0.2-0.4
2505	2531	95%	Granite & Gneiss Complex.	Moderate fracturing, local fault zones. FeOx on joints. Well altered. Local supergene chalcocite.	quartz veins chloritization local destruction of ferms.	Total sulfides: ½% py, cc, ccpy, MoS_2 Cu: tr.	0.2-0.3
2531	2535	90%	Andesite	Generally, at fault zone. Moderately altered.	chloritization quartz veins	Total sulfides: tr py.	0.3
2535	2548	100%	Granite & Gneiss Complex	As above interval of same.	as above	Total sulfides: ½% py, cc, ccpy, MoS_2 Cu: tr	0.1-0.5
2548	2571 S	100%	Diorite	Well to moderately fractured. Moderately altered. Local leaching of sulfides. Some	quartz veins calcite veins	Total sulfides: 3-4% py, ccpy, cc, bornite, PbS,	0.1-0.6

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM-39 SHEET NO. 5

COORDINATES

TYPE DRILL BIT SIZE

DATE STARTED

Project Sheep Mountain

COLLAR ELEVATION

TOTAL FOOTAGE

LOGGED BY RSP

DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG % Cu assay
2571	2576	90%	Fault Zone	Fragments of diorite and andesite			0.4
2576	2605	100%	Diorite & Gneiss	Well to moderately fractured. Locally faulted. Oxidized along fault zones. Moderately altered. FeOx on joints	quartz veins argillization of feldspars	Total sulfides: 1½% py, copy, MoS_2 Cu: tr	0.1-0.2
2605	2611	90%	Fault Zone	fragments of granite & gneiss			0.2
2611	2636	100%	Diorite-gneiss Complex	as above interval of same. But with local supergene chalcocite		Total sulfides: 1% py, copy, cc, MoS_2 Cu: tr	0.3-0.4
2636	2639	90%	Fault Zone	fragments granite, gneiss, diorite			0.2-.4
2639	2651	100%	Granite.	Moderately fractured, but with local fault zones. FeOx on joints. Moderate - weak alteration	quartz veins	Total sulfides: trace py, MoS_2	0.2-0.3
2651	2712	80%	Fault Zone.	fragments of granite. Local oxidation of sulfides. FeOx on joints. 10% recovery (2666-76)	do.	Total sulfides: 1% py, cc, copy, MoS_2 Cu: tr-0.1%	0.1-0.2
2712	2763	100%	Granite Diorite complex	Moderately fractured. Locally faulted. FeOx on joints. Well altered.	quartz veins argillization of feldsp. see K-feldsp. chloritization local destruction of ferromagnesians	Total sulfides: ≤1% py, MoS_2, copy, cc Cu: tr	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SILEEP MOUNTAIN

HOLE NO. SM 40 SHEET NO. 1 of 3
COORDINATES
TYPE DRILL Joy 22 BIT SIZE BXWL
DATE STARTED June 24 (Rotary) August 18 (Core)

COLLAR ELEVATION 3001
TOTAL FOOTAGE 2453
LOGGED BY RSP + MEN
DATE COMPLETED Sept. 13, 1965

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	1918	Rotary Drilled		Post mineral agglomerates, tuffs, conglomerates, andesites.			
1918	1948.5	95%	Younger Granite Porphyry	Poorly fractured. Well altered. Not oxidized. Locally, solution cavities along jointing.	Quartz veining Sericitized feldspar phenocrysts. sec. K-feldspars local chlorite	Total sulfides: 1-2% Py, MoS_2, copy, born, cc? Cu: 0.2% MoS_2: tr-0.1 Cu minerals = 0.6%	
1948.5	2050	95%	Granite	Coarse grained. Has schist at top (xenolith?) and dioritic intervals. Has linear fabric. Local solution cavities. Abundant molybdenite remlets. Well altered.	Quartz veining sec. K-feldspars Chlorite local destruction of ferromags.	Total sulfides: 1-2% Py, MoS_2, copy Cu: tr-0.1% MoS_2: 0.1%	
2050	2067.5	95%	Gneiss-Diorite-Granite Complex	Poorly fractured. Well altered. Intervals of granite, gneiss, diorite.	quartz veins sec. K-feldspars local destruction of ferromags. local sericite alteration & chloritization of primary feldspars (locally)	Total sulfides: 2% Py, MoS_2, copy, bornite. Cu: tr-0.1%	
2067.5	2089	90-99%	Granite-Schist-Breccia-Complex	Well fractured: generally, a fault zone. Breccia = granitic fragments in a leached chloritic matrix. Schist - well chloritized.	chlorite secondary biotite } schist quartz veins in granite	Total sulfides: <½% Py, MoS_2	
			Chlorite	Moderately to poorly fractured. Very	quartz veins with biotite	Total sulfides: 5%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project SILVER MOUNTAIN

HOLE NO. SM 40 SHEET NO. 2 of 3
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2097.5	2108	95%	Granite	Moderately fractured. Transported FeOx on joints. Fine-grained. Aligned ferromags give gneissoid texture. Well altered.	quartz veins. Total argillization of feldspars (plagio)	Total sulfides: tr py, MoS_2	
2108	2123	80%	Fault Zone	Fragmented granite with locally green gouge.	do.	do.	
2123	2185	95%	Granite	Esa Generally as above interval. Locally abundant quartz-molybdenite veinlets	quartz veins Sec. K feldspars argillization of plagio. + Chlorite.	Total sulfides: 1% py, MoS_2, ccpy. Cu: tr-0.1% ccpy < ½% MoS_2: tr-0.1%	
2185	2241	95%	Granite Gneiss	Moderately fractured. Transported FeOx on joints. Well altered. Locally abundant quartz-moly veinlets.	quartz veins Sec K-feldspars argillization of primary feldspars - strong	Total sulfides: 1% py, ccpy, MoS_2 Cu: tr-0.1% MoS_2: 0.1%	
2241	2303	98%	Diorite-granite Complex	Granite is gneissic & pegmatitic. Moderately to poorly fractured. Well altered. Copper minerals in diorite, gneiss. Molybdenite in ese-gr granite.	quartz veins Chlorite Sec. sericite w/ qtz veins argillization of feldspars in diorite	Total sulfides: 2% py, ccpy, MoS_2 Cu: 0.1% MoS_2: tr, 0.1% in granite	
2303	2324.5	95% but only 10% at 2311-24	Granite	Moderately to well fractured. Could be a fault at 2314-24. Well altered.	quartz veins argillization of feldspars local sericite	Total sulfides: 1% py, ccpy, MoS_2 Cu: tr MoS_2: tr	

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Skagg Mountain

HOLE NO. SM 40 SHEET NO. 3 of 3
COORDINATES
TYPE DRILL DIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP + AENavin
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2321.5	2365	95%	Diorite Gneiss	Poorly fractured. Well altered. Chalcopyrite commonly in biotite, replacing py too.	quartz veins chloritization of garnets (total) and biotite (strong) argillization of feldspars calcite veins.	Total sulfides: 1-2% py, ccpy, MoS_2 Cu: tr-0.1% MoS_2: 0.1%	
2365	2376.5	98%	Granite	Moderately fractured. Well altered. Generally, similar to previous intervals.	quartz veins Sec. K-feldspars local chlorite argillization of feldspars	Total sulfides: 1% or less py, MoS_2, ccpy. Cu: tr MoS_2: 0.1%	
2376.5	2408.5	95%	Diorite Gneiss	As above, but locally well fractured.	as above interval.	Total sulfides: <1% py, ccpy, MoS_2 Cu: tr	
2408.5	2447 to 2453	95%	Diorite to Granite Gneiss Complex	Diorite: moderately fractured. well altered. Granite: moderately fractured. Moderately altered. Strong qtz-molybdenite veinlets to 2423	quartz veining argillization of feldspars local chlorite destruction ferromags } Diorite quartz veining Sec. K-feldspars argillization of feldspars } Granite	Total sulfides: <1% py, MoS_2, ccpy. Cu: tr MoS_2: 0.1% (to 2423) tr overall	
				# END OF THE HOLE #			

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GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM44 SHEET NO. 1
COORDINATES
TYPE DRILL Joy 22 BIT SIZE BXWL
DATE STARTED October 13, 1965

COLLAR ELEVATION 2872
TOTAL FOOTAGE 2150 ft
LOGGED BY RSP
DATE COMPLETED December 9, 1965

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
0	1972	Rotary Drilled	Pre Post mineral volcanics	Tuffs, andesites, agglomerates, conglomerates			
1972	1977	90%	Fault zone	Fragments of diorite & andesite. Base of post-mineral volcanics approx 1950.	Of andesite: weak. Moderate quartz veining Of diorite: total argillization of feldspars, quartz veining	Total sulfides: 1-2% py, ccpy Cu: 0.2%	
1977	1986.5	95%	Andesite	Well fractured - a continuation of above fault. Moderate to weak alteration. Contains fragments of granite.	local chlorite moderate quartz veins	Total sulfides: 1-2% py, bornite (?) Cu: 02%	
1986.5	2020	99%	Granite	Fine-grained. Well fractured. Local oxidation (10-15%) of sulfides. FeOx on joint surfaces. Local solution of quartz veins on jointing. Traces of supergene chalcocite. Moderate to weak alteration	moderate quartz veining weak sec. K-feldspars destruction of ferro-mags local sericite	Original sulfides: 3% Total sulfides: 2½-3% py, cc Cu: tr	
2020	2033	99%		Medium to coarse-grained. Moderately to well fractured, locally faulted. Locally oxidized (10-15%). FeOx on joints. Moderately altered. Traces supergene cc.	moderate quartz veining weak sec. K-feldspars destruction of ferromags local sericite	Original sulfides: 4% Total sulfides: 3-4% py, MoS_2, cc Cu: tr	
2033	2078	98%		Contains local pegmatites. Moderately to well fractured, with small local faulted zones. Silt/fault gouge at top of interval.	strong quartz veining total argillization of feldspars moderate sec. K-feldspars	Total sulfides: 5-7% py, ccpy, MoS_2, cc Cu: tr	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM 44 SHEET NO. 2
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2078	2105	98%	Granite	Fine to coarse-grained. Moderately fractured. Locally, has a gneissic texture. Local (<10%) oxidation. Well altered.	strong quartz veining total argillization of feldspars locally moderate sec K-feldspars sericite in quartz veins	Original sulfides: 2-3% Total sulfides: 2-3% Py, ccpy Cu: tr	
2105	2119	95%		Well fractured. - generally a fault zone. Well oxidized (50-70%). Zone of strongest supergene chalcocite. Well altered. FeOx MnOx. CuOx	as above, but with destruction of ferromags.	Original sulfides: 6% Total sulfides: 2-3% cc, Py, ccpy, MoS_2 Cu: 1-2%	
2119	2161.8	98%		Medium to coarse-grained. Well fractured. Locally (10%) oxidation. Well altered. Occasional supergene chalcocite.	strong quartz veining siliceous total argillization of feldspars (primary) moderate sec. K-feldspars sericite in quartz veins	Total sulfides: 2% Py, cc, ccpy, MoS_2 Cu: tr-0.1%	
2161.8	2180	98%	Metamorphic complex	Granite, granite-pegmatite, diorite. Moderately to well fractured. Local oxidation (<10%) Well altered.	strong quartz veining strong argillization of feldspars (primary) sec K-feldspars (weak)	Total sulfides: 2% Py, ccpy, MoS_2 Cu: tr	
2180	2256	98%	Granite	Medium to fine-grained. Contains local pegmatites. Moderately fractured, with local small fault zones. Local oxidation; FeOx on joints	silicified strong quartz veining wk-mod sec. K feldspars sericite in qtz veins	Total sulfides: 1-5% Py, ccpy, MoS_2 Cu: tr-0.1%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mtn

LE NO. SM 14 SHEET NO 3
ORDINATES
E DRILL BIT SIZE
TE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

ROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
256	2269	63%	Fault Zone	No core (2256-57), only 0.25 ft (2257-61) Gouge, fragments of post-mineral andesite, volcanic breccia, and granite.	Of granite - as before.	Total sulfides: 1% py, cc, ccpy Cu: tr	
269	2277	85%	Andesite	Post-mineral dike. Local gouge, otherwise is moderately to well fractured.	none	none.	
277	2298.3	95%	Breccia	Post-mineral. Precambrian fragments in a grey andesitic matrix. Moderately to well fractured. Weak to moderate alteration	Chloritization of ferro-mags.	Total sulfides: 3% py, ccpy, MoS_2 Cu: tr	
298.3	2300	95%	Granite	Fine to medium-grained. Moderately to well fractured with small fault zones. Xenolith of schist Well altered.	strong quartz veining moderate-strong sec. K-feldspars - strongly argillized feldspars. local sericite in qtz veins	Total sulfides: 2% py, MoS_2, ccpy Cu: tr.	
300	2304	90%		Fault zone of above granite	do.	do.	
304	2316	95%	Breccia	Post-mineral. Fragments of precambrian and volcanics in soft grey matrix. Moderately to poorly fractured.	Of breccia - none	Total sulfides: 2% py, ccpy. Cu: tr	
316	2363	98%	Metamorphic	Coarse-gr. granite, biotite-gneiss, diorite, and pegmatite. Moderately to well fractured.	strong silicification & quartz veining mod-wk argillization of feldsp	Total sulfides: 1% or less py, MoS_2, ccpy	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

Project Sheep Mountain

HOLE NO. SM 44 SHEET NO. 4
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2263	2267	90%	Metamorphic Complex	Fault zone in previous complex	as above	as above.	
2267	2381	99%		similar to previous interval of Precambrian complex.	as above	Total sulfides: 1% Py, ccpy, MoS_2 Cu: tr	
2381	2385.5	95%	Andesite	Moderately fractured. Moderately altered. Re-mineral dike	mod. quartz veining weak calcite veining	Total sulfides: 1% Py	
2385.5	2396	98%	Granite	Moderately to well fractured. Very well altered locally oxidized.	Strong quartz veining total chloritization of ferro-mags. moderate sec. K-feldspars local argillization of feldsp. sericite in quartz veins	Total sulfides: <1% Py, ccpy, MoS_2 Cu: tr	
2396.	2397.3	95%	Breccia	Granitic fragments in a brown hematitic cement. Total oxidation of sulfides in bx. Also a short granite, unbrecciated interval.	of granite, & frags: as above	Original sulfides: 3% Total sulfides: tr Py.	
2397.3	2400	96%	Andesite	Moderately fractured. Moderate to weak alteration. Post Re-mineral dike	moderate quartz veining weak calcite veining	Total sulfides: 1-2% Pyrite	
2400	2453.7	95%	Metamorphic Complex	granite, pegmatite, diorite, schist, gneissic intervals. Well to moderately fractured, locally small faults. Well altered. Traces of oxidation of pyrite.	strong quartz veining chloritization of ferromags. + locally, feldspars. moderate sec. K-feldspars sericite in qtz vns. sec. [illegible] in schist.	Total sulfides: 1-2% Py, ccpy, bornite, MoS_2 Cu: tr - 0.1%	

PHELPS DODGE CORPORATION

GEOPHYSICAL RESEARCH AND EXPLORATION DEPARTMENT

GEOLOGIC LOG

HOLE NO. SM 44 SHEET NO. 5
COORDINATES
TYPE DRILL BIT SIZE
DATE STARTED

Project

COLLAR ELEVATION
TOTAL FOOTAGE
LOGGED BY RSP
DATE COMPLETED

FROM	TO	CORE RECOVERY	ROCK TYPE	ROCK DESCRIPTION	ALTERATION	METALLIZATION	GRAPHIC LOG
2438.7	2450	98%	Granite	Gr. oid texture. Moderately to well fractured. Moderate (30%) oxidation of sulfides. Well altered.	strong silicification + quartz veining moderate sec K-feldspar mod-strong sericite	Total sulfides: 1% Py.	
				END OF THE HOLE.			