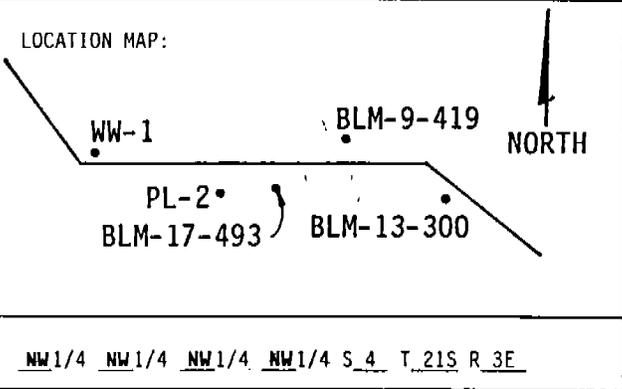


# LITHOLOGIC LOG

LOCATION MAP:



SITE ID: NASA-WSTF LOCATION ID: BLM-17-493

SITE COORDINATES (ft.):

N 227717.21 E 403033.96

GROUND ELEVATION (ft. MSL): 4538.13 (B.C.)

STATE: NEW MEXICO COUNTY: DOÑA ANA

DRILLING METHOD: Mud & Air-Foam Rotary

DRILLING CONTR.: Larjon Drilling

DATE STARTED: 1 February 1989 DATE COMPLETED: 27 February 1989

FIELD REP.: R. Cooper

COMMENTS: 0'-75' drilled using mud rotary. 10" x 75' steel surface casing. 75'-56' drilled 9 7/8" borehole using air-foam rotary. TD = 560'. Bedrock at 550'.

LOCATION DESCRIPTION:

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				0-560' cuttings	0-550' Alluvium (Santa Fe Group): Cutting samples are multicolor and have no predominant color except in clay-rich zones which are light brown (5 YR 6/4) to moderate brown (5 YR 4/4). Cuttings range in size from silt size to 20 mm (0.8 inches) with an average size of 3-5 mm (0.12-0.20 inches). Cuttings are rounded to angular. Rounded to sub-rounded cuttings are formational grains that comprise 5-30% of each sample. The alluvium is a unconsolidated to moderately well consolidated, poorly sorted pebble to boulder conglomerate containing intermittent clay and sand lenses. Alluvium contains clasts of white (N9) and red and white mottled rhyolite with varying amounts of iron-staining; light olive green (5 Y 3/2) and very dark red (5 R 2/6) and medium dark gray (N4) porphyritic andesite with some pyroxene alteration to epidote; moderate reddish brown (10 R 4/6) to moderate red (5 R 4/6) and greenish gray (5 GY 6/1) siltstone; light gray (N7) to grayish black (N2) micritic limestone with <10% allochems; white (N9) calcite; moderate brown (5 YR 4/4) iron-stained sandstone; iron-stained quartzite; translucent to blue white (5 B 9/1) quartz; light brown (5 YR 6/4) and moderate brown (5 YR 4/4) clay ranging in amount from less than 10% to 90% in the upper 200' to less than 10% between 200' and the alluvium-bedrock contact at 550'. Igneous clasts are predominant cuttings and increase in abundance with depth. Rhyolite is the most abundant igneous cutting from 0'-460'. A transition from rhyolite-rich to andesite-rich alluvium occurs between 460' and 470'. In most samples above 520', except in clay-rich zones, a cutting composed of carbonate-cemented conglomerate is present. Due to the similarity in appearance between these cuttings and that of a caliche soil horizon, these cuttings will be referred to as caliche. The caliche is pinkish gray (5 YR 8/1) to yellowish gray (5 Y 8/1) in color.
5	VVVVV+L+L+O//		19		
10	VVVVV+L+L+O//		18		
15	VVVVV+L+L+O//		27		
20	VVVVV+L+L+O//		26		
25	VVVVV+L+L+O//		21		
30	VVVVV+L+L+O//		65		
35	L+L+L+VVVV//		43		
40	L+L+L+VVVV//		12		
45	L+L+L+VVVV//		12		
50	L+L+L+VVVV//		43		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
50	====+VV				50'-175' Clay-rich alluvium varying in color from light brown (5 YR 6/4) to moderate brown (5 YR 4/4).
55	====+VV		29		
60	====+		67		
65	====+		31		
70	====+VV		28		
75	====+		61		
80	====VVV++		4		
85	====VVV++//		3.5		
90	====+V		4.5		
95	====+V		4.5		
100	====+V		5		
105	====+VV		4.5		
110	VVV+++=//o		5.5		
115	VVV+++=//o		6		

50'-175' Clay-rich alluvium varying in color from light brown (5 YR 6/4) to moderate brown (5 YR 4/4).

75'-560' Change in drilling method from mud rotary to air-foam rotary.

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
115	VVVV++//O				
120	====V+		5		
125	====V+		5		
130	====V+		4		
135	====V+O		5		
140	====V++O		5		
145	====V++O		4.5		
150	====V++O		5		
155	====+VVO		4.5		
160	====+VVO		5		
165	====V++O		3		
170	====V++O		3		
175	====V++//O	4.5			175'-460' Samples remain very similar, amount of carbonate and igneous cuttings change slightly.
180	VVVVVV++++//	5			

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
180	VVVVVV++++//				
185	VVVVVV++++//		4		
190	VVVVVV++++//		4		
195	VVVVVV++++//		5		
200	VVVVVV++++//		4.5		
205	VVVVVV++++//		7		
210	VVVVVV++++//		6		
215	VVVVVV++++//		5		
220	VVVVVV++++//		7		
225	VVVVVV++++//		5		
230	VVVVVV++++//		5		
235	VVVVVV++++//		6		
240	VVVVVV++++//		5		
245	VVVVVV++++//	9			

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
245	VVVVVVVV+//O				
250	VVVVVVVV+//O		12		
255	VVVVVVVV+//O		8		
260	VVVVVVVV+//O		9		
265	VVVVVVVV+//O		12		
270	VVVVVVVV+		6		
275	VVVVVVVV+		7		
280	VVVVVVVV+		6.5		
285	VVVVVVVV+//O		8		
290	VVVVVVVV+//O		5.5		
295	VVVVVVVV+//O		11		
300	VVVVVVVV+//O		19		
305	VVVVVVVV+//O		7		
310	VVVVVVVV+//O	6			

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
310	VVVVVVVVVV+H				
315	VVVVVVVVVV+H		6		
320	VVVVVVVVVV+H		6		
325	VVVVVVVVVV+H		6		
330	VVVVVVVVVV+H		8		
335	VVVVVVVVVV+H		8		
340	VVVVVVVVVV+H		5		
345	VVVVVVVVVV+H		8		
350	VVVVVVVVVV+H		9		
355	VVVVVVVVVV+H		7		
360	VVVVVVVVVV+H		8		
365	VVVVVVVVVV+H		15		
370	VVVVVVVVVV+H		5.5		
375	VVVVVVVVVV+H		8		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
375	vvvvv+ttt///				
380	vvvvv+ttt///		6		
385	tttt+vvvv//o		5.5		
390	tttt+vvvv//		6.5		
395	tttt+vvvv//o		8		
400	vvvvv+ttt//o		6		
405	tttt+vvvv//o		6		
410	vvvvv+ttt//o		6		
415	vvvvv+ttt//o		15		
420	vvvvv+ttt//o		21		
425	vvvvv+ttt//o		16		
430	vvvvv+ttt//o		18		
435	vvvvv+ttt//o		22		
440	vvvvv+ttt//o		24		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
440	VVVVVVVV++//O				
445	VVVVVVVV++//O		13		
450	VVVVVVVV++//O		10		
455	VVVVVVVV++//O		7		
460	VVVVVVVV++//O		8		460'-470' Transition zone from rhyolite-rich alluvium to andesite-rich alluvium.
465	VVVVVVVV++//O		7		460'-500' Caliche cuttings still present in samples.
470	VVVVVVVV++//O		12		470' Distinct color change in drilling foam coming out of the hole. Foam changed from a tan color to a purplish gray color.
475	VVVVVVVVVV+O		6.5		470'-480' First occurrence of pinkish gray (5 YR 8/1) to light gray (N7) crystal-vitric tuff. Trace amounts of tuff present.
480	VVVVVVVVVV+O		7		480'-490' Tuff percentage increased to 10-15% of sample.
485	VVVVVVVVVV+O		10		
490	VVVVVVVVVV+O		6		490'-500' Trace amounts of tuff present.
495	VVVVVVVVVV+O		6		
500	VVVVVVVVVV+O		495'-515' No drillo-graph available		500'-515' Increase in tuff percentage up to 20% of each sample. No visible caliche in samples.
505	VVVVVVVVVV+O				

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
505	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓				
510	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓		-		
515	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓		-		515'-550' Trace amounts of tuff present. 515'-520' Caliche cuttings present in sample.
520	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓		5		
525	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓		4		525'-540' Cutting shapes change from mostly angular to mostly subrounded. This interval is a moderately consolidated, coarse-grained sand composed of volcanic rock fragments. No caliche fragments present.
530	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓		7		
535	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓		7		
540	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓		4		540'-550' Cuttings become mostly angular in shape.
545	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓		7		
550	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓		6		550'-560' <u>Oregon Andesite</u> : Blackish red (5 R 2/2) to grayish black (N2) when wet and very dark red (5 R 2/6) to dark gray (N3) when dry porphyritic andesite containing pyrite, altered pyroxene and plagioclase phenocrysts. Alteration is exhibited mostly in the pyroxenes altering to epidote. Phenocrysts range from 0.5 mm to 2 mm (.02 inches to .08 inches). Cuttings are angular in shape and 2-3 mm (.08-.12 inches) in size.
555	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓	37			
560	✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓	34		Total Depth = 560'	
565					
570					