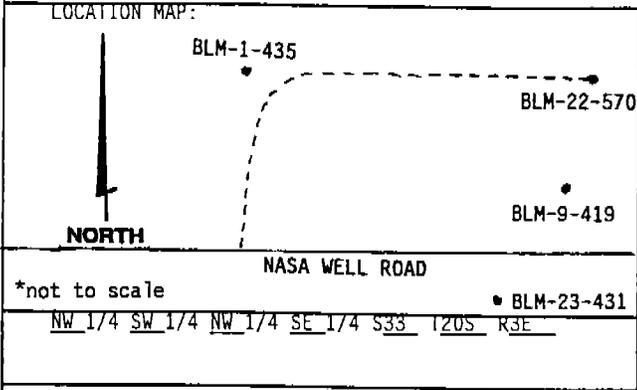


LITHOLOGIC LOG



SITE ID: NASA-WSTF LOCATION ID: BLM-22-570
 SITE COORDINATES (ft.):
 N 229559.96 E 406254.11
 GROUND ELEVATION (ft. MSL): 4606.84 (BC)
 STATE: NEW MEXICO COUNTY: DOÑA ANA
 DRILLING METHOD: Mud/air foam Rotary
 DRILLING CONTR.: Larion Drilling Co.
 DATE STARTED: 07/13/90 DATE COMPLETED: 08/24/90
 FIELD REP.: G. Contaldo, D. Menzie
 COMMENTS: Mud rotary, 0'-70'(7 7/8" bit) ream to 16", 10"x70' steel surface casing, air foam rotary 70'-340' (9 7/8" bit), air foam rotary 340'-605'(9" air hammer bit), Top of bed-rock from geophysical logs is 325'. Total Depth (TD) =608.5'

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
			(Timed by driller)	0'-605' Cuttings	
5		[Stippled Lithology]	6		0'-325' Alluvium (Santa Fe Group): Samples range in color from light brown (5 YR 6/4) to moderate brown (5 YR 4/4) and cuttings in samples are multicolored. Samples comprised of cuttings which range in size from much less than 0.1 inches (silt size) to 1.4 inches. Cuttings are rounded to angular with smaller alluvial grains in samples being rounded to subrounded and larger cuttings clasts being angular to subangular. Samples represent a poorly sorted, unconsolidated to moderately consolidated, polygenetic, pebble to boulder conglomerate. Clay and caliche-bearing intervals which occur throughout the alluvium are noted below. Cuttings which represent lithologies of clasts within the alluvium are composed of dark gray (N3) to greenish gray (5 G 6/1) limestone and dolomite, grayish red (5 R 5/2) to pale brown (5 YR 5/2) siltstone, white (N9) iron-stained rhyolite, grayish pink (5 R 8/2) to moderate pink (5 R 7/4) granite, moderate brown (5 YR 4/4) sandstone with small amounts of caliche, chert and some flow-banded rhyolite near the contact with bedrock at the bottom of the alluvial section.
10			13		
15			11		
20			13		
25			31		
30			11		
35			26		
40			49		
45			22		
50			15		
				0'-30'	Clay-rich interval, cuttings range in size from much less than 0.1 inches (silt size) to 0.9 inches, average cuttings size 0.3 inches, cuttings are angular to rounded.
				35'-50'	Clay-rich interval with clay content 20-60%.

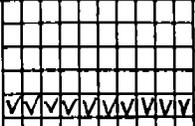
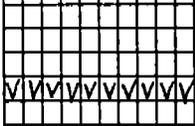
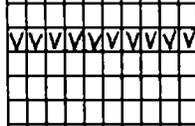
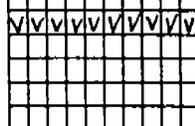
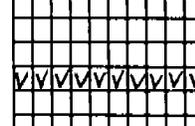
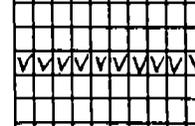
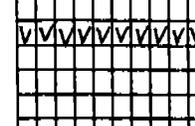
Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
50			15	Cuttings (cont'd)	
55			39		
60			10		
65			8		
70			27		70'-80' Increase in clay content.
75			(Start drillograph) 3		
80			6		80'-90' Caliche content ≥ 20%.
85			12		
90			9		
95			5		
100			6		
105			7		
110			7		
115			5		115'-145' Increase in clay content to ≥20%.

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
115			5		
120			5		
125			13		
130			8		
135			10		135'-145' Increase in drilling times.
140			40		
145			36		
150			13		150'-165' Increase in clay content to 60-70%.
155			32		
160			24		
165			13		165'-185' Decrease in clay content to ≥20%.
170			7		
175			5		
180			6		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
180			6	Cuttings (cont'd)	
185			16		
190			17		190'-215' Increase in clay content ranges from 10% to 30%. Cuttings average 0.2 inches. Angular to rounded.
195			6		
200			8		
205			7		
210			10		
215			8		
220			6		
225			7		
230			10		
235			13		
240			14		
245			15		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
245	VVVV		15		
250	VVVV		8		
255	VVVV		11		
260	VVVV		9		
265	VVVV		13		
270	VVVV		16		
275	VVVV		14		
			(Timed by Driller)		277' Rig down, lost rotation, 07/19/90.
280	VVVV		8		
285	VVVV		12		
290	VVVV		13		290'-325' Significant caliche content from 20% to 30%.
295	OOOVV		7		
300	OOOVV		21		
305	VVVV	14			
310	VVVV	19			

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
310	VVVV 000		19		
315	VVVV 000		9		
320	000V VV		14		
325	000V VV		10		325'-580' <u>Flow-Banded Rhyolite</u> : Dark brownish gray (5 YR 4/1) to grayish red (10 R 4/2) rhyolite with very light gray (N8) flow banding. Cuttings are angular to subrounded and range in size from much less than 0.1 inches (silt size) to 0.8 inches. Cuttings average less than 0.1 inches in size. The rhyolite is dense and hard. The red bands have an aphanitic texture and the gray bands consist of very fine-grained crystalline quartz. Trace amounts of dark brown to black accessory minerals occur within the gray bands. The bands range in width from more than 0.1 inches to less than 0.05 inches. Chemical alteration and calcite from fracture fillings are most abundant below 500'. Spherulitic rhyolite occurs at the bottom of the unit near the contact with the underlying rock. Top of rhyolite from geophysical logs is 325'.
330	VVVV VV		55		
335	VVVV VV		92		
340	VVVV VV		65		
345	VVVV VV		16		335'-340' Increase in average cuttings size to 0.3 inches. Cuttings angular. Large increase in drilling times, so changed to 9" hammer bit at 340'.
350	VVVV VV		22		
355	VVVV VV		16		340'-395' Decrease in average cuttings size to 0.1 inches.
360	VVVV VV		14		
365	VVVV VV		14		
370	VVVV VV		13		
375	VVVV VV		14		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
375			14	Cuttings (cont'd)	
380			13		
385			13		
390			14		
395			8		
400			17		
405			13		405'-415' Decrease in average cuttings size to much less than 0.1 inches.
410			12		
415			15		
420			14		435'-470' Decrease in average cuttings size to much less than 0.1 inches.
425			15		
430			12		
435			14		
440			15		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
440	VVVVVVVVVVVVVVVV		15		
445	VVVVVVVVVVVVVVVV		15		
450	VVVVVVVVVVVVVVVV		14		
455	VVVVVVVVVVVVVVVV		12		
460	VVVVVVVVVVVVVVVV		13		
465	VVVVVVVVVVVVVVVV		16		
470	VVVVVVVVVVVVVVVV		17		
475	VVVVVVVVVVVVVVVV		16		
480	VVVVVVVVVVVVVVVV		18		480'-485' Decrease in average cuttings size to much less than 0.1 inches.
485	VVVVVVVVVVVVVVVV		17		
490	VVVVVVVVVVVVVVVV		23		
495	VVVVVVVVVVVVVVVV		21		
500	VVVVVVVVVVVVVVVV		16		500'-525' Decrease in average cuttings size to much less than 0.1 inches.
505	VVVVVVVVVVVVVVVV		10		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
505	████████████████████	▲▲▲▲▲▲▲▲▲▲	10		
510	████████████████████	▲▲▲▲▲▲▲▲▲▲	13		
515	████████████████████	▲▲▲▲▲▲▲▲▲▲	14		
520	████████████████████	▲▲▲▲▲▲▲▲▲▲	13		
525	████████████████████	▲▲▲▲▲▲▲▲▲▲	15		
530	████████████████████	▲▲▲▲▲▲▲▲▲▲	17		
535	████████████████████	▲▲▲▲▲▲▲▲▲▲	20		535'-560' Increase in average cuttings size to 0.2 to 0.3 inches, calcite from fracture fillings becoming more common with increasing depth.
540	████████████████████	▲▲▲▲▲▲▲▲▲▲	18		
545	████████████████████	▲▲▲▲▲▲▲▲▲▲	13		
550	████████████████████	▲▲▲▲▲▲▲▲▲▲	13		
555	████████████████████	▲▲▲▲▲▲▲▲▲▲	14		
560	████████████████████	▲▲▲▲▲▲▲▲▲▲	14		560'-575' Decrease in average cuttings size to much less than 0.1 inches.
565	████████████████████	▲▲▲▲▲▲▲▲▲▲	8		565'-590' Significant decrease in drilling times.
570	████████████████████	▲▲▲▲▲▲▲▲▲▲	5		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
570			5	Cuttings (cont'd)	
575			5		575'-580' Increase in average cuttings size to 0.2 inches. Clay is present in amounts up to 10%. Some black glassy fragments present.
580			5		580'-605' <u>Volcanic Epiclastic</u> : Samples range in color from pinkish gray (5 YR 8/1) to brownish gray (5 YR 6/1) and cuttings in samples are multicolored. Samples comprised of cuttings range in size from much less than 0.1 inches to 0.7 inches. Cuttings average less than 0.1 inches in size. Cuttings are rounded to subangular. Cuttings clasts consist of black (N1) to dark greenish gray (5 G 4/1) glassy fragments, grayish pink (5 R 8/2) to light brownish gray (5 YR 6/1) clay and grayish red (5 R 4/2) rhyolite.
585			4		
590			5		
595			9		580'-585' Cuttings size ranges from 0.1 to 0.7 inches, cuttings are rounded to subangular, cuttings consist of clay, glassy fragments and rhyolite.
600			8		585'-605' Decrease in average cuttings size to much less than 0.1 inches.
605			8		TD = 608.5'
610					
615					
620					
625					
630					
635					