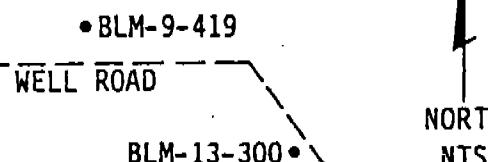


LITHOLOGIC LOG

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LOCATION MAP:



SE 1/4 NW 1/4 SW 1/4 SE 1/4 S 33 T20S R 3E

SITE ID: NASA-WSTF LOCATION ID: BLM-9-419

SITE COORDINATES (ft.):

N 228517.55 E 406183.31GROUND ELEVATION (ft. MSL): 4602.24 (BRASS CAP)STATE: NEW MEXICO COUNTY: DOÑA ANADRILLING METHOD: MUD ROTARY 0'-100' AIR-FOAM ROTARY 100'-557'DRILLING CONTR.: LARJON DRILLINGDATE STARTED: 5 OCTOBER 1988 DATE COMPLETED: 9 NOVEMBER 1988FIELD REP.: R. COOPERCOMMENTS: 0'-92' 12 3/4" Pilot hole reamed to 16" borehole,10"x92' steel surface casing; 92'-557'(TD) 9 7/8" borehole;

Top of bedrock at 340' by geophysical logs.

LOCATION DESCRIPTION:

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
5	+ + + + V V V V : / -		25	0'-557' cuttings	Alluvium (Santa Fe Group): The predominant color of the washed cuttings is dark gray (N3); unwashed samples in the more clay-rich zones (10-70% clay) are grayish orange (10YR 7/4) to light brown (SYR 6/4) and light gray (N7) to Medium gray (N5) in samples with <10% clay content. Cuttings range in size from silt-size to 30mm (1.2 inches) with an average size of 3mm (.12 inches). Cutting shapes range from flakes to blocky fragments. Formational grains are subrounded to rounded and make up 5-25% of each sample. The alluvium is an unconsolidated to moderately consolidated poorly sorted pebble to boulder conglomerate with intermittent clay and silty sand zones. Alluvium contains clasts of light gray (N7) to grayish black (N2) micritic limestone with <10% allochems; white (N9) and red and white mottled rhyolite with varying amounts of iron-staining; light olive gray (5Y 3/2) and very dark red (5R 2/6) andesite with some pyroxene alteration to epidote; translucent to blue white (5B 9/1) quartz; iron-stained quartzite; iron-stained sandstone; moderate reddish brown (10R 4/6) granite; moderate reddish brown (10R 4/6) to moderate red (5R 4/6) and greenish gray (5GY 6/1) to greenish gray (5G 6/1) siltstone; and grayish orange (10YR 7/4) to light brown (SYR 6/4) clay. The clay content ranges from less than 10% to greater than 70% of the samples in the upper 215'. It comprises less than 10% of the sample from 215' to the bedrock contact at 340'. Limestone is the predominant clast but the igneous fraction in samples increases with depth and becomes the predominant fraction below 315'.
10	+ + + + V V V V : / -		35		
15	+ + + + + V V V V : / -		17		
20	+ + + + + V V V V : / -		48		
25	+ + + + + V V V V : / -		18		
30	+ + + + + V V V V : / -		36		
35	+ + + + + V V V V : / -		34		
40	+ + + + + V V V V : / -		23		
45	+ + + + + V V V V : / -		58	0'-35'	Average cutting size ranges from 3mm (0.12 inches) to 4mm (0.16 inches).
50	+ + + + + V V V V : / -		36	35'-45'	Slight increase in average cutting size to 5-6mm (0.20-0.24 inches).
				45'-80'	Average cutting size 3-4mm (0.12-0.16 inches).

Depth	Visual %	Lith.	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
50				Cuttings (cont'd)	Alluvium (Santa Fe Group): continued 50'-65' Clay-rich zone in alluvium.
55			32		
60			109		
65			23		
70			19		
75			61		
80			55		80'-105' Decrease in average cutting size to 1-2mm (0.04-0.08 inches).
85			32		80'-200' Clay-rich alluvium with clay content varying between 20 and 70%.
90			30		
95			5		
100			2		
105			2		92'-557' Change in drilling method from mud rotary to air-foam rotary.
110			2		*
115			2		105'-230' Average cutting size is 4-5mm (0.16-0.20 inches).

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
115				Cuttings (cont'd)	Alluvium (Santa Fe Group): continued
120			2		
125			3		
130			5		
135			3		
140			2		
145			3		
150			4		
155			3		
160			2		
165			2		
170			2		
175			2		
180			20		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
180				Cuttings (cont'd)	Alluvium (Santa Fe Group): continued
185			3		
190			2.5		
195			2.5		
200			4		
205			5		
210			6		
215			6		
220			4		220'-355' Clay content in alluvium is <10%.
225			5		
230			7		230'-350' Average cutting size is 3-4mm (0.12-0.20 inches).
235			5		*
240			4		
245			6		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
245				Cuttings (cont'd)	Alluvium (Santa Fe Group): continued
250			14		
255			20		
260			10		
265			9		
270			11		
275			13		
280			20		
285			27		
290			20		
295			24		
300			15		
305			26		
310			20		

Depth	Visual %	Lith.	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
310	+ + + + V V V V V / 0			Cuttings (cont'd)	Alluvium (Santa Fe Group): continued
315	+ + + + V V V V V / D		24		
320	V V V V V + + + / 0		24		
325	V V V V V V + + + / 0		31		
330	V V V V V V + + + / 0		27		
335	V V V V V V + + + / 0		29		
340	V V V V V V + + + / 0		22		
345	V V V V V V + + + / 0		19		
350	V V V V V V V + + + / 0		10		350'-380' Decrease in average cutting size to 2-3mm (0.08-0.12 inches).
355	V V V V V V V V V V		10		355'-395' <u>Volcanic Tuff</u> : Medium light gray (N6) to medium gray (N5) when wet and very light gray (N8) to light gray (N7) when dry crystal-vitric-lithic tuff. Cuttings are angular and can be scratched easily with a knife. Top of bedrock by geophysical logs is 340'.
360	V V V V V V V V V V		8		
365	V V V V V V V V V V		8		
370	V V V V V V V V V V		5		
375	V V V V V V V V V V		11		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
375	VVVVVVVVVVVVVV				
380	VVVVVVVVVVVVVV		18		380'-415' Slight increase in average cutting size to 3-5mm (0.12-0.20 inches).
385	VVVVVVVVVVVVVV		13		
390	VVVVVVVVVVVVVV		14		
395	VVVVVVVVVVVVVV		10		395'-420' <u>Volcanic Tuff</u> : Grayish red (10R 4/2) to moderate reddish brown (10R 4/6) vitric-lithic-crystal tuff. Cuttings are angular and the average size is 4-5mm (0.16-0.20 inches).
400	VVVVVVVVVVVVVV		6		
405	VVVVVVVVVVVVVV		5		
410	VVVVVVVVVVVVVV		4		
415	VVVVVVVVVVVVVV		5		415'-435' Decrease in average cutting size to 2-3mm (0.08-0.12 inches).
420	VVVVVVVVVVVVVV		4		420'-435' <u>Volcanic Epiclastic</u> : Color is similar to the above-mentioned tuff but has a slightly more reddish orange color. Cuttings are much smaller (average size 1-2mm, 0.04-0.08 inches) and include many individual grains of glass and quartz. Most grains are rounded but angular cuttings are still present in minor amounts.
425	VVVVVVVVVVVVVV		2		
430	VVVVVVVVVVVVVV		2		
435	VVVVVVVVVVVVVV		2		435'-465' <u>Volcanic Tuff</u> : Dark reddish brown (10R 3/4) to very dusky red (10R 2/2). The darker tuff seems to be more lithic than the tuff at 395'-420'. Cuttings are a mixture of grayish tuff and reddish tuff. Most cuttings are angular.
440	VVVVVVVVVVVVVV		3		435'-455' Slight increase in average cutting size to 3-4mm (0.12-0.16 inches).

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
440	VVVVVVVVVVVVVV				
445	VVVVVVVVVVVVVV		5		
450	VVVVVVVVVVVVVV		5		450'-465' Grayish tuff is predominant but there is still small amounts of reddish tuff. Possibly a transition from an oxidized zone to a none oxidized zone of the same flow.
455	VVVVVVVVVVVVVV		5		455'-460' Decrease in average cutting size to 1-2mm (0.04-0.08 inches).
460	VVVVVVVVVVVVVV		4		460'-470' Slight increase in average cutting size to 2-3mm (0.08-0.12 inches).
465	VVVVVVVVVVVVVV		4		465'-525' <u>Volcanic Tuff</u> : Pale red (5R 6/2 - 10R 6/2) lithic crystal tuff. Cuttings are angular and can be easily broken by hand and scratched with fingernail.
470	VVVVVVVVVVVVVV		4		470'-485' Slight increase in average cutting size to 3-4mm (0.12-0.16 inches).
475	VVVVVVVVVVVVVV		4		485'-490' Decrease in average cutting size to 1-2mm (0.04-0.08 inches).
480	VVVVVVVVVVVVVV		4		490'-557' Increase in average cutting size to 3-5mm (0.12-0.20 inches).
485	VVVVVVVVVVVVVV		3		
490	YVVVVVVVVVVVVV		3		
495	VVVVVVVVVVVVVV		3		
500	VVVVVVVVVVVVVV		4		
505	VVVVVVVVVVVVVV		3		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
505	VVVVVVVVVVVVV				
510	VVVVVVVVVVVVVV		5		
515	VVVVVVVVVVVVVV		4		
520	VVVVVVVVVVVVVV		4		
525	VVVVVVVVVVVVVV		4		525'-557' Volcanic Tuff: Some pale red (5R 6/2 - 10R 6/2) tuff combined with medium gray (N5) to medium dark gray (N4) lithic tuff and cutting of white (N9) to light greenish gray (5G 8/1) talc. Most cutting are angular but there are some rounded grains. The soft nature of these rocks may allow them to be rounded as they are being blown up the hole; it is impossible to say whether or not these grains are rounded in the formation.
530	VVVVVVVVVVVVVV		3		
535	VVVVVVVVVVVVVV		4		
540	VVVVVVVVVVVVVV		4		
545	VVVVVVVVVVVVVV		5		
550	VVVVVVVVVVVVVV		5		
555	VVVVVVVVVVVVVV		10		Total depth = 557'
560					
565					
570					