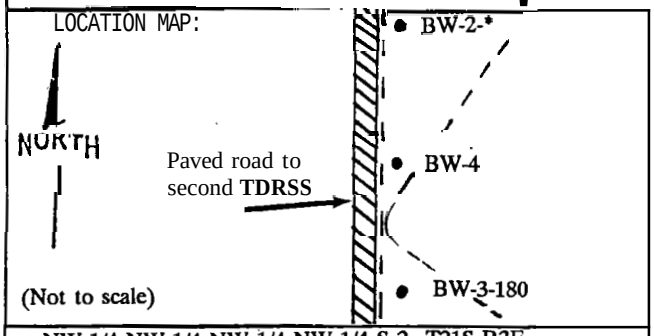
LITHOLOGIC LOG



NW 1/4 NW 1/4 NW 1/4 NW 1/4 S 2 T21S R3E

SITE IO: NASA-WSTF LOCATION IO: BW-4

SITE COORDINATES (ft.):

N 227775.20 E 413654.93

GROUND ELEVATION (ft. MSL): 4750.75(BC)

STATE: NEW MEXICO COUNTY: DOÑA ANA

DRILLING METHOD: Mud Rotary/Air Foam Rotary

DRILLING CONTR.: Larion Drilling Co.

DATE STARTED: 02/02/93 DATE COMPLETED: 02/17/93

FIELD REP.: J. Kirby, D. Menzie, K. Sumners

COMMENTS: 0'-244' mud rotary with 8 3/4" mill tooth bit. Set 244' of 5" steel surface casing. 244' to 482' air/foam rotary with 4 1/2" hammer bit. Andesite bedrock at 230'. Total Depth = 482'.

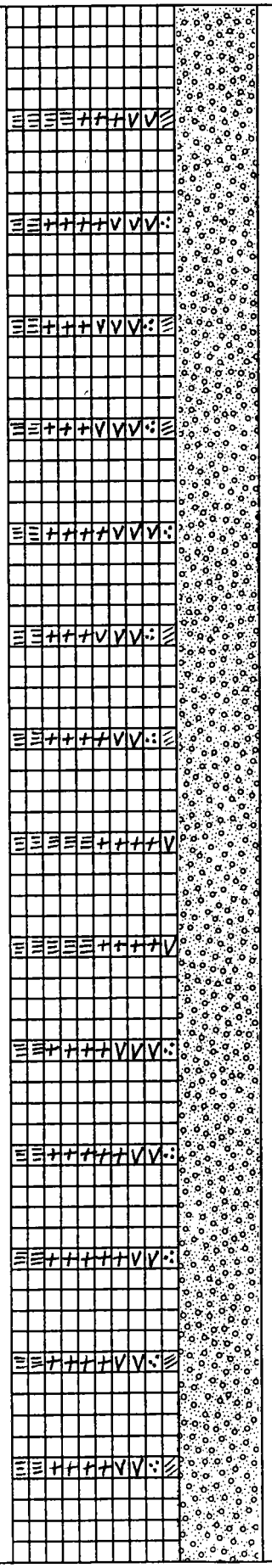
Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
			Timed by driller	Cuttings rab sample every 5'	
5			3		
10			5		
15			7		
20			5		
25			4		
30			5		
35			6		
40			5		
45			6		
50			6		

0'-230' Alluvium (Santa Fe Group): Washed samples are multicolored due to different lithologies of the cuttings. Cuttings range in size from much less than 0.1 inches (clay and silt sizes) to 0.9 inches. Cuttings are angular to subrounded and formational grains are subrounded to rounded. Samples are 15 to 50% formational grains. The alluvium is a poorly sorted, unconsolidated to moderately consolidated, pebble to boulder, polygenetic conglomerate. Cutting clast lithologies in decreasing order of abundance include light gray (N7) to grayish black (N2) micritic limestone, light brown (5 YR 6/4) clay, dark reddish brown (10 R 3/4) siltstone, white (N9) iron-stained rhyolite, light brown (5 YR 6/4) caliche, brownish black (5 YR 2/11 sandstone, and lesser amounts of quartz, granite, and andesite. Clay and caliche-rich intervals are noted in the log. The alluvium becomes volcanic-rich just above the top of the andesite bedrock.

0'-10' Caliche content 10%.

0'-30' Clay content 30%.

30'-50' Clay content increases to 40-50%.

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
50			6		50'-80' Clay content decreases to 20%.
55			5		
60			4		60'-65' Drill time increases.
65			14		
70			8		
75			6		
80			6		80'-90' Clay content increases to 50%.
85			5		
90			6		90'-130' Clay content decreases to 20%.
95			5		
100			5		
105			8		105'-110' Drill time increases.
110			18		
115			7		

Oepth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
115			7		
120			14		
125			22		125'-240' **Drill times increase.**
130			20		130'-140' **Caliche content** 10%. 130'-155' **Decrease in clay content to** 10%.
135			38		
140			62		
145			70		
150			56		
155			58		155'-175' **Clay increases to** 20%. 155'-160' **Caliche** 10%.
160			90		
165			80		165'-175' **Caliche** 10%.
170			44		
175			56		175'-185' **Caliche increases to 20%.**
180			55		

Oepth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
180			55		
185			60		185'-190' Clay content 10%.
					185'-200' Caliche decreases to 10%.
190			39		
195			49		
200			50		
205			51		205'-225' Clay increases to 20%.
					205'-215' Caliche 10%.
210			41		
215			49		215'-220' Volcanic fraction is mostly rhyolite.
220			70		220' Andesite-rich alluvium.
225			42		225'-230' Clay decreases to 10%
230			62		230'-482' Andesite (Orejon): Samples range in color from grayish black (N2) to blackish red (5 R 2/2). Samples are predominantly porphyritic andesites with lesser amount of andesitic lahar deposits. Andesite porphyry contains plagioclase and hornblende phenocrysts in a fine-grained groundmass. White to colorless plagioclase phenocrysts are anhedral to euhedral and may be up to 0.1 inches in length. Bladed hornblende makes up 2 to 10% of the phenocrysts and are up to .05 inches in length. Some hornblende has been altered to chlorite. White to colorless calcite is present as fracture filling. Cutting clasts range in size from less than 0.1 inches to 0.5 inches and average 0.2 inches in size.
235			49		
240			45		
245			7		

LOCATION ID: BW-4

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
245			7		
250			a		
255			9		
260			8		
265			11		
270			9		
275			9		
280			9		
285			8		
290			7		
295			11		
300			9		300' Slight bit chatter.
305			9		
310			9		

Depth	Visual X / Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
			Cuttings (cont'd)	
310		9		
315		9		
320		11		
325		26		325'-345' Drill times increase.
330		24		330' Bit chatter.
335		21		
340		13		
345		22		
350		16		350' Bit chatter.
355		9		
360		7		360' Bit chatter.
365		14		
370		9		
375		7		

LOCATION ID: BW-4

Depth	Visual % / Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
			Cuttings (cont'd)	
375		7		
380		7		
385		8		
390		7		
395		7		395' Bit chatter.
400		5		400'-405' Drill time increases.
405		23		
410		9		
415		8		
420		8		420' Bit chatter.
425		10		
430		8		
435		8		
440		9		

LOCATION IO: 8W-4

Oepth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
440			9		
445			11		
450			9		
455			12		
460			8		
465			16		
					468' Bit chatter.
470			7		
475			8		
480			8		
					482' Total Depth by pipe tally (drillograph only read 477'). TO by geophysical logger was 481'.
485					
490					
495					
500					
505					