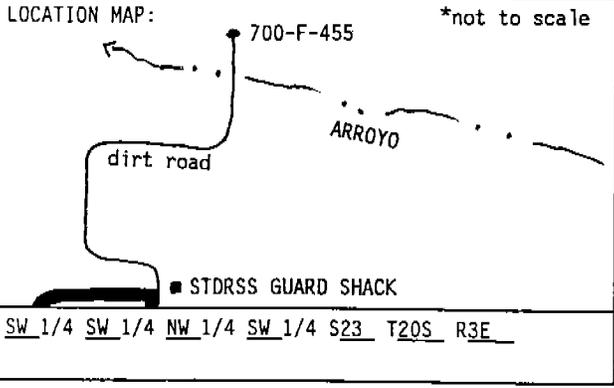


# LITHOLOGIC LOG

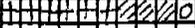
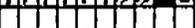
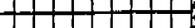


SITE ID: NASA-WSTF LOCATION ID: 700-F-455  
 SITE COORDINATES (ft.):  
 N 239697.66 E 414160.61  
 GROUND ELEVATION (ft. MSL): 4763.62 (BC)  
 STATE: NEW MEXICO COUNTY: DOÑA ANA  
 DRILLING METHOD: Mud/Air-foam Rotary  
 DRILLING CONTR.: Larion Drilling Co.  
 DATE STARTED: 09/24/90 DATE COMPLETED: 01/31/91  
 FIELD REP.: D. Menzie

COMMENTS: Mud Rotary 0'-60' (12 1/2" mill tooth), ream to 16", set 10"x60' steel surface casing, air-foam rotary 60'-525' (9 7/8" mill tooth to 190', 9" hammer to 526'). Andesite-rich alluvium at 200' and andesite bedrock at 305'. Total Depth = 526'.

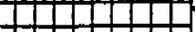
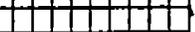
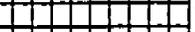
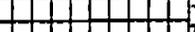
Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
			(Timed by driller)	Cuttings (0'-526')	0'-60' Mud rotary drilling.
5		[Dotted Lithology]	16		0'-200' Alluvium (Santa Fe Group): Unwashed samples range in color from moderate brown (5 YR 3/4) to dark gray (N3). Washed samples are predominantly dark gray to multicolored. Samples are comprised of cuttings which range in size from 0.9 inches to much less than 0.1 inches (silt size), and average 0.2 inches in size. Cuttings are rounded to angular with smaller alluvial grains rounded to subrounded and larger clasts angular to subrounded. Samples represent a poorly sorted, unconsolidated to moderately consolidated, polygenetic, pebble to boulder conglomerate. Cuttings representing lithologies within the alluvium are dark gray (N3) to brownish gray (5 YR 4/1) micritic limestone, grayish red (5 R 4/2) to light olive gray (5 Y 5/2) siltstone, white (N9) iron-stained rhyolite, moderate brown (5 YR 4/4) sandstone, pale red (5 R 6/2) to grayish pink (5 R 8/2) caliche, light brown (5 YR 6/4) to grayish red (5 R 4/2) clay, grayish red (5 R 4/2) to light brownish gray (5 YR 6/1) andesite and minor amounts of quartz, chert, granite and calcite. Significant clay and caliche zones are noted below. A transition to andesite-rich alluvium begins at 180'. The top of andesite-rich alluvium at 200' is chosen from geophysical logs.
10			29		
15			16		
20			23		
25			20		
30			13		
35			15		0'-10' Clay-rich interval, clay content 20-30%.
40			36		0'-60' Cuttings are angular to rounded with smaller grains being rounded to subangular and larger clasts angular to subrounded. Cuttings range in size from much less than 0.1 inches to 0.9 inches and average 0.4 inches.
45			18		20'-30' White rhyolite forms bulk of volcanics.
50			10		25'-45' Clay-rich interval, clay content 20-60%.

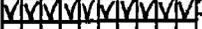
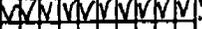
Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
50			10	Cuttings (cont'd)	
55			40		55'-60' Clay-rich interval, clay content 30%.
60			22		60'-525' Switch to air-foam rotary drilling.
			Drillograph		
65			6		60'-70' Cuttings predominantly angular to subangular chips, bit chatter indicates boulders. Cutting range in size from less than 0.1 inches to 0.8 inches and average 0.3 inches.
70			6		70'-115' Cuttings predominantly angular to subrounded and range in size from less than 0.1 inches to 0.6 inches. Average cuttings size 0.2 inches.
75			7		
80			6		
85			7		
90			4		
95			4		
100			5		
105			5		105'-115' Clay content about 5%.
110			5		
115			5		115'-180' Cuttings predominantly subrounded to subangular. Cuttings range in size from less than 0.1 inches to 0.5 inches and average size is 0.1 inches.

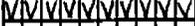
Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
115			5	Cuttings (cont'd)	
120			8		
125			7		
130			6		
135			8		
140			7		
145			5		
150			9		
155			8		
160			9		
165			7		
170			9		
175			13		
180			12		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
180			12	Cuttings (cont'd)	180'-200' First appearance of porphyritic andesite in cuttings. Foam changes color from brown to purple at 190'-195'. Gray to grayish red, porphyritic andesite is mostly angular to subangular with average cuttings size of 0.1 inches. Sedimentary clasts mostly rounded to subrounded.
185			8		
190			32		190'-525' Change from tricone mill tooth bit (9 7/8") to air-hammer bit (9").
195			90		
200			70		200'-305' <u>Andesite-rich Alluvium (Santa Fe Group)</u> : Alluvium predominantly (60%-95% of sample) comprised of gray (N5) to grayish red (10 R 4/2) aphanitic to porphyritic andesite with minor (< 15%) plagioclase phenocrysts. Andesite cuttings are mostly angular to subangular flat chips. Average cutting size is 0.1 inches. Minor fraction (5%-40%) of sample consists of mostly rounded to subrounded clasts of limestone, siltstone and small amounts of sandstone.
205			47		
210			45		
215			49		
220			55		
225			55		
230			21		
235			36		
240			32		
245			29		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
245			29	Cuttings (cont'd)	<p>255'-305' Average cutting size decreases to less than 0.1 inches (very fine sand to silt). Cuttings range from much less than 0.1 inches to 0.3 inches. Andesite clasts mostly angular chips and flakes. Limestone and siltstone clasts mostly rounded to subrounded. Much of the very fine material washes through the sieve.</p>
250			29		
255			22		
260			23		
265			23		
270			23		
275			25		
280			19		
285			28		
290			28		
295			23		
300			20		<p>305'-525' <u>Oregon Andesite</u>: Grayish red (10 R 4/2) to medium gray (N5) aphanitic to porphyritic andesite. Cuttings are mostly angular to subangular chips and flakes. Average cutting size is 0.1 inches but sizes range from much less than 0.1 inch (silt-size) to 0.5 inches. Porphyritic andesite contains minor (&lt; 15%) phenocrysts of plagioclase and pyroxene. Some alteration of plagioclase to serrucite is evident. Small amounts of calcite from filled fractures are present in the samples. Depth to top of Andesite chosen from Geophysical logs.</p>
305			17		
310			29		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
310			29	Cuttings (cont'd)	
315			21		
320			27		
325			24		
330			19		
335			25		
340			24		
345			23		
350			25		349' Very slight bit chatter.
355			34		351' Very slight bit chatter. No sign of water after adding joint to drill stem.
360			38		
365			37		
370			16		
375			26		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
375			26	Cuttings (cont'd)	
380			29		
385			52		385'-400' Increase in average cuttings size to 0.2". Increase in drill times.
390			39		
395			34		
400			30		400'-420' Silt-size cuttings.
405			26		
410			34		
415			31		
420			32		420'-430' Increase in cutting size to 0.1 inches.
425			28		
430			25		430'-450' Silt-size cuttings.
435			40		435'-450' Increase in drill times.
440			42		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
440			42	Cuttings (cont'd)	450'-510' Cutting size is very small. Not many cuttings larger than 0.1 inch.
445			36		
450			20		
455			22		
460			22		
465			18		
470			21		
475			28		
480			26		
485			36		
490			22		
495			19		
500			38		
505			33		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
505			33		
510			28		
515			32		
520			33		
525			31		
530					
535					
540					
545					
550					
555					
560					
565					
570					

510'-525' Increase in average cutting size to 0.15 inch.

T.D. = 525' (Drilllograph)

T.D. = 526' (Geophysical logs and sounding).