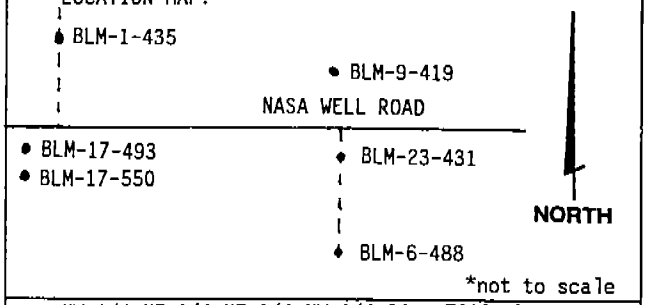
LITHOLOGIC LOG

LOCATION MAP:



*not to scale

NW 1/4 NE 1/4 NE 1/4 NW 1/4 S4 T21S R3E

LOCATION DESCRIPTION: _____

SITE ID: NASA-WSTF LOCATION ID: BLM-23-431

SITE COORDINATES (ft.):

N 227100.37 E 405946.17

GROUND ELEVATION (ft. MSL): 4588.96 (BC)

STATE: NEW MEXICO COUNTY: DOÑA ANA

DRILLING METHOD: Mud/Air-foam Rotary

DRILLING CONTR.: Larjon Drilling Co.

DATE STARTED: 06/04/90 DATE COMPLETED: 06/25/90

FIELD REP.: Jack Kirby-GCL

COMMENTS: 0-80' 12 3/4" pilot hole reamed to 16" borehole. 10" x 80'steel surface casing; 80'-285' 9 7/8" borehole; 285'-500' 9" air-hammer bit; core interval 500'-505'(TD). Top of andesite bedrock at 352'(by geophysical logs).

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
5			35	0'-500' Cuttings	0'-352' Alluvium (Santa Fe Group): Washed cutting color ranges from white (N9) to dark gray (N3) to translucent. Unwashed samples average 10% to 20% clay content (yellowish-gray 5 Y 8/1) and range as high as 40% at the 40' to 45' interval. Cuttings range from silt-size to 1 inch (≈25mm) with average size ≈0.12 inch (3mm). Cutting shapes range from flakes (exhibiting fresh surfaces) to highly rounded/spherical weathered grains. This formation contains clasts of light gray (N7) to dark gray (N3) limestone; white (N9) rhyolite with varying amounts of iron-staining; olive-gray (5 Y 4/1) siltstone (some cuttings exhibiting bedding planes); grayish red (5 R 4/2) to dark reddish brown (10 R 3/4) andesite exhibiting epidotization; translucent to bluish white (5 B 9/1), anhedral to subhedral, quartz; dusky red (5 R 3/4) sandstone with minor iron staining. Limestone is the predominant clast at surface (decreasing with depth). Andesite becomes the predominate rock type below 120 feet.
10			14		
15			10		
20			6		
25			12		
30			16		15'-25' Reduction in average cutting size to ≈.08 in. (2mm).
35			10		25'-30' Increase in average cutting size to ≈0.40 in. (10mm). Sample returns are commonly weathered surfaces and not cuttings.
40			13		30'-60' Average cutting size ≈0.8in(2mm).
45			13		40'-45' Slight increase in clay content.
50			16		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
50			16	0'-500' Cuttings (cont'd)	
55			18		
60			11		60'-70' Sample returns reduce in average size to ≈.04 in (1mm) drill cuttings.
65			8		70'-215' Average cutting size ≈0.8in(2mm).
70			16		
75			13		
80			12		80'-500' Drilling method changes from mud rotary to air-foam rotary.
85			5		80'-242' Average drill rate is 2 min/ft.
90			4		
95			7		
100			6		
105			4		
110			6		
115			6		

LOCATION ID: BLM-23-431

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				0'-500' Cuttings (cont'd)	
115			6		
120			5		
125			4		
130			6		
135			5		
140			4		
145			8		
150			7		
155			6		
160			6		
165			7		
170			8		
175			5		
180			8		

LOCATION ID: BLM-23-431

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
180			8	0'-500' Cuttings (cont'd)	
185			5		
190			10		
195			5		
200			6		
205			5		
210			7		
215			7		215'-275' Average drill cutting size reduces to 0.4 in. (1mm).
220			21		
225			13		
230			12		
235			11		
240			15		242'-500' Drill rate decreases to ≈8 min/ft.
245			22		

LOCATION ID: BLM-23-431

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
245			22		
250			32		
255			41		
260			39		
265			18		
270			48		
275			60		275'-285' Average cutting size less than 0.4 in.(1mm) Highly cemented alluvium.
280			83		
285			55		285'-500' Drilling method changes from 9 7/8" air-foam rotary (tri-cone bit) to 9" air-foam rotary (air-hammer bit). Average cutting size ≈0.8in.(2mm).
290			18		
295			15		
300			14		
305			16		
310			18		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
310			18	0'-500' Cuttings (cont'd)	
315			18		
320			19		
325			21		
330			16		
335			22		
340			19		
345			20		
350			21		
355			15		352'-505' Orejon Andesite: Medium gray (N5) to grayish black (N2) aphanitic andesite. No visible phenocrysts in drill cuttings (average size of ≈0.12 inch/3mm), with visible phenocrysts in core sample (see attached core sample description for 500'-505'). Cuttings contain minor calcite from fracture fill with small amounts of dark reddish brown (10 R 3/4) iron staining. Two weathered/alluvial zones were encountered while drilling through Orejon Andesite (380'-400', 415'-420). These zones probably represent an unconformity in which erosion occurred between andesitic flow episodes; several different lithologic types are represented in these zones (see alluvial description at 0'). Some alteration of andesite to epidote occurs throughout bedrock with increasing amounts towards the bottom of the borehole.
360			21		
365			19		
370			21		
375			22		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
375			22	0'-500' Cuttings (cont'd)	
380			30		380'-400' Weathered bedrock zone/erosional surface containing up to 20% non-volcanic cuttings. Average cutting size ≈0.08 inch (2 mm) exhibiting moderate roundness.
385			25		
390			26		
395			20		
400			22		
405			15		
410			28		
415			17		415'-420' Erosional surface within the Orejon Andesite. Cutting size increases to ≈0.16 inch (4mm) exhibiting moderate to high roundness.
420			19		
425			27		
430			19		
435			34		
440			18		

LOCATION ID: BLM-23-431

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				0'-500' Cuttings (cont'd)	
440			18		
445			27		
450			36		
455			28		
460			23		
465			32		
470			28		
475			27		
480			35		
485			31		
490			28		
495			30		
500			34		500'-505' **CORE INTERVAL** See attached description
505			164		505' Total depth (TD).