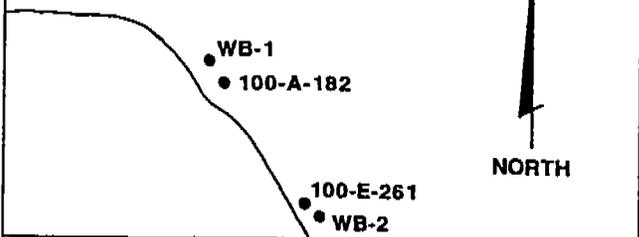


# LITHOLOGIC LOG

**LOCATION MAP:**



SE 1/4 SW 1/4 NE 1/4 NE 1/4 S 11 T 21S R 3E

SITE ID: NASA-WSTF LOCATION ID: WB-2

SITE COORDINATES (ft.):

N 221601.22 E 417825.10

GROUND ELEVATION (ft. MSL): 4901.00 (BC)

STATE: NEW MEXICO COUNTY: DOÑA ANA

DRILLING METHOD: Mud & Air-Foam Rotary

DRILLING CONTR.: Larjon Drilling Co.

DATE STARTED: 01/24/90 DATE COMPLETED: 4/13/90

FIELD REP.: R. Cooper

COMMENTS: Mud Rotary 0'-135' (7 7/8" bit) 5" x 136'

temporary surface casing. Air-foam rotary with 4" hammer bit

135'-380'. Top of limestone bedrock = 126'. Total Depth = 380'

**LOCATION DESCRIPTION:**

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings 0'-50'	0'-126' Alluvium (Santa Fe Group): Light brown (5 YR 6/4) to pale brown (5 YR 5/2) colored alluvium from silt and clay content. Cutting samples are multicolored. Cutting size ranges from silt-size to 45 mm (1.8 inches). Cutting shapes range from angular to rounded. Subrounded to rounded alluvial grains comprise from 10% to 70% of each sample. Alluvium is an unconsolidated to semi-consolidated pebble to boulder polygenetic conglomerate. Alluvial clasts include light gray (N7) to dark gray (N3) limestone and dolomite, light olive gray (5 Y 5/2) and reddish brown (10 R 3/4) siltstone, moderate brown (5 YR 4/4) sandstone, white (N9) and mottled (red and white) iron-stained rhyolite, mottled (colorless and reddish brown) granite, grayish red (10 R 4/2) andesite, colorless to light gray (N7) quartz and chert. Caliche is present in the uppermost 35' of the alluvium. Rhyolite is the predominant igneous clast and comprises approximately 90% of the igneous fraction. The olive gray siltstone comprises ≥ 95% of the siltstone fraction. Alluvium is mostly unconsolidated but becomes slightly more consolidated from 120'-126'.
5	VVV		5		0'-25' Sandy gravel; average cutting size 2-4 mm (0.08 - 0.16 inches).
10	VVVV		12		25'-30' Average cutting size 6-10 mm (0.24 - 0.40 inches) drilled through a limestone cobble or boulder.
15	VVVV		13		30'-40' Sandy gravel; average cutting size 2-3 mm (0.08 - 0.12 inches).
20	VVVV		47		40'-50' Sandy gravel and boulders. Average cutting size 5-8 mm (0.20 - 0.32 inches).
25	VVV		12		
30	VVV		7		
35	VVV		6		
40	VVV		13		
45	VVV		7		
50	VVV		14		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description	
50				Cuttings (cont'd) 50'-115'	50'-65' Gravelly sand, average cutting size 2-3 mm (0.08 - 0.12 inches).	
55	=====		13			
60			11			
65			7			65'-70' Sandy gravel and boulders. Average cutting size 5-8 mm (0.20 - 0.32 inches).
70			6.5			70'-80' Gravelly sand. Average cutting size 1-2 mm (0.04 - 0.08 inches).
75			8			
80			9			80'-85' Sandy gravel. Average cutting size 2-4 mm (0.08 - 0.16 inches).
85			11			
90			11			90'-100' Average cutting size 3-6 mm (0.12 - 0.16 inches).
95			7			
100			7			100'-105' Gravelly sand. Average cutting size 2-3 mm (0.08 - 0.12 inches).
105			5			105'-120' Sandy gravel. Average cutting size 4-6 mm (0.16 - 0.24 inches).
110			7			
115			9			

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
115				Cuttings (cont'd) 115'-180'	
120			15		120'-126' Average cutting size 2-3 mm (0.08 - 0.12 inches). High percentages of caliche and clay present; caliche is probably conglomerate matrix which resembles a caliche horizon.
125			23		126'-380' <u>Panther Seep Formation</u> : Interbedded moderate brown (5 YR 4/4) sandstone, olive gray (5 Y 3/2) siltstones, dark gray (N3) to black (N1) calcareous shales and light gray (N7) to dark gray micritic to fossiliferous limestones. The (+) symbol is used to represent both limestone and calcareous shale fraction.
130			55		
135			39		126'-135' Light olive gray (5 Y 5/2) to olive gray silty micritic limestone. Limestone is weathered; light olive gray lime mud is contained in cuttings.
140			5		135'-145' Silty olive gray to medium gray micritic limestone displays no calcite filled fractures iron and limonite staining present but not prevalent.
145			5		145'-150' Medium to dark gray micritic limestone; magnetite, iron staining and limonite staining present; fractures are filled with iron minerals. Moderately effervescent.
150			10		150'-180' Olive gray to medium dark gray limestone. Limestone seems to be slightly shaley or very fissile because cuttings are very flaky. Moderately effervescent.
155			7		
160			13		
165			12		
170			13		
175			16		
180			14		175'-180' Cuttings contain a few light reddish brown to reddish brown silty limestones and light olive gray limestones.

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd) 180'-245'	
180					180'-195' Light olive gray to olive brown silty fossiliferous limestone is predominant with some limonite and iron staining. Also some reddish brown silty limestone. Hairline fractures filled with iron oxide (?) material.
185			11		
190			11		
195			12		195'-200' Mixture of above limestone and medium to dark gray limestone. Limestone maybe slightly shaley.
200			9		200'-215' Medium to dark gray shaley limestone. Small amounts of olive gray to olive brown limestone present.
205			5		
210			7		
215			11		215'-220' Olive gray to olive brown limestone containing some small allochems. Hairline fractures filled with calcite and limonite. Iron staining occurs on some cuttings but is not prevalent. Cuttings also include medium to dark gray limestone.
220			7		
225			7		220'-225' Silty to shaley olive brown to olive gray limestone. Hairline to 2 mm (0.08 inches) fractures filled with calcite.
230			8		225'-230' Medium to dark gray to dark gray shaley limestone.
235			9		230'-240' Medium gray to dark gray fossiliferous limestone. Allochems are unidentifiable and replaced with sparite; hairline fractures filled with calcite.
240			14		
245			12		240'-245' Medium dark gray to dark gray shaley limestone mixed with above fossiliferous limestone hairline fractures filled with calcite.

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
245				Cuttings (cont'd) 245' 310'	
245					245'-260' Medium gray to medium dark gray slightly fossiliferous limestone. Alteration to sparite is common calcite filled fractures hairline to at least 2 mm (0.08 inches).
250			7		
255			16		
260			15		260'-265' Dark gray to grayish black shaley limestone. No fractures apparent.
265			12		265'-270' Grayish black to black calcareous shale, no fractures apparent.
270			9		270'-280' Dark gray to grayish black calcareous shale and shaley limestone. No fractures apparent.
275			11		
280			5		280'-300' Dark gray to grayish black calcareous shale.
285			7		
290			7		
295			6		300'-305' Thinly bedded silty to shaley medium gray limestone, iron and limonite staining on flat surfaces. Some limestone very soft and can be scratched with a fingernail. Also cuttings are calcareous shales and slightly fossiliferous medium gray to medium dark gray limestone.
300			5		
305			14		305'-325' Medium to dark gray shaley limestone and sparsely medium gray limestone hairline to 2 mm (0.08 inches) calcite filled fractures and calcite cuttings present in small amounts. Sparite possibly replaced fossils. Some limonite and iron staining present.
310			16		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd) 310'-375'	
310					
315			14		
320			16		
325			14		325'-340' Dark gray to grayish black calcareous shale with a small percentage of shaley limestone.
330			9		
335			11		
340			7		340'-380' Very light gray to light gray calcareous siltstone or shale mixed with dark gray to grayish black shale.
345			14		
350			10		
355			15		355'-380' Limonite and iron-staining present on some of the cuttings (10-15%).
360			16		
365			22		365'-380' Large pieces of iron-stained calcite ( $\leq$ 5% of cuttings) possibly fracture fill.
370			24		
375			22		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
375		[Lithology Pattern]	16	Cuttings (cont'd) 375'-380'	Total Depth = 380'
380		[Lithology Pattern]			
385					
390					
395					
400					
405					
410					
415					
420					
425					
430					
435					
440					