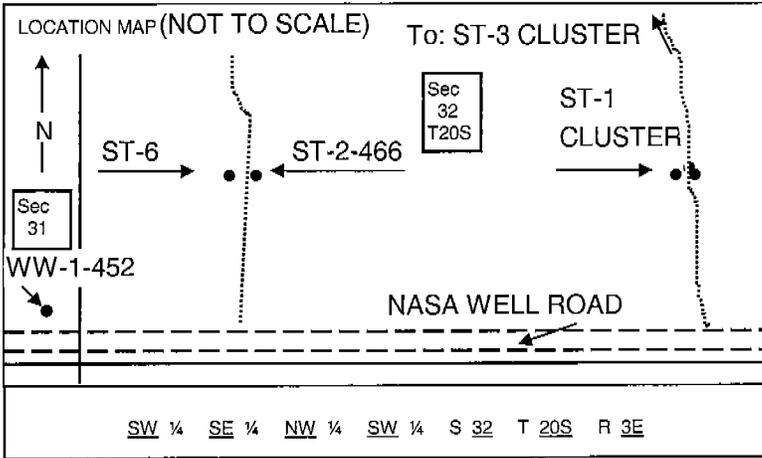


LITHOLOGIC LOG



SITE ID: NASA-WSTF LOCATION ID: ST-6

SITE COORDINATES (ft.):
 N: 229172.66 E: 398955.05

GROUND ELEVATION (ft. MSL): 4465.72 (BC)

STATE: New Mexico COUNTY: Dona Ana

DRILLING METHOD: Mud/Air Foam Rotary

DRILLING CONTR.: Stewart Brothers Drilling Co.

DATE STARTED/COMPLETED: 07/08/97 - 10/05/97

FIELD REP.: GILLES/PEARSON/RUSSELL/EGAN

COMMENTS: Drilled Mud Rotary (8 3/4") to 40'; Reamed to 14.7/8"
and set 10 3/4" surface casing to 40'. Drilled 9 7/8" to 1010' (TD).
Set 4" SS with Westbay retrofit. (5 screen zones total)

LOCATION DESCRIPTION: ST-6 is located 2.8 miles northwest of the WSTF 100 Area and 25 miles north of the NASA Well Road.

Depth (ft)	Visual %	Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description
				Grab Samples Every 10' 0'-1010'	0' - 570' : ALLUVIUM (Santa Fe Group): Samples range from grayish orange pink (5 YR 7/2) to light brown (5 YR 5/6) due to very high (20% - 80%) silty/gummy clay content. Individual clasts are highly variable in color and range from < .5 mm to 1.5 cm in diameter. Formational grains are rounded to subangular. Cuttings are subangular to angular. Formation is a poorly to moderately sorted polygenetic pebble conglomerate. Lithologies are highly variable and include rocks shed from surrounding highs of the southern San Andres Mountains. Limestones are micritic to fossiliferous, are medium light gray (N6) to dark gray (N3), and may exhibit hair-line calcite-filled fractures. Massive to laminated greenish gray (5 GY 6/1) to dark reddish brown (10 R 3/4) siltstones and a variety of igneous (predominantly volcanic) rock types characterize the formation. Very pale orange (10 YR 8/2) rhyolite porphyries, very light gray (N8) to medium light gray vitric to lithic crystal tuffs, arenaceous to argillaceous sandstones, quartzites, granites, and quartz/feldspar sands are also present.
10	+ + + v v v o o // //		24		
20	+ + + v v v o o // //		40		
30	+ + + + + v v v o // //		18		
40	+ + + + + v v // //		21		
50	+ + + + + v v v // //		10		
60	+ + + + + v v v // //		30		
70	+ + + + + v v v // //		17		
80	= = = = + + + v v v		30		80' - 90' Tan brown clayey silt comprises 60%-70% coarse subrounded to subangular gravel.
90	= = = = + + + v v		21		
100	= = = = + + + v v		60		

Depth (ft)	Visual %										Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description		
	=	=	=	=	=	=	=	=	=	=						
110	=	=	=	=	=	=	=	+	+	v	v		60	Grab Samples Every 10' 0'-1010'	110' - 120' Tan brown silty clay comprises 60% of the sample Gravel as before, made up mostly of limestone with a variety of volcanics.	
120	=	=	=	=	=	=	=	+	+	+	v	v		24		
130	=	=	=	=	=	=	=	+	+	+				46		130' - 140' Sand size grains suspended in moderate brown (5 YR 4/4) clay.
140	=	=	=	=	=	=	=	+	+	+				22		140' - 170' Tan brown silty clay makes up 60%-70%. Remainder is limestone-rich subrounded gravel and coarse sand.
150	=	=	=	=	=	=	=	+	+	+	+	+		40		
160	=	=	=	=	=	=	=	+	+	+	v	v		33		
170	=	=	=	=	=	=	=	+	+	+	v	v		27		170' - 180' Gravel, fine to coarse, subrounded-subangular, and gray/tan to white. Tan brown clayey silt.
180	=	=	=	=	v	v	v	+	+	+				60		180' - 200' Tan brown silty clay (85%). 15% fine to coarse gravel as before.
190	=	=	=	=	=	=	=	+	+	v	v			25		
200	=	=	=	=	=	=	=	+	+	v	v			60		
210	=	=	=	=	=	=	=	=	+	+				12		
220	=	=	=	=	=	v	v	+	+	+				35		
230	=	=	=	=	=	=	=	v	v	+				29		230' - 240' Brown, gray, white, fine to coarse, subrounded-subangular gravel with 30% gummy clay.
240	=	=	=	=	v	v	v	+	+	+				43		

Depth (ft)	Visual %								Lith	Drilling Time Scale: ft/ht	Sample Type and Interval	Lithologic Description		
250	=	=	=	=	=	+	+	+	v	v		38	Grab Samples Every 10' 0'-1010'	250'-270' Clay increases from 50% - 90%.
260	=	=	=	=	=	=	=	=	v	v	+	38		
270	=	=	=	=	=	=	=	=	v	v	+	30		270'-280' Decrease in clay. Clasts are subangular to rounded and are sand to gravel size.
280	=	=	=	=	+	+	+	+	v	v	v	27		280'- 310' Silty clay with sands and gravels. 5% grayish orange pink (10 R 8/2) caliche apparent.
290	=	=	=	=	+	+	+	+	v	v	v	33		
300	=	=	=	=	+	+	+	+	v	v	v	60		
310	=	=	=	=	+	+	+	+	v	v	v	60		
320	=	=	=	=	+	+	+	+	v	v	v	50		
330	=	=	=	=	+	+	+	+	v	v	v	30		
340	=	=	=	=	+	+	+	+	v	v	v	33		340'- 350' Moderate to well rounded sand-gravel size grains suspended in gummy clay
350	=	=	=	=	v	v	v	v	v	+	+	40		
360	=	=	=	=	+	+	+	+	v	v	v	30		
370	=	=	=	=	+	+	+	+	v	v	v	43		370' - 400' Caliche grains and coatings present. Clay is lighter in color, ranging from grayish orange pink (5 YR 7/2) to very pale orange (10 YR 8/2). Increasing percentages of volcanics. Very pale orange (10 YR 8/2) to dark yellowish orange (10 YR 6/6) rhyolite and grayish red purple (5 RP 4/2) andesite.
380	=	=	=	=	+	+	+	+	v	v	v	19		

Depth (ft)	Visual %										Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description
390	=	=	=	=	+	+	+	v	v	v		30	Grab Samples Every 10' 0'-1010'	
400	=	=	=	=	v	v	v	+	+	o		26		
410	=	=	=	=	v	v	v	+	+	:		33		
420	=	=	=	=	v	v	v	+	+	:		20		
430	=	=	=	=	v	v	v	v	+	+		32		
440	=	=	=	=	v	v	v	+	+			43		
450	=	=	=	=	v	v	v	v	v	+		46		450' - 490' Porphyritic Orejon Andesite and a variety of rhyolites dominate the moderate to well rounded gravels. Limestone and trace % of quartz sandstone also present.
460	=	=	=	=	v	v	v	v	v	+		25		
470	=	=	=	=	v	v	v	v	v	+		33		
480	=	=	=	=	v	v	v	v	v	+		24		
490	=	=	=	=	v	v	v	v	v			38		490' - TD <u>VOLCANIC RICH ALLUVIUM</u> : Consists of sand/gravel size clasts of volcanic and igneous rocks suspended in 20% to 50% clay. Volcanics consist of very pale orange (10 YR 8/2) to light brown (5 YR 5/6) and moderate red brown (10 YR 4/6) aphanetic rhyolite porphyries with 10% to 30% mafic phenocrysts. Andesite porphyry with tabular plagioclase phenocrysts (up to 40%) present. Aplitic granite fragments with predominately quartz and biotite are also present. Quartz/feldspar sands and other mafic alteration products of acidic volcanic suite are present as well.
500	=	=	=	=	v	v	v	v	v	v		21		
510	=	=	=	=	v	v	v	v	v	v		33		
520	=	=	=	=	v	v	v	v	v	v		24		

Depth (ft)	Visual %										Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description	
530	=	=	=	v	v	v	v	v	v	v		33	Grab Samples Every 10' 0'-1010'		
540	=	=	=	=	v	v	v	v	v	v		25			
550	=	=	=	v	v	v	v	v	v	v		35			
560	=	=	=	v	v	v	v	v	v	v		26			
570	=	=	=	v	v	v	v	v	v	v		17			570' - 580' Clay is pale red (10 R 6/2).
580	=	=	=	v	v	v	v	v	v	v		35			
590	=	=	=	v	v	v	v	v	v	v		Not Recorded			
600	=	=	=	v	v	v	v	v	v	v		"			600' - 610' Gravel is angular and coarser (average 5 cm).
610	=	=	=	v	v	v	v	v	v	v		"			
620	=	=	=	=	v	v	v	v	v	v		35			620' - 800' Volcanic alluvium is fine sand to fine gravel in size with volcanic rock types suspended in clay.
630	=	=	=	=	v	v	v	v	v	v	26				
640	=	=	=	=	v	v	v	v	v	v	35				
650	=	=	=	=	v	v	v	v	v	v	23				
660	=	=	=	=	v	v	v	v	v	v	40				

Depth (ft)	Visual %										Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description		
670	=	=	=	=	=	v	v	v	v	v		23	Grab Samples Every 10' 0'-1010'			
680	=	=	=	v	v	v	v	v	v	v		35				
690	=	=	=	=	v	v	v	v	v	v		19				
700	=	=	=	v	v	v	v	v	v	v		38				
710	=	=	=	v	v	v	v	v	v	v		25				
720	=	=	=	v	v	v	v	v	v	v		33				
730	=	=	=	v	v	v	v	v	v	v		32			730' - 740' Mixed volcanics and volcaniclastics. Rock types include welded lithic tuff, andesitic lahar, andesite porphyry and rhyolite. Sand to gravel size clasts are rounded to subangular.	
740	=	=	v	v	v	v	v	v	v	v		30				
750	=	=	=	v	v	v	v	v	v	v		26				
760	=	=	=	v	v	v	v	v	v	v		38				
770	=	=	v	v	v	v	v	v	v	v		23				
780	=	=	v	v	v	v	v	v	v	v		30				
790	=	=	=	v	v	v	v	v	v	v		21				
800	=	=	v	v	v	v	v	v	v	v		33				800' - 1000' Clay decreases slightly. Average grain size of clasts increases.

Depth (ft)	Visual %										Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description
810	=	=	v	v	v	v	v	v	v	v		21	Grab Samples Every 10' 0'-1010'	
820	=	=	v	v	v	v	v	v	v	v		24		
830	=	=	v	v	v	v	v	v	v	v		22		
840	=	=	v	v	v	v	v	v	v	v		33		
850	=	=	v	v	v	v	v	v	v	v		46		
860	=	=	v	v	v	v	v	v	v	v		24		
870	=	=	v	v	v	v	v	v	v	v		35		
880	=	=	v	v	v	v	v	v	v	v		46		
890	=	=	v	v	v	v	v	v	v	v		40		
900	=	=	v	v	v	v	v	v	v	v		19		
910	=	=	v	v	v	v	v	v	v	v		43		
920	=	=	v	v	v	v	v	v	v	v		27		
930	=	=	v	v	v	v	v	v	v	v		46		
940	=	=	v	v	v	v	v	v	v	v		23		

850' - 1000' Predominantly andesitic lithology grades into predominantly rhyolite and rhyolitic tuffs. Silica rich chips are angular to well rounded. Chips are translucent gray with large quartz / mafic bladed phenocrysts to reddish brown (10 R 4/6) with 15% to 20% phenocrysts. Highly varied lithologies present. Crystallitic/vitric tuffs and weathered products. Hematite grains, quartz, feldspar, and mafics. Clay is gummy and variegated in color with iron-oxidized biotite and hornblende.

