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**Lithological Conditions at
the Box Canyon Site: Results
of Drilling, Coring and Open
Borehole Measurements
1995–1997 Data Report**

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Carol Knutson, and Buck Sisson

Earth Sciences Division

September 1998

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LITHOLOGICAL CONDITIONS AT THE BOX CANYON SITE: RESULTS OF DRILLING, CORING AND OPEN BOREHOLE MEASUREMENTS

1995-1997 Data Report

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September 1998

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Introduction

Motivation

DOE faces the remediation of several contaminated sites in unsaturated fractured basalt where organic and radioactive wastes have migrated downward through fracture pathways that are difficult, if not impossible, to detect. Perched water zones located above zones of low permeability (massive basalt) create a complicated system of hydraulic baffles. Because of these large scale heterogeneities, the characterization of the lithology of the rock and the geometry of the subsurface fracture pattern is a crucial step in the development of a conceptual model of fluid flow and chemical transport, and eventually the design of a remediation system.

The overall objectives of the investigations at the Box Canyon site were:

- (1) Develop a suite of reliable tools and methodologies that can be used together to characterize fluid flow and chemical transport.
- (2) Develop a conceptual model of fluid flow and chemical transport in unsaturated fractured basalt based on the results of ponded infiltration tests and lithological studies.

To address these objectives, a series of ponded infiltration tests was conducted at the Box Canyon site using instruments and monitoring techniques specifically designed to study fluid flow and chemical transport in fractured basalt.

General Description of the Site

The Box Canyon site, an analog site for contaminated sites, is located in the Eastern Snake River Plain near the Idaho National Engineering and Environmental Laboratory (Figure 1). In order to install the instrumentation and obtain lithological data, 38 vertical and slanted boreholes were drilled over the course of three years (1995-1997). Table 1 summarizes the well coordinates, inclination, and lengths. Figure 2 shows the borehole layout and boundaries of the infiltration pond.

The surface of the site consists of exposed weathered basalt and soils (clays and silts) which infill the near-surface fractures and basalt column joints (Figure 3). Along the cliff face, about 30 m from the pond, two distinct basalt flow fingers and a rubble zone between them can be seen. The characteristic fracture spacing in the basalt flow exhibits an increase in spacing with depth in the upper 2/3 of the flow. The lower 1/3 exhibits an inverted pattern, in which the fracture spacing decreases with depth. This pattern of fracture spacing is most likely due to differences in cooling rate and temperature gradient near the center of the flow as compared to the exposed surfaces.

Figure 1. A map showing the location of the Box Canyon site.

Table 1. Well Information and Coordinate System for Box Canyon Site

well id	vertical/ slant	angle from vertical	length (ft)	length (m)	x _{top} (m)	y _{top} (m)	z _{top} (m)	x _{bot} (m)	y _{bot} (m)	z _{bot} (m)
					(east)	(north)	(elev.)	(east)	(north)	(elev.)
E-1	slant	45.0	60.0	18.29	57.90	61.80	1599.67	68.50	72.04	1586.74
E-2	slant	40.0	60.0	18.29	57.30	60.90	1599.69	64.43	70.25	1585.68
E-3	slant	35.0	60.0	18.29	56.20	60.00	1599.64	62.75	68.19	1584.66
E-4	slant	28.0	60.0	18.29	55.90	59.20	1599.63	61.14	66.00	1583.48
I-1	vertical	0.0	40.0	12.19	58.90	64.40	1599.64	58.90	64.40	1587.45
I-2	vertical	0.0	40.0	12.19	60.80	67.90	1599.70	60.80	67.90	1587.50
I-3	vertical	0.0	40.0	12.19	60.90	61.00	1599.65	60.90	61.00	1587.46
I-4	vertical	0.0	40.0	12.19	61.90	57.20	1599.57	61.90	57.20	1587.38
I-5	vertical	0.0	20.0	6.10	66.70	60.30	1599.46	66.70	60.30	1593.36
II-1	vertical	0.0	63.2	18.29	53.50	67.30	1599.82	53.50	67.30	1581.53
II-2	vertical	0.0	60.0	19.26	56.10	70.10	1599.68	56.10	70.10	1580.42
II-3	vertical	0.0	60.0	18.29	55.50	62.80	1599.65	55.50	62.80	1581.36
II-4	vertical	0.0	60.1	18.32	58.10	56.80	1599.57	58.10	56.80	1581.25
II-5	vertical	0.0	73.7	22.46	62.40	62.90	1599.70	62.40	62.90	1577.23
II-6	vertical	0.0	60.0	18.29	68.90	66.70	1599.34	68.90	66.70	1581.05
II-7	vertical	0.0	60.0	18.29	65.80	54.90	1599.50	65.80	54.90	1581.21
II-8	vertical	0.0	60.0	18.29	69.60	55.70	1599.35	69.60	55.70	1581.06
R-1	slant	27.5	65.0	19.81	72.79	62.84	1599.28	63.65	62.80	1581.71
R-2	slant	41.1	65.0	19.81	67.36	63.04	1599.57	54.38	63.00	1584.64
R-3	slant	27.3	65.0	19.81	71.80	67.89	1599.25	62.71	67.90	1581.65
R-4	slant	29.2	75.0	22.86	66.16	67.60	1599.53	55.05	67.60	1579.58
R-5	slant	25.9	60.0	18.29	70.43	62.94	1599.5*	59.43*	62.94*	1581.40*
R-6	slant	26.3	60.0	18.29	69.44	67.77	1599.5*	59.55*	67.77*	157.50*
S-1	slant	30.0	16.0	4.88	62.30	64.90	1599.60	61.04	62.81	1595.37
S-2	slant	30.0	20.1	6.13	63.30	66.10	1599.53	61.44	63.67	1594.22
S-3	slant	30.0	44.4	13.53	64.60	68.10	1599.58	60.71	62.56	1587.86
S-4	slant	30.0	69.4	21.15	66.50	71.80	1599.50	61.01	62.76	1581.18
T-1	vertical	0.0	20.0	6.10	57.30	63.00	1599.65	57.30	63.00	1593.56
T-2	vertical	0.0	20.0	6.10	67.00	64.50	1599.50	67.00	64.50	1593.41
T-3	vertical	0.0	20.0	6.10	63.30	69.20	1599.75	63.30	69.20	1593.65
T-4	vertical	0.0	20.0	6.10	63.10	58.20	1599.56	63.10	58.20	1593.46
T-5	vertical	0.0	10.0	3.05	62.10	63.40	1599.75	62.10	63.40	1596.70
T-6	vertical	0.0	22.0	6.71	60.70	63.10	1599.83	60.70	63.10	1593.13
T-7	vertical	0.0	20.0	6.10	59.70	62.80	1599.64	59.70	62.80	1593.54
T-8	vertical	0.0	10.0	3.05	59.70	64.30	1599.75	59.70	64.30	1596.70
T-8A	vertical	0.0	20.0	6.10	58.90	65.60	1599.60	58.90	65.60	1593.50
T-9	vertical	0.0	10.0	3.05	60.20	66.50	1599.68	60.20	66.50	1596.63
T-10	vertical	0.0	10.0	3.05	61.67	65.70	1599.67	61.70	65.70	1596.62

Notes: Coordinates of bottoms of slant wells have been calculated.

*approximate

Figure 2. Borehole Layout at Box Canyon Site

T3

Studies of core and TV logs and cliff face mapping revealed that the fractured basalt vadose zone at the Box Canyon site is composed of the following geological components:

- Topsoil layer including flow-top rubble
- Upper vesicular zones with numerous near-surface soil-infilled fractures
- Massive basalt
- Vertical and sub-vertical column-bounding fractures
- Horizontal and sub-horizontal fractures
- Central fracture zone
- Lower vesicular zone
- Underlying rubble zone

Purpose and Structure of the Report

The purpose of this data report is to compile and document the results of drilling and lithological studies conducted in open boreholes at the Box Canyon site. Lithological templates are included for each well and contain data such as drilling date, drilling method, logging method, well coordinates, lithological log, gamma measurements, caliper measurements, core run and recovery depth, vesicular intervals, single fracture depths and descriptions, fracture zone depths and descriptions, and general comments about the borehole lithology. The lithological features were mapped for each borehole, and a legend depicting each feature is given in Table 2. The gamma and caliper measurements are presented as separate plots using greater resolution. Color core photos and core descriptions are also included. TV logging was used to map the lithology of the boreholes that were not cored (E, R, and T wells). This information will be further used to create a comprehensive lithological model of the subsurface.

The TV logging of cored wells was viewed to compare the resolution and accuracy of TV logging to core logging. The TV logging method accurately showed large scale features such as zones of vesicularity, large fractures, fracture zones, rubble zones, and massive basalt zones, but it was difficult to detect hairline fractures, fracture orientation, and mineralization of fractures. Also, all depth measurements in increments less than 1 ft are estimated. TV logging is not as precise as logging directly from the core, but it is useful for mapping the major lithological features.

Table 2

Lithological Legend

Box Canyon Site

Massive Basalt

Vesicular Zone

Rubble Zone

Horizontal Fracture

Low Angle Fracture

High Angle Fracture

Well I-1

BORING # I-1		DATE DRILLED: July 17, 1995		LOGGED FROM: T.V. Borehole Camera		METHOD: Air Percussion		PAGE: 1/1						
DRILLED BY: INEL			LOGGED BY: Marque Mesa			NORTHING: 211.4 ft.		EASTING: 193.2 ft		SURFACE ELEVATION: 5249.0 ft.				
Lithological Log	depth (feet)	total gamma (cps)		caliper (Inches)		Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
		15	25	3	6.5		10	Before Test		During Test	depths	description	depths	
						1.0				1.0	High angle.			Moderately Vesicular.
									3.0	2.0	Low angle.			
	5					5.0			5.0					Massive Basalt with sparse vesicles.
									7.0	7.0	Low angle vesicular fracture.			Vesicular Bands.
									9.0		Low angle.			
	10					10.0			10.0		Low angle.			
									12.9		Horizontal.			
									13.9					Vesicular.
	15					15.0			15.0					
									17.7					Vesicular Bands.
									18.3					
	20					20.0			21.1	21.1	Horizontal.			Notice a decrease in Caliper from 6.1" to 5.75" at about 20 foot depth.
								22.0						
25								26.0					Vesicular Bands.	
								27.0	26.8	Low angle.	27.0	3 high angle fractures.	Slightly vesicular.	
						28.0			28.5	2 Low angle fractures.	28.5			
30								29.9		Horizontal.				
								32.2	Low angle.	32.3	High angle fractures.			
						33.0			33.6	2 Low angle fractures.	33.0		Slightly vesicular.	
35								35.0		Horizontal.				
								36.9		Low angle.				
												38.0	Rubble Zone.	
Bottom of Well I-1 40.0'

Well I-2

BORING #		I-2		DATE DRILLED:		July 17, 1995		LOGGED FROM:		T.V. Borehole Camera		METHOD:		Air Percussion		PAGE:		1/1									
DRILLED BY:				INEL				LOGGED BY:				Marque Mesa				NORTHING:		222.9 ft.		EASTING:		199.4 ft.		SURFACE ELEVATION:		5248.8 ft.	
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)			Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments													
							Before Test	During Test		depths	description	depths	description														
		15 25	3	6.5	10																						
						1.5	///	///	2.0 3.2																Vesicles.		
	5					5.0			5.5	5.9 Two vertical fractures. 6.9 Horizontal. 8.2 Two horizontal fractures.															Massive Basalt with sparse vesicles.		
	10					10.0		///	9.0																Vesicular Band. Massive Basalt.		
	15					14.0		///	13.4 14.7																Vesicular.		
	20								17.8	16.0 High angle fracture.															Vesicular Band. Massive Basalt.		
	25								20.8 22.0																Vesicular.		
	30									29.2 Low angle fracture.		28.0	Tiny low angle fractures.														
	35									35.2 Horizontal fracture.																	
										37.9 High angle fracture.		39.0	Rubble Zone.												Rubble Zone.		

Bottom of Well I-2 40'

1-2

1-2

Well I-3

BORING #		I-3		DATE DRILLED:		July 1995		LOGGED FROM:		T.V. Borehole Camera		METHOD:		Air Percussion		PAGE:		1/1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
DRILLED BY:				INEL				LOGGED BY:				Marque Mesa				NORTHING:		200.0 ft.		EASTING:		200.0 ft		SURFACE ELEVATION:				5249.0 ft.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)		Lysimeter	Before	After	vesicular intervals	Single Fracture		Fracture Zone		comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Bottom of Well I-3 40'

Well I-4

Well I-5

BORING # I-5		DATE DRILLED: July 1995		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion		PAGE: 1/1			
DRILLED BY: INEL		LOGGED BY: Marque Mesa			NORTHING: 197.8 ft.		EASTING: 218.8 ft.		SURFACE ELEVATION: 5246.5 ft.		
Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)		vesicular intervals	Single Fracture		Fracture Zone		comments
							depths	description	depths	description
15	25	3	6.5	10					Vesicular Zone.
						3.8	4.0 4.1	2 Horizontal fractures.			Notice a sudden decrease in caliper.
	5						7.1	Low angle fracture.	6.1 6.3	Rubbly Area.	Rubbly Area.
									7.9 8.3	Rubbly Area.	Rubbly Area.
	10					10.0 11.2	10.1 10.3	2-Low angle fractures.			Vesicular Zone.
						13.7 14.1					
	15						17.1	High angle fracture.			Massive Basalt.
							19.1	Low angle fracture.	17.5 18.5	Rubbly Area.	Rubbly Area.
	20						21.8	Low angle fracture.			Massive Basalt.
	25										
	30										
	35										
		</									

Bottom of Well I-5 23.3'

Well II-1

BORING #		II-1		DATE DRILLED:		07/02/95		LOGGED FROM:		Coring.		METHOD:		HX Coring using Water		PAGE:		1/2									
DRILLED BY:				INEL				LOGGED BY:				David Burgess				NORTHING:		220.8 ft		EASTING:		175.5 ft		SURFACE ELEVATION:		5246.5 ft	
Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)		core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments															
								depths	description	depths	description																
		15	25	3	6.5	10																					
							2.0	2.3	Horizontal sed. stained.	2.3	High angle fractures with sed. staining.		No Recovery. Upper Vesicular.														
							3.5	3.8	Horizontal sed. staining with mineralization	3.1			Massive Zone.														
	5					4.7		7.3	Horizontal sed. stained.																		
							9.8	11.2	Horizontal sed. stained.	10.0	Low angle fracture zone with sed. stain.		Massive Zone. Moderately vesicular.														
								12.6	2 Horizontal fractures.	12.0	High angle sed. stained.																
	10							13.0		13.5	High angle sed. stained.		Sediment staining.														
						14.8		16.8	Horizontal sed. stained.	14.5			Massive Zone.														
										17.3	Highly fracture zone. Low and High angle. No sed. staining.		Moderately vesicular.														
	20					19.8		22.2	Horizontal sed. stained.	18.3			Massive Basalt. Moderately vesicular.														
										23.0	Low angle fracture zone.																
	25					24.3				26.0	Low angle fracture zone with sed. staining.																
										27.5																	
	30					29.3		32.2	Low Angle sed. stained.	30.3	1 high angle and 1 low angle fracture. Sed. stained.		Massive Zone. Moderately vesicular.														
	35					33.8				35.5	Highly fractured zone. Low and high angle.		Lower Vesicular. 35.5 Flow Break. Rubble Zone.														
										38.4			Partially sediment filled.														
						38.8																					
							39.5																				

BORING #		DATE DRILLED:		LOGGED FROM:		METHOD:		PAGE:		
II-1		07/02/95		Coring.		HX Coring using Water		2/2		
DRILLED BY:		LOGGED BY:		NORTHING:		EASTING:		SURFACE ELEVATION:		
INEL		David Burgess		220.8 ft		175.5 ft		5246.5 ft		
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments
						depths	description	depths	description
15 25 3	6.5 10			40.6 41.2	2 Horizontal sed. stained fractures.	40.2 41.3 41.7	Highly fractured zone. Low angle with sed. staining.	Rubble-like.
					42.8		Low angle sed. stained.	43.8	Low angle sed. stained.	Massive Zone.
	45				45.0					Massive Zone. Slightly vesicular.
					46.7	Horizontal sed. stained.				
					49.0					Massive Zone.
	50				49.8			50.2	Low angle sed. stained.	Highly vesicular.
								51.6	Low angle sed. stained.	
								52.2	Low angle sed. stained.	Highly vesicular.
	55				53.1			54.6	Low angle sed. stained.	Massive Zone.
						55.2	Low angle sed. stained.			Slightly vesicular.
						56.7 57.5	2 Horizontal fractures.	57.8	Low angle sed. stained.	Lower vesicular.
	60				58.2			59.6 60.1	Highly fracture zone. Sed. staining. Rubble zone.	59.6' Flow Break. Rubble Zone.
Bottom of Well II-1 63.2'										
	65									
	70									
	75									

II-1

II-1

Well II-1	Vertical Well
Core logging by David Burgess on July 2, 1995	

Core Run (feet)	Vertical Depth (feet)	Description
0-2.0	0-2.0	No recovery
2.0-4.7	2.0-3.5	Upper vesicular
	3.5-4.7	Massive basalt zone
	2.3	Horizontal fracture with sediment staining
	2.3-3.1	High angle fracture with sediment staining
	3.78	Horizontal fracture with sediment staining and mineralization
4.7-9.8	4.7-9.8	Massive zone
	7.3	Horizontal fracture with sediment staining
9.8-14.8	9.8-10.1	Massive zone, moderately vesicular
	10.1-14.8	Massive zone, slightly vesicular
	9.8-10.1	Massive zone, moderately vesicular
	11.2	Horizontal fracture with sedimentary staining
	12.0-13.5	High angle fractures with sedimentary staining
	14.3-14.8	High angle fracture with sedimentary staining
14.8-19.8	14.8-17.2	Massive zone, slightly vesicular
	17.2-17.5	Massive zone, moderately vesicular
	17.5-19.8	Massive zone, slightly vesicular
	16.8	Horizontal fracture with sedimentary staining
	17.3-18.3	Highly fracture zone-No sedimentary staining-Probably due to drilling
19.8-24.3	19.8-22.0	Massive basalt, slightly vesicular
	22.0-22.9	Massive zone, moderately vesicular
	22.9-24.3	Massive basalt, slightly vesicular
24.3-29.3	24.3-29.3	Massive basalt, slightly vesicular
	26.0-26.1	Low angle fracture with sedimentary staining
	26.3-26.8	Fracture zone with sedimentary staining
	27.1-27.5	Several low angle fractures with sedimentary staining
29.3-33.8	29.3-33.8	Massive basalt, slightly vesicular
	30.1-30.6	Fracture zone with sedimentary staining
	29.9	Horizontal fracture with sedimentary staining
	32.2	Low angle fracture with sedimentary staining
33.8-38.8	33.8-34.7	Massive zone, slightly vesicular
	34.7-35.5	Lower vesicular
	35.5-37.3	Flow Break. No returns--Probably rubble zone
	37.3-38.4	Rubble zone--Partially sediment filled
	38.4-38.8	Upper vesicular
	35.5-38.4	Highly fractured
38.8-43.8	38.8-39.5	Rubble Zone--Might be part of upper vesicular
	39.5-42.8	Upper vesicular
	42.8-43.8	Massive zone
	38.8-39.5	Rubbly
	40.2-40.3	Highly fracture zone almost completely filled with sediment
	40.6	Horizontal fracture with sediment staining
	41.2	Horizontal fracture with sediment staining
	41.3-41.7	Highly fracture zone with sediment staining
43.8-49.0	43.8-49.0	Massive zone, slightly vesicular
	43.8-43.9	Low angle fracture with sedimentary staining
	46.7	Horizontal fracture with sedimentary staining
49.0-54.0	49.0-49.8	Massive zone

	49.8-54.0	Massive zone, highly vesicular
	50.0-50.3	Several low angle fractures with sediment staining
	51.5-51.7	Low angle fracture with sediment staining
	52.2-52.3	Low angle fracture with sediment staining
		Must have been some earlier redrill--driller says bottom of hole is 53.1 According to core, the bottom is at 54.0
53.1-58.2	53.1-53.8	Massive zone, highly vesicular
	53.8-57.4	Massive zone, slightly vesicular
	57.4-58.2	Lower vesicular, moderately vesicular
	54.6-54.7	Low angle fracture with sediment staining
	55.2	Low angle fracture with sediment staining
	56.7	Horizontal fracture, no sediment staining
	5.5	Horizontal fracture, no sediment staining
	57.7-57.9	Several low angle fractures with sediment staining
58.2-63.2	58.2-59.6	Lower vesicular
	59.6-59.9	Rubble zone--flow break
	59.9-61.9	Upper vesicular
	61.9-63.2	Massive zone
	59.9-60.1	Highly fractured and sedimentary stained
	60.4-60.9	Highly fractured and sedimentary stained.

Well II-2

BORING # II-2		DATE DRILLED: August 1995		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion		PAGE: 1/2				
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 230.1 ft.		EASTING: 184.0 ft.		SURFACE ELEVATION: 5248.7 ft.				
Lithological Log	depth (feet)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
					Before Test	During Test		depths	description	depths	description	
	3	6.5	10									
												Vesicular.
	5						3.9	4.2	Low angle.			
							5.1	5.2	Low angle.			5.1' vesicular band.
							6.9					6.9' & 7.2' vesicular bands.
	10						8.5	9.1	High angle fracture.	9.1	High angle fracture zone.	Massive Basalt.
			Not Cored.	Not Cored.	None Installed.	Not Applicable.				11.2	One-wide horizontal fracture.	
							14.2	13.0	Horizontal.			Vesicular Bands.
	15							13.2	Low angle fracture.			
							16.2	16.2	Horizontal fracture.			Vesicular.
	20						16.8					Massive Basalt.
							17.2					Vesicular.
	25						21.1	21.1	Low angle fracture.			Massive Basalt.
							21.7					Vesicular.
							22.3					Massive Basalt.
	30						25.6	25.6	Horizontal.			Vesicular.
							26.0	26.0	Low angle.			
							26.8	26.1	High angle fracture.			
							27.2					
	35						29.5	29.5	High angle fracture.			
							31.9	31.9	Low angle fracture.			
							34.7					Vesicular.
							36.0					
										37.0	Rubble Zone.	Rubble Zone.

II-2

Caliper

Well II-3

BORING #		II-3		DATE DRILLED:		July 1995		LOGGED FROM:		T.V. Borehole Camera		METHOD:		Air Percussion		PAGE:		1/2													
DRILLED BY:				INEL				LOGGED BY:				Marque Mesa				NORTHING:		205.9 ft.		EASTING:		182.0 ft.		SURFACE ELEVATION:				5249.0 ft.			
Lithological Log	depth (feet)	total gamma (cps)				caliper (inches)				vesicular intervals	Single Fracture		Fracture Zone		comments																
											depths	description	depths	description																	
		15	25	3	6.5	10				2.1	Low angle.					Vesicular.															
	5								5.5								Massive Basalt with sparse vesicles.														
									7.0	7.0	Low angle.	7.0	High angle fracture.																		
									7.5			8.0																			
	10								9.5																						
									10.2	12.4	Two low angle fractures.	12.0	Two high angle fractures.				Vesicular Bands.														
									10.9			14.0																			
									11.2																						
	15									15.2	Low angle.																				
										17.9	High angle.						Massive Basalt.														
	20								19.2																						
									20.9	23.2	Two low angle fractures.	20.5	High angle fracture zone.				Vesicular.														
												22.1																			
	25											24.1	Low angle fractures.																		
												25.0					Massive Basalt.														
	30																Massive Basalt.														
	35									34.2	2 Horizontal fractures.																				
										34.8																					
										36.0	Low angle.	36.1	Rubble Zone. Massive Rubble.				Rubble Zone.														

BORING # II-3		DATE DRILLED: July 1995		LOGGED FROM: T.V. Borehole Camera		METHOD: Air Percussion		PAGE: 2/2	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 205.9 ft.		EASTING: 182.0 ft		SURFACE ELEVATION: 5249.0 ft.	

Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	vesicular intervals	Single Fracture		Fracture Zone		comments
					depths	description	depths	description	
		15 25	3 6.5 10						
	45								
	50			50.0					
				52.0	51.8	Low angle.			
					52.5	Low angle.			
	55			55.0					
				56.0	56.0	Low angle.			
					57.0	Low angle.			
					58.0	Low angle.			
	60	Bottom of Well II-3 60.0'							
	65								
	70								
	75

Well II-4

BORING # II-4		DATE DRILLED: July 14, 1995		LOGGED FROM: Coring		METHOD: HX Coring using Water		PAGE: 1/2				
DRILLED BY: INEL		LOGGED BY: David Burgess			NORTHING: 186.4 ft.	EASTING: 190.8 ft.	SURFACE ELEVATION: 5248.7 ft.					
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)			core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments
								depths	description	depths	description	
		15 25 3	6.5 10			1.5 1.7						Massive Zone.
								4.4	Low angle fracture.			Vesicular.
	5					4.9 4.9						Massive Zone.
								7.5 7.8	2 Horizontal clean fractures.			Vesicular.
	10					9.9 10.6		11.0	Horizontal.			
										13.0 14.0	Low and high angle fracture zone.	Massive Zone with some vesicles.
	15					15.0		14.4	Low angle fracture.			Massive Zone.
								16.8	Horizontal with sediment staining.			Some vesicles present.
	20					20.0 20.8						Massive Zone with some vesicles.
										24.0 25.0	Low and high angle fracture zone.	Massive Zone.
	25					25.0				25.6 28.1	Majority high angle fracture zone with some low angle fractures.	Massive Zone.
	30					30.1				31.1 31.9	High angle fracture with tan silt tanning. Possibly from drilling.	Massive Zone.
								32.6	Horizontal.			
	35					35.1		34.2	Low angle fracture with sediment staining.			
										37.1 38.2	Low and high angle fracture zone.	37.1 Flow Break.
										39.2 39.6	Low and high angle fracture zone.	Highly fractured.

BORING #		II-4		DATE DRILLED:		July 14, 1995		LOGGED FROM:		Coring		METHOD:		HX Coring using Water		PAGE:		2/2									
DRILLED BY:				INEL				LOGGED BY:				David Burgess				NORTHING:		186.4 ft.		EASTING:		190.8 ft.		SURFACE ELEVATION:		5248.7 ft.	
Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)		core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments															
								depths	description	depths	description																
		15	25	3	6.5	10																					
	45					45.1	45.1					43.6	Low, high, & vertical fractures w/ sediment staining.	40.5' Flow Break. Rubble Zone 40.5' to 43.6'. Upper/Lower vesicular.													
												45.1															
												46.6		46.1 Flow Break.													
								48.2	Horizontal. Sed. stained.			47.4	Low angle fracture zone.														
								49.2				48.2															
	50					50.1		49.5	Low angle.				2 Near vertical fractures.														
								49.9	Horizontal. Sed. stained.			50.1															
												52.2		52.2 Flow Break. Rubble zone 52.2' to 52.7'.													
												52.7	High angle zone with sed. staining.														
	55					55.1		53.5	Horizontal.			53.6															
								54.3	Low angle.																		
												55.1	Low and high angle fracture zone with sed. staining.	56.3 Flow Break. Rubble Zone 56.3' to 57.2'.													
												57.2															
												58.5	Low and high angle fracture zone with sed. staining.														
	60																										
Bottom of Well II-4 60.0'																											
	65																										
	70																										
	75

Well II-4	Vertical Well
Core logging by David Burgess on July 14, 1995	

Core Run (feet)	Vertical Depth (feet)	Description
1.5-4.9	1.5-1.9	Upper vesicular, significant calcite crystals filling void spaces
	1.9-4.9	Massive zone
	4.1	Horizontal to low angle fracture, void of sediment or mineralization- This fracture may have been caused during the coring process
4.9-9.9	4.9-6.5	Massive zone with air bubbles/vesicular
	6.5-7.0	Massive zone
	7.0-7.3	Massive zone with air bubbles/vesicular
	7.3-9.7	Massive zone
	9.7-9.9	Massive zone with air bubbles/vesicular
	7.5	Horizontal fracture, clean
	7.8	Horizontal fracture, clean
9.9-14.9	9.9-10.6	Massive zone with air bubbles/vesicular
	10.6-13.0	Massive zone
	13.0-14.6	Massive zone, with tan silt infill, highly fractured
	14.6-14.9	Massive zone
	11.0	Horizontal fracture
	13.0-14.0	Fracture zone, high angle and horizontal fractures
	14.3-14.5	Moderate angle fracture
14.9-20.0	14.9-20.0	Massive zone
20.0-25.0	20.0-20.8	Massive zone, air bubbles/vesicular
	20.8-25.0	Massive zone
	24.0-25.0	Highly fractured zone, low to high angle fractures, some of these fractures may have been caused during removal from core barrel- however some sediment staining is present
25.0-30.1	25.0-30.1	Massive zone, non-vesicular more vesicular beginning at 28.1'
	25.6-28.0	Highly fracture zone-mostly to low angle fractures with some horizontal fractures
30.1-35.1	30.1-35.1	Massive zone
	31.1-31.9	High angle fractures with tan silt staining
	32.6	Horizontal fracture-possible caused during drilling recovery-No sediment staining
	34.2-34.3	Low angle fracture with sediment staining
35.1-40.1	35.1-36.6	Massive zone
	36.6-37.1	Lower vesicular
	37.1-38.2	Flow break-lower vesicular-highly fractured
	38.2-39.2	Upper vesicular
	39.2-39.6	Upper vesicular, highly fractured
	39.6-40.1	Massive zone
	37.1-38.2	Highly fractured zone with sediment staining
	38.7-38.9	Low angle fracture with no sediment staining
	39.2-39.6	Highly fractured zone
	39.6-40.1	Massive zone
40.1-45.1	40.1-40.5	Massive zone
	40.5-43.6	Rubble zone with only partial returns
	43.6-45.1	Upper vesicular
	44.2-45.1	High angle and vertical fractures with sediment staining
45.1-50.1	45.1-46.1	Upper/lower vesicular
	46.1	Flow break
	46.1-49.2	Upper vesicular

	49.2-50.1	Massive zone
	45.1-46.6	Highly fractured zone-sediment staining-oxidized
	47.2-47.4	Several low angle fractures-sediment staining
	48.2	Horizontal fracture-sediment stained
	48.2-50.1	Near vertical fracture
	49.5	Low angle fracture with sediment staining
	49.9	Horizontal fracture with sediment staining
50.1-55.1	50.1-51.6	Massive zone
	51.6-52.2	Lower vesicular
	52.2-52.7	Rubble zone-flow break
	52.7-54.1	Upper vesicular
	54.1-55.0	Massive zone, minimal air bubbles
	55.0-55.1	Lower vesicular
	48.2-52.2	High angle-vertical fracture-sediment stained
	52.7-53.6	High angle fracture-sediment stained
	53.5	Horizontal fracture-sediment stained
	54.2-54.4	Low angle fracture-sediment stained
55.1-60.1	55.1-56.3	Lower vesicular zone
	56.3-57.2	Flow break-rubble zone
	57.2-60.1	Upper vesicular
	55.1-57.2	Highly fractured zone-sediment stained
	58.3-58.7	Moderately high angle fractures-sediment stained

Well II-5

BORING #		DATE DRILLED:		LOGGED FROM:		METHOD:		PAGE:				
II-5		7/13/95		Coring		HX Coring using Water		1/2				
DRILLED BY:		LOGGED BY:		NORTHING:		EASTING:		SURFACE ELEVATION:				
INEL		David Burgess		206.4 ft		204.6 ft		5249.0 ft				
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)			core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments
								depths	description	depths	description	
		15 25 3	6.5	10								
						1.2		2.5		1.2	Rubble?	-Calcite deposits from 1.2'-2.5'.
							3.5		High angle	3.0	Low angle fracture zone.	-Vesicles decrease with depth.
	5					5.8		5.8		5.8		-Fracture zone at 3'-5.8' from coring?
						9.3						
	10						12.1 12.7					
						13.7		14.2	Low Angle			
	15						15.8 16.3					
						18.7						
	20						19.4 20.4	19.6	Horizontal			
						23.7				23.7		
	25						26.7			26.0	High Angle	
						28.7	28.7	27.3	High Angle	28.7		Slightly Vesicular
	30									31.3	High angle and horizontal zone.	Lost circulation at 28 feet.
						33.7	33.7	31.9 32.1 32.9 33.4 33.9	Low angle Horizontal High angle and horizontal			
	35							36.1	Horizontal	35.7	Rubble.	Rubble and no recovery from core run.
						35.7		37.0 37.3 37.6 37.7 38.4 39.1	Horizontal Horizontal Low angle Low angle	36.8		
						38.7	39.3	40.0	Horizontal			

BORING #		II-5		DATE DRILLED:		7/13/95		LOGGED FROM:		Coring		METHOD:		HX Coring using Water		PAGE:		2/2									
DRILLED BY:				INEL				LOGGED BY:				David Burgess				NORTHING:		206.4 ft.		EASTING:		204.6 ft		SURFACE ELEVATION:		5249.0 ft	
Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)		core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments															
								depths	description	depths	description																
		15	25	3	6.5	10	40.9	40.8	High angle																		
								41.7	Low angle		41.4	Rubble	Light tan silt in fractures and vesicles in rubble zone.														
								42.3	Horizontal		42.1																
								42.9	Horizontal		43.7	Rubble															
	45						43.7				44.3																
								44.4	High angle																		
								45.0																			
							45.3																				
							45.7	45.6	Low angle																		
										46.6	Rubble																
								47.3	Low angle																		
								47.5	High angle																		
	50						48.7	48.2																			
							49.7																				
								51.7	High angle																		
								52.5	Horizontal																		
							53.0																				
							53.7	54.2	Horizontal	53.5	Rubble																
	55							54.3	High angle				Heavy mineralization of fractures.														
							55.2	55.5	Low angle																		
								56.4	High angle				Heavy mineralization of fractures.														
								57.0																			
							58.1			58.6	Rubble?		tan silt material present.														
	60						58.7																				
							60.5			60.5	Low angle zone		61.6 Rubble. tan silt material present.														
								62.2	Horizontal	61.6	Rubble with low angle fractures																
								62.5	Horizontal				Low angle fracture zone. tan silt fillings.														
							63.4	62.7	High angle	63.7	Rubble																
	65						64.1			64.4																	
								64.1			Rubble																
							66.7			66.7																	
								67.9		67.9	Low angle fracture zone.																
							68.1			68.7	Rubble																
	70						68.7																				
								69.7		69.7																	
								71.5		71.5	Low angle fracture zone.																
								71.8		72.2	Rubble																
										73.3																	
	75																										
Bottom of Well II-5																73.7'

Well II-5	Vertical Well
Core logging by David Burgess on July 13, 1995	

Core Run (feet)	Vertical Depth (feet)	Description
0-5.8	0-5.8	Upper vesicular, highly fractured from 3' to 5.8'. Some fractures seem to be induced by coring. Lost approximately 1' of core during retrieval. Calcite deposits and highly vesicular at 1.2'-2.5'. Vesicle density decreases with depth in this run. Vertical high angle fracture from 2.5'-5.8'.
5.8-9.3	5.8-9.3	Massive zone.
9.3-13.7	9.3-12.1	Massive zone.
	12.1-12.7	Massive zone-Very vesicular. Fracture caused by handling of core.
13.7-18.7	13.7-15.8	Massive zone.
	14.2	35° Fracture.
	15.8-16.3	Massive zone, very vesicular.
	16.3-18.7	Massive zone. 16.9° fracture.
18.7-23.7	18.7-19.4	Massive zone.
	19.4-20.4	Massive zone, highly vesicular.
	19.6	Horizontal fractures.
	20.4-23.7	Massive zone.
23.7-28.7	23.7-26	High angle fracture zone.
	23.7-26.7	Massive zone.
	26.7-28.7	Massive zone, slightly vesicular.
	27.3	High angle fracture to 28'.
28.7-33.7	28.7-33.7	Massive zone.
	28.7-31.3	Highly fractured with horizontal and high angle fractures.
	31.9-32.1	Moderate angle fractures.
	32.9	Horizontal fractures.
	33.4-33.9	High angle fracture.
	33.7	Horizontal fractures.
33.7-38.7	33.7-35.7	Upper/lower vesicular.
	35.7-36.2	Rubble zone, no recovery.
	35.7-36.8	Flow break. Rubble zone.
	36.8-38.7	Upper vesicular.
	36.1	Horizontal fracture.
	37.0	Horizontal fracture.
	37.3-37.6	Moderate angle fracture.
	37.6	Horizontal fracture.
	37.7-38.4	High angle fracture.
	38.5	Horizontal fracture.
38.7-43.7	38.7-39.3	Upper vesicular.
	39.3-40.9	Massive.
	40.9-41.4	Lower vesicular.
	41.4-42.1	Flow break. Rubble zone. Light tan silt in fractures and vesicles in the rubble zone.
	42.1-43.7	Upper vesicular.
	39.1-39.3	Moderate angle fractures.
	40.0	Horizontal fractures.
	40.8-41.7	High angle fractures.
	42.5	Horizontal fractures.
	42.3-42.6	Moderate angle fractures.
	42.9	Horizontal fractures.
43.7-48.7	43.7-44.3	Flow break. Rubble zone.

	44.3-45.3	Upper vesicular.
	45.3-45.7	Massive zone.
	45.7-46.6	Lower vesicular.
	46.6-46.8	Rubble zone.
	46.8-48.7	Upper vesicular.
	43.7-44.3	Highly fractured.
	44.4-45.3	Highly fractured.
	45.6-46.7	Moderate to low angle fracture.
	46.6-46.8	Highly fractured zone.
	47.3-47.4	Low angle fracture.
	47.5-48.2	High angle fracture.
48.7-53.7	48.7-49.7	Upper vesicular.
	49.7-53.0	Massive zone.
	53.0-53.5	Lower vesicular.
	53.5-53.7	Rubble zone and highly fractured.
	51.7-52.1	High angle fracture.
	52.5	Horizontal fracture.
53.7-58.7	53.7-55.2	Upper vesicular. Top of this run is the very beginning of the upper vesicular zone.
	55.2-58.1	Massive zone.
	58.1-58.6	Lower vesicular.
	58.6-58.7	Flow break. Rubble zone.
	54.2	Horizontal fractured.
	54.3-55.0	High angle fracture. Heavy mineralization.
	55.5-55.8	Low angle fracture. Heavy mineralization.
	56.4-57.0	High angle fracture. Heavy mineralization.
58.7-63.7	58.7-60.5	No recovery. Probably rubble zone or small interbed. Heavy mineralization and silt material in recovered portion of this zone.
	58.7-61.2	Flow break. Rubble zone. Significant tan silt present with broken basalt.
	61.2-61.6	Upper vesicular/lower vesicular zone.
	61.6-61.9	Flow break. Rubble zone. Significant tan silt.
	61.9-63.4	Upper vesicular zone.
	63.4-63.7	Flow break. Top of rubble zone or interbed highly fractured with black and tan silt filling all vesicles and fractures.
	60.5-61.2	Highly fractured.
	61.6-61.9	Highly fractured.
	62.2	Horizontal fracture, minimal silt material present in fracture.
	62.5	Horizontal fracture zone. Zone is approximately 0.1" thick with significant tan silt.
	63.4-63.7	Highly fractured with silt filling all available vesicles and fracture spaces.
63.7-68.7	63.7-64.1	No recovery in rubble zone.
	64.1-64.4	Upper/lower vesicular.
	64.4-66.7	Rubble zone with tan silt fill all vesicles and fractures.
	66.7-68.1	Fracture zone or small rubble zone filled with tan silt sediment.
	68.1-68.4	Upper/lower vesicular zone.
	68.4-68.7	Flow break. Rubble zone.
		Note: from 66.7 to 68.4 may be combined to form a single upper/lower vesicular zone.
68.7-73.7	68.7-69.1	No recovery. Probably rubble zone.
	68.7-69.7	Rubble zone with tan silt filling all voids.
	69.7-71.5	Upper/lower vesicular.
	71.5-71.8	Fracture zone within upper/lower vesicular zone.

	71.8-72.2	Upper/lower vesicular zone.
	72.2-73.3	Flow break. Rubble zone with tan silt in most fractures.
	73.3-73.7	Upper vesicular.

Well II-6

BORING #		II-6		DATE DRILLED:		July 17, 1995		LOGGED FROM:		Coring		METHOD:		HX Coring using Water		PAGE:		1/2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
DRILLED BY:				INEL				LOGGED BY:				David Burgess				NORTHING:		218.9 ft.		EASTING:		226.0 ft.		SURFACE ELEVATION:		5249.9 ft.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)		core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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		15	25	3	6.5	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													</

BORING # II-6		DATE DRILLED: July 17, 1995		LOGGED FROM: Coring		METHOD: HX Coring using Water		PAGE: 2/2	
DRILLED BY: INEL		LOGGED BY: David Burgess		NORTHING: 218.9 ft.		EASTING: 226.0 ft.		SURFACE ELEVATION: 5249.9 ft.	

Lithological Log	depth (feet)	total gamma (cps)			caliper (inches)	core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments
		15	25	3				6.5	10	depths	description	
								41.7 42.3	Horizontal. Horizontal. Sed. stained.	40.4 41.6 42.6 43.2 44.3	Low and high angle fracture zone. High angle. Low and high angle zone w/ sed. staining.	Rubble Zone. 40.6 Flow Break. No recovery.
	45					45.0	45.0 46.1	44.5 44.7 45.4 46.6	2 Horizontal fractures. Horizontal. Low angle sed. stained.			Sediment stained. Massive zone.
	50					50.0		49.9 51.7	Low angle sed. stained. Horizontal. Sed. stained.			
	55					55.0				52.3 53.1 53.4 54.2	Low angle sed. staining. High angle sed. staining.	Massive zone.
								57.5 58.1 58.6 59.3		59.6	Low and high angle zone with sediment staining.	Lower Vesicular. No Returns. Rubble Zone.
	60	Bottom of Well II-6 60'										
	65											
	70											
	75

Well II-6	Vertical Well
Core logged by David Burgess on July 17, 1995	

Core Run (feet)	Vertical Depth (feet)	Description
2.5-5.0	2.5-5.0	Upper vesicular
	3.2	Induced fracture during drilling or removal. No sediment staining or mineralization
5.0-10.0	5.0-5.5	Upper vesicular
	5.5-10.0	Massive
	8.6-9.2	Two high angle fractures with sediment staining
10.0-15.0	10.0-12.1	Massive and slightly vesicular
	12.1-12.8	Massive very vesicular
	12.8-15.0	Massive and slightly vesicular
	10.3	Horizontal fracture. No sediment staining, probably caused by drilling
	13.0	Horizontal fracture. No sediment staining, probably caused by drilling
	12.6	Horizontal fracture with sediment staining and mineralization
	12.6-13.1	High angle fracture with no sediment staining
	14.5	Horizontal fracture with sediment staining
15.0-20.0	15.0-19.0	Massive zone
	19.0-19.7	Massive zone, very vesicular
	19.3	Horizontal fracture filled with tan silt sediment
20.0-25.0	20.0-25.0	Massive zone
	20.3-21.5	High angle fractures may have been caused during drilling. No sediment staining
	22.2	Horizontal fracture with sediment staining
	22.9-23.1	Low angle fracture with sediment staining
	23.9	Horizontal fracture caused when removing core from remaining shell
	24.4	Horizontal fracture caused when removing core from remaining shell
25.0-30.0	25.0-26.0	Massive, slightly vesicular
	26.0-28.3	Massive zone, non-vesicular
	28.3-30.0	Massive zone, slightly vesicular
	28.4	Horizontal fracture with sediment staining
	28.4-29.0	Moderately-high angle fracture with sediment staining
	24.2	Horizontal fracture caused when removing remaining shell
30.0-35.0	30.0-35.0	Massive basalt slightly vesicular
	34.6-34.8	Moderate angle fracture with sediment staining
35.0-40.0	35.0-35.1	Massive zone
	35.1-35.4	Lower vesicular
	35.4-36.0	Flow break. Rubble zone.
	36.0-38.7	Upper vesicular
	38.7-39.4	Massive zone
	39.4-40.0	Lower vesicular
	35.4-36.0	Rubble zone with no sediment filling

	36.5	Horizontal fracture with sediment staining
	36.8-37.5	Highly fractured zone
	38.4	Horizontal fracture with no sediment staining
	38.8	Horizontal fracture with staining
40.0-45.0	40.0-40.4	No recovery, probably rubble zone
	40.6	Flow break
	40.4-41.2	Rubble zone, no sediment in rubble, although staining is present
	41.2-41.6	Moderate angle and high angle fracture with no sediment staining
	41.7	Horizontal fracture. No sediment staining
	42.3	Horizontal fracture with sediment staining
	42.4-42.7	Highly fractured zone with sediment staining
	43.2-44.3	Highly fractured zone with sediment staining
	44.5-44.7	Horizontal fracture with sediment staining
45.0-50.0	45.0-46.1	Upper vesicular, possible flow break at 45.8'
	46.1-50.0	Massive zone
	45.4	Horizontal fracture with sediment staining
	45.8	Horizontal fracture with sediment staining
	46.6	Low angle fracture with sediment staining
	49.9-50.0	Moderate angle fracture with sediment staining
50.0-55.0	50.0-55.0	Massive zone
	51.7	Horizontal fracture with sediment staining
	52.3-53.5	High angle fracture with sediment staining
	52.3-53.1	Moderate angle fracture with sediment staining
	53.4-54.2	High angle fracture with sediment staining
	54.2-55.0	Extremely fractured zone probably due to coring. No sediment staining
55.0-60.0	55.0-57.5	Massive zone
	57.5-58.1	Lower vesicular
	58.1-58.4	Lower vesicular
	58.1-58.6	Flow break. Rubble zone
	58.6-59.3	Upper vesicular
	59.3-59.5	Massive zone. May be upper/lower vesicular. However this zone had significantly less air bubbles than above or below
	59.5-60.0	Lower/Upper vesicular
	58.1-58.6	Some sediment filling and sediment staining
	59.6-60.0	Highly fractured zone with some sediment staining

Well II-7

BORING #		DATE DRILLED:		LOGGED FROM:		METHOD:		PAGE:			
II-7		July 1995		T.V. Borehole Camera		Air Percussion		1/2			
DRILLED BY:		LOGGED BY:		NORTHING:		EASTING:		SURFACE ELEVATION:			
INEL		Marque Mesa		180.2 ft.		216.6 ft		5249.4 ft.			
Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)		vesicular intervals	Single Fracture		Fracture Zone		comments
							depths	description	depths	description	
		15	25	3	6.5	10					
	5						1.0	Low angle vesicular fracture.			Sparse vesicles.
							3.2	Low angle vesicular fracture.			
							5.0	Horizontal fracture.			
						3					
						7.5					
	10						9.2	Horizontal vesicular fracture.			
						11.9					
						13.5	13.5	Horizontal vesicular fracture.			
	15					15.0					Massive Basalt.
							19.3	Horizontal fracture.			
	20					20.2	20.3	High angle fracture.			
						21.5					
						23.2					
	25										
							25.3	Low angle fracture.			Massive Basalt.
							29.2	Low angle fracture.			
	30										
						32.0					
						33.0	33.1	Three high angle fractures.			
	35										
						36.2	36.2	Low angle fracture.	35.5	Rubble Zone.	Rubble Zone.
									36.0		
									37.0	Low angle fracture zone.	
									37.6		
							39.2	Horizontal fracture.			

BORING # II-7		DATE DRILLED: July 1995		LOGGED FROM: T.V. Borehole Camera		METHOD: Air Percussion		PAGE: 2/2	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 180.2 ft.		EASTING: 216.6 ft		SURFACE ELEVATION: 5249.4 ft.	

Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)		vesicular intervals	Single Fracture		Fracture Zone		comments
		15	25	3	6.5		10	depths	description	depths	
	45								42.5 43.9 44.4	Rubble Zone. Low angle fracture zone.	Rubble Zone.
						45.5	45.2	Horizontal fracture.			
						48.5	49.0	Two Horizontal fractures.			
	50										52.0 Hit Groundwater Level. Water Table.
						52.0					
	55					55.0			55.1 55.7	Rubble Zone.	Rubble Zone.
	60	Bottom of Well II-7 60.0'									
	65										
	70										
	75

Well II-8

BORING #		II-8		DATE DRILLED:		July 1995		LOGGED FROM:		T.V. Borehole Camera		METHOD:		Air Percussion		PAGE:		1/2									
DRILLED BY:				INEL				LOGGED BY:				Marque Mesa				NORTHING:		182.9		EASTING:		228.4 ft		SURFACE ELEVATION:		5250.0 ft.	
Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)			vesicular intervals	Single Fracture		Fracture Zone		comments															
								depths	description	depths	description																
		15	25	3	6.5	10																					
	5						3.0																				
							6.2																				
							6.6		6.8	Low angle fracture.														Massive Basalt.			
							8.5																				
	10						9.3																				
							10.0		10.0	Horizontal fracture.																	
							11.2																				
							12.0																	Slightly Vesicular.			
							14.0																				
	15						15.2																				
									16.9	Low angle fracture.																	
							18.3																				
									19.3	Horizontal fracture. Slightly vesicular.																	
	20																										
						</																					

BORING # II-8		DATE DRILLED: July 1995		LOGGED FROM: T.V. Borehole Camera		METHOD: Air Percussion		PAGE: 2/2	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 182.9		EASTING: 228.4 ft		SURFACE ELEVATION: 5250.0 ft.	
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	vesicular intervals	Single Fracture		Fracture Zone		comments
					depths	description	depths	description	
		15 25	3 6.5 10		40.3 40.8 41.4 42.0	3 Low angle fractures. Horizontal fracture.			
	45						43.9 45.2 45.9 46.2	High angle fracture zone. Rubble Zone.	Rubble Zone.
	50					48.0 49.0 49.2	Low angle fracture. 2 Low angle fractures.		
	55			51.3	52.1	Low angle fracture.	51.3 52.0	Rubble Zone.	Rubble Zone.
				56.0 58.0					53.9' Groundwater Level. Water table at 53.9'.
<p align="center">Bottom of Well II-8 60.0'</p>									
	60								
	65								
	70								
	75

Well S-1

BORING # S-1		DATE DRILLED: 7/17/95		LOGGED FROM: Coring		METHOD: HX Coring using water		PAGE: 1/1					
DRILLED BY: INEL (30 degree slant from vertical)		LOGGED BY: David Burgess		NORTHING: 213.1		EASTING: 204.5		SURFACE ELEVATION: 5248.9					
Lithological Log	vertical depth (ft)	total gamma (cps)	caliper (inches)		core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments		
							depths	description	depths	description			
		15 25	3	6.5	10	1.0	1.2					No Recovery.	
						2.55	2.63	2 Horizontal w/ sed stain.	1.81	High angle fractures with sed. stain.		Massive Zone.	
						4.16	2 Horizontal w/ sed stain.	2.46					
	5					4.50	Horizontal.						
						5.01	Horizontal w/ sed. stain.	5.75	Low angle fractures with sed. stain.		Massive Zone.		
						5.86	2 Low angle w/ sed. stain.						
						6.88	7.14	2 Horizontal w/ sed. stain.					
						8.67	9.35						
	10					9.4							
						11.20	11.05	Horizontal w/ sed stain.	10.0	Low angle w/ sed. stain.		Massive Zone.	
					12.75	12.58	3 Horizontal w/ sed stain.	11.8	High angle fractures with sed. stain.		Massive Zone.		
					13.0						Massive Zone.		
Vertical Depth of Well S-1 13.6'													
	15												
	20												
	25												
	30												
	35

Well S-1	Slant Well at $\approx 30^\circ$ from vertical
Core logged by David Burgess on July 19, 1995	

Core Run Length (feet)	Core Run Depth (feet)	Vertical Depth (feet)	Description
1.2-6.2	1.2-5.2	1.2-2.55	Upper vesicular.
		2.55-5.27	Massive zone.
		1.81-2.46	Medium to high angle fracture with sediment staining.
		2.63	Horizontal fracture with sediment staining.
		2.72	Horizontal fracture with sediment staining.
		4.16	Horizontal fracture with sediment staining.
		4.50	Horizontal fracture with sediment staining.
		5.01	Horizontal fracture. No sediment staining. Probably caused during drilling.
6.2-11.0	5.27-9.35	5.27-9.35	Massive zone.
		5.69-5.86	Low angle fracture with sediment staining.
		5.86	Horizontal fracture with sediment staining.
		6.88	Low angle fracture with sediment staining.
		7.14	Low angle fracture with sediment staining.
		8.67	Horizontal fracture with sediment staining.
		9.01	Horizontal fracture caused from removing core from reaming shell. No sediment staining.
11.0-16.0	9.35-13.6	9.35-11.05	Massive zone.
		11.05-11.39	Massive zone. Moderately vesicular.
		11.39-12.32	Massive zone.
		12.32-13.0	Massive zone. Moderately vesicular.
		13.0-13.6	Massive zone.
		9.35	Horizontal fracture with sediment staining.
		9.94-10.03	Low angle fracture with sediment staining.
		11.05	Horizontal fracture with sediment staining.
		11.56-12.24	High angle fracture zone with sediment staining.
		12.58	Horizontal fracture with sediment staining.
		12.75	Horizontal fracture with sediment staining.
		13.0	Horizontal fracture. No sediment staining. Fracture probably caused during removal of core from reaming shell.
		13.6	Bottom of Well S-1

Well S-2

BORING # S-2 (~30 degree slant from vertical)		DATE DRILLED: 7/14/95		LOGGED FROM: Coring.		METHOD: HX coring using water		PAGE: 1/1		
DRILLED BY: INEL		LOGGED BY: David Burgess		NORTHING: 217.0 ft		EASTING: 207.6 ft		SURFACE ELEVATION: 5249.2 ft		
Lithological Log	Vertical depth(ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments
						depths	description	depths	description
15 25	3 6.5 10	1.3	1.3	1.95	2 Horizontal and sediment stained.	2.97	Low angle sed. stained zone.	Calcite crystals at 2.38'.
				2.89		2.38		3.48		Massive Zone.
	5			4.3		4.5	Low Angle.			Massive Zone.
						6.29	Horizontal.			
						7.22	Horizontal.			
					7.56	7.56	Horizontal.			
					8.5	8.33	Horizontal and sediment stained.			
	10				10.5					
					12.8	12.83	12.8	Low angle.		Massive Zone.
						13.09			13.73	Low angle sed. stained.
	15				13.9	14.79	Horizontal.			No sediment staining at 14.79'.
				17.1						
Bottom of Well S-2 17.1'										
	20									
	25									
	30									
	35

Well S-2	Slant Well at $\approx 30^\circ$ from vertical
Core logged by David Burgess on July 17, 1995	

Core Run Length (feet)	Core Run Depth (feet)	Vertical Depth (feet)	Description
1.3-5.1	1.3-4.33	1.3-2.89	Upper vesicular
		2.89-4.33	Massive zone
		1.3-1.4	Moderate angle fracture with sediment staining
		1.95	Horizontal fracture with sediment staining
		2.38	Horizontal fracture with sediment staining and calcite crystals
		2.97-3.06	Low angle fracture with sediment staining
		3.31-3.48	Low angle fracture with sediment staining
5.1-10.0	4.33-8.5	4.33-8.5	Massive zone
		6.29	Horizontal fracture-no sediment staining
		7.22	Horizontal fracture-no sediment staining
		7.56	Horizontal fracture at small vesicular zone with sediment staining
		8.33	Horizontal fracture-no sediment staining
10.0-15.0	12.83-17.08	12.83-13.09	Massive zone, moderately vesicular
		13.09-17.08	Massive zone
		13.68-13.85	Low angle fracture with sediment staining
		14.79	Horizontal fracture-no sediment staining
		15.3	Horizontal fracture with sediment staining
		15.47	Horizontal fracture-no sediment staining
		17.08	Bottom of Well S-2

Well S-3

BORING #		DATE DRILLED:		LOGGED FROM:		METHOD:		PAGE:					
S-3 (~30 degree slant from vertical)		07/20/95		Coring.		HX Coring using water.		1/1					
DRILLED BY:		LOGGED BY:		NORTHING:		EASTING:		SURFACE ELEVATION:					
INEL		David Burgess		223.4 ft.		211.9 ft.		5249.3 ft.					
Lithological Log	vertical depth (ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
	5 10 15 20 25 30 35		3 6.5 10		2.5			1.0	1.19	Horizontal sed. stain.	2.89	Low angle fractures with sediment staining.	All fractures in the first 5' have mineralization. Massive Zone.
								2.72	2.04	Horizontal.			
								3.65	3.14	Horizontal.			
								4.4	3.48	Horizontal.			
									4.33	Horizontal.			
								6.1	5.52	Horizontal.			
									6.54	Low angle.			
									7.65	Horizontal.			
								11.98	11.9	Horizontal.			
								13.4	13.26	Low angle sed. staining.			
									14.7	Horizontal.			
									15.21	Horizontal.			
									16.06	Horizontal.			
									17.59	Horizontal with sediment staining.			
								20.4	19.8	Horizontal.			
								20.82					
	24.0	Horizontal sediment staining.											
	25.7	Low angle.											
	26.3	Horizontal.											
	29.1												
	33.5												
	34.9												
	35.2												
	37.7												
	35.4	Horizontal w/ sed. staining											
	36.1	Horizontal w/ sed. staining											
	36.4	Low angle Highly fractured zone with sed. staining and mineralizaiton.											
	37.2												
Vertical Depth of Well S-3													37.7'

Well S-3	Slant Well at $\approx 30^\circ$ from vertical
Core logged by David Burgess on July 19, 20, 27, 1995	

Core Run Length (feet)	Core Run Depth (feet)	Vertical Depth (feet)	Description
1.0-4.3	1.0-3.65	1.0-2.72	Upper vesicular
		2.72-3.65	Massive zone
		1.19	Horizontal fracture with mineralization and sediment stain
		2.04	Horizontal fracture with mineralization. No sediment stain
		3.14	Horizontal fracture with mineralization. No sediment stain
		3.48	Horizontal fracture. No mineralization or sediment stain
		3.4-3.65	Low to moderate angle fracture with sediment staining
4.3-9.6	3.65-8.16	3.65-8.16	Massive zone
		2.89-3.82	Continued fracture from above run
		3.91-4.25	Moderate angle fracture with sediment staining
		4.33	Low angle to horizontal fracture with no sediment staining
		5.52	Horizontal fracture with sediment staining
		6.54	Low angle fracture with sediment staining
		6.54-6.8	Moderate angle fracture with no sediment staining
		7.65	Horizontal fracture. No sediment staining
			<i>The following data was logged on July 20</i>
9.6-14.6	8.16-12.4	8.16-11.98	Massive zone
		11.98-12.4	Massive zone, moderately vesicular
		9.26-9.35	Low angle fracture with sediment staining
		10.96-11.22	Two low angle fractures with sediment staining
		11.9	Horizontal fracture. No sediment staining
14.6-19.6	12.4-16.7	12.4-13.4	Massive zone, moderately vesicular
		13.4-16.6	Massive zone
		12.4-12.49	Low angle fracture with sediment staining
		13.26	Low angle fracture with sediment staining
		14.7	Horizontal fracture with sediment staining
		14.87-15.0	Low angle fracture with sediment staining
		15.21	Horizontal fracture with no sediment staining
		16.06	Horizontal fracture with no sediment staining
19.6-24.5	16.7-20.82	19.21-20.4	Massive zone
		20.4-20.82	Massive zone. Moderately vesicular
		17.59	Horizontal fracture with sediment staining

		17.76-17.93	Low angle fracture with sediment staining
		19.46-19.55	Low angle fracture with sediment staining
		19.80	Horizontal fracture with no sediment staining
24.5-29.5	20.82-25.07	20.82-25.07	Massive zone
		23.2-23.6	Moderate angle fracture with sediment staining
		23.7-23.8	Low angle fracture with sediment staining
		24.0	Horizontal fracture with sediment staining
		24.22-24.9	Fracture zone due to drilling. No sediment staining
		24.55-24.73	Low angle fracture with sediment staining
		24.9-25.07	Low angle fracture with sediment staining
			<i>The following data was logged on July 27</i>
29.5-34.3	25.07-29.1	25.0-26.2	Massive zone. No vesicles.
		26.2-29.1	Massive zone. Slightly vesicular
		25.07-25.5	Moderate angle. Moderate angle fractures due to drilling. No sediment staining.
		25.7	Moderate angle fractures probably due to drilling.
		26.0-26.1	Low angle fractures with sediment staining
		26.3	Horizontal fracture with sediment staining
		28.3	Horizontal fracture due to drilling
		29.1-33.5	N 15% intergranular porosity, Massive grey basalt.
34.3-39.4	29.1-33.5	33.5-34.6	Massive zone, slightly vesicular
		34.6-34.9	Lower vesicular, locally oxidized
		34.9-35.2	Flow Break. Rubble zone. Oxidized and sediment stained. No recovery from 41.3-41.5
		35.2-37.3	Upper vesicular, oxidized near rubble zone
		37.3-37.7	Massive zone, slightly vesicular
		34.8-35.2	Highly fractured rubble zone.
		35.4	Horizontal fracture with sedimentation and mineralization
		36.1	Horizontal fracture with sediment staining
		36.4-36.46	Low angle fracture with sediment staining
		36.8-37.2	Highly fractured zone with sediment staining mineralization
	37.7	37.7	Bottom of Well S-3

Well S-4

BORING # S-4		DATE DRILLED: July 27-Aug. 28 1995		LOGGED FROM: Coring		METHOD: HX Coring using Water		PAGE: 1/2		
~30 degree angle from vertical)										
DRILLED BY: INEL		LOGGED BY: David Burgess		NORTHING: 235.7 ft.		EASTING: 218.2 ft.		SURFACE ELEVATION: 5249.5 ft.		
Lithological Log	vertical depth (ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments
						depths	description	depths	description
15 25	3 6.5 10		1.3 3.57			1.27 1.4 2.7	2 Low angle fracture zones with sediment staining.	
	5				3.7			4.95	Low angle.	Heavy caliche mineralization.
					7.9	8.8	Low angle. Sediment stained.	6.5 7.0	2 Low angle fracture zones with sediment staining.	Massive Zone.
	10				12.1			12.5 13.7	Low and high angle fracture zone.	Highly fractured. Moderate-high vesicularity. Slightly oxidized.
					16.3					Massive Zone.
					20.1	17.7	Low angle sediment stained.	18.2 19.0 19.5	High angle fractures. Low angle fractures.	Sediment staining. Sediment staining.
	20				20.57	20.1	Horizontal sediment stained.			
						21.9 22.3 23.0	3 Horizontal fractures with sediment staining.	23.2	Low and high angle fracture zone.	Sediment staining.
	25				25.5			25.5 26.2 27.6	Low and high angle fracture zone.	Sediment staining.
					30.0	28.8 29.4	Horizontal. Horizontal with sediment staining.			Massive Zone. Lower Vesicular. Flow Break.
	30							32.5	Low angle fracture zone.	Sediment staining.
					34.0			34.8 35.7	High angle fracture zone.	Sediment staining.
35				35.8	37.3	Low angle with sediment staining.	37.5	Low angle fracture zone.		
				38.2	38.6	Low angle with sediment staining.	39.8	Low angle fracture zone.	Upper Vesicular. Flow Break.	

BORING #		S-4		DATE DRILLED:		LOGGED FROM:		METHOD:		PAGE:	
				July 27-Aug. 28 1995		Coring		HX Coring using Water		2/2	
-30 degree angle from vertical)											
DRILLED BY:				LOGGED BY:				NORTHING:		EASTING:	
INEL				David Burgess				235.7 ft.		218.2 ft.	
								SURFACE ELEVATION:			
								5249.5 ft.			
Lithological Log	vertical depth (ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	vesicular intervals	Single Fracture		Fracture Zone		comments	
						depths	description	depths	description		
		15 25 3	6.5 10			40.3	2 horizontal fractures with sed. staining.	40.3	Low and high angle fracture zone with sediment staining.	Minimal recovery.	
				41.6		40.9		42.2			
					43.0	42.7	Low angle fracture with sediment staining.				
				44.2						Massive Zone.	
	45										
					46.6						
					47.2						
					47.8			48.3	Low angle fracture zone with sediment staining.	47.2-47.8 Rubble Zone	
						49.2	2 Low angle fractures with sediment staining.				
	50			50.1	50.0	50.0				Massive Zone.	
					51.3		Low angle fracture with sediment staining.			Lower Vesicular.	
						52.3		52.6	High angle fracture zone.	Flow Break.	
								53.1	Two low angle fractures.	Rubble Zone	
								53.5		Sed. stain.	
	55			55.5						Massive Zone.	
								55.5	Low angle fracture zone	Upper vesicular.	
								55.9	Sed. staining.		
								57.9	High angle fracture zone.	57.3-57.5 Rubble Zone.	
								58.3	Sediment staining.	Flow Break.	
				58.7							
	60	Vertical Depth of Well S-4						60.0'			
	65										
	70										
	75

Well S-4	Slant Well at $\approx 30^\circ$ from vertical
Core logged by David Burgess on July 27 & 28 and August 28, 1995	

Core Run Length (feet)	Core Run Depth (feet)	Vertical Depth (feet)	Description
1-4.3	1-3.65	1-3.57	Upper vesicular
		3.57-3.65	Massive zone, slightly vesicular
		1.27-1.4	Several low angle fractures with sediment staining
		2.6-2.8	Two low angle fractures with sediment staining
		3.4	Horizontal fractures due to removal of core from reaming shell
			<i>The following data was logged on July 28, 1995</i>
4.3-9.3	3.65-7.9	3.65-7.9	Massive zone, slightly vesicular
		4.93-5.0	Low angle fractures with heavy calcite mineralization
		6.37-6.63	Moderate angle fracture with sediment staining
		6.88-7.22	Moderate angle fracture with sediment staining
		7.4-7.65	Fractures due to removal of reaming shell
9.3-14.2	7.9-12.07	7.9-12.07	Massive zone, slightly vesicular
		8.75	Low angle fracture with sediment staining
14.2-19.2	12.07-16.32	12.07-12.5	Massive zone
		12.5-13.34	Massive zone, moderate to highly vesicular, and slightly oxidized
		13.34-16.32	Massive zone, slightly vesicular
		12.5-13.68	Highly fractured zone with sediment staining and oxidation
19.2-24.2	16.32-20.57	16.32-18.9	Massive zone, slightly vesicular
		18.9-19.97	Massive zone, moderate to highly vesicular. Not oxidized
		19.97-20.57	Massive zone, slightly vesicular
		17.68-17.76	Low angle fracture with sediment staining
		18.2-18.95	Fracture zone. Mostly low angle with sediment staining
		19.38-19.72	Fracture zone. Mostly low angle with sediment staining
		20.06	Horizontal fracture probably caused when removing core from reaming shell. No sediment staining
			<i>The following data was logged on August 28, 1995</i>
24.2-30	20.6-25.5	20.6-25.5	Massive zone
		21.9	Horizontal fracture with sediment staining
		22.3	Horizontal fracture with sediment staining
		23.0	Horizontal fracture. No sediment staining

		23.0	Horizontal fracture. No sediment staining
		23.2-25.5	Highly fracture zone with sediment staining. Extremely fractured from 24.0-25.5
30.0-35.5	25.5-29.7	25.5-29.7	Massive zone
		26.2-27.6	Fracture zone with sediment staining
		28.8	Horizontal fracture. No sediment staining
		29.4	Horizontal fracture with sediment staining
35.0-40.0	29.7-34.0	29.7-34.0	Massive zone
		30.3	Horizontal fracture from drilling
		32.4-32.6	Several low angle fractures with sediment staining
		32.8	Horizontal fracture from drilling
40.0-45.0	34.0-38.2	34.0-35.8	Massive zone
		35.8-36.2	Lower vesicular
		36.2-36.4	Lower/upper vesicular
		37.2-37.4	Moderate angle fracture with sediment staining
		37.5-37.6	Fracture zone with sediment staining
45.0-49.0	38.2-41.65	38.2-38.5	Upper vesicular
		38.5-39.0	Massive zone
		39.0-39.8	Lower vesicular
		39.8-39.86	Flow Break. Lower/upper vesicular
		39.86-41.65	Upper vesicular
		38.6-38.7	Moderate angle fracture with sediment staining
		39.8-39.86	Fracture zone with sediment and sediment staining
		40.3	Horizontal fracture with sediment staining
		40.3-40.7	Moderate angle fracture with sediment staining
		40.9	Horizontal fracture with sediment staining
		41.0-41.5	Highly fracture zone with sediment staining. Missing about 1" of core. Probably fell out the bottom of the core barrel
49.0-52.0	41.65-44.2	41.65-43.0	Upper vesicular
		43.0-44.2	Massive zone
		41.65-42.2	Highly fracture zone with minimal recovery
		42.7	Low angle fracture with sediment staining
55.5-59.0	44.2-47.17	47.17 -47.8	Flow Break. Rubble zone
		47.8-50.0	Upper vesicular
		50.0-50.1	Massive zone
		47.15-47.8	Minimal returns. Rubble
		48.2-48.4	Fracture zone with sediment staining
		49.2-49.3	Low angle fracture with sediment staining
		50.0	Low angle fracture with sediment staining
59.0-64.1	50.1-54.5	50.1-51.3	Massive zone
		51.3-52.8	Lower vesicular
		52.8-52.9	Flow Break. Upper/lower vesicular

		52.9-54.5	Upper vesicular
		52.3	Low angle fracture with sediment staining
		52.6-53.1	Highly fracture zone with sediment staining
		53.4-53.5	Two low angle fractures with sediment staining
64.1-69.1	54.5-58.7	54.5-55.0	Upper vesicular
		55.0-56.9	Massive zone
		56.9-57.3	Lower vesicular
		57.3-57.5	Flow Break. No returns. Assume rubble zone
		57.5-58.7	Upper vesicular
		55.5-55.9	Moderate angle fracture with sediment staining
		57.3-57.5	Rubble zone
		57.9	Moderate angle fracture. No sediment staining
		57.9-58.3	Moderate angle fracture with sediment staining
			<i>Note: A flow break had to occur between 57.3' and 57.9' vertical depth due to no returns. The Flow break at 57.3' was an approximate value.</i>
	60.0'	60.0'	Bottom of Well S-4

Well E-1

BORING #		E-1		DATE DRILLED:		LOGGED FROM:		METHOD:		PAGE:						
45 degree slant from vertical.				May 2, 1996		T.V Borehole Camera		Air Percussion Method		1/2						
DRILLED BY:		INEL		LOGGED BY:		Marque Mesa		NORTHING:		EASTING:		SURFACE ELEVATION:				
								202.8 ft.		190.0 ft.		5249.6 ft.				
Lithological Log	vertical depth(ft)	total gamma (cps)		caliper (inches)		core run and recovery depth	Lysimeter	Water		Single Fracture		Fracture Zone		comments		
								Before Test	During Test						vesicular intervals	depths
15	25	3	6.5	10										Vesicular.
5	Not Gamma Logged		Not Caliper Logged
10
Vesicular.
15
Massive Basalt.
20
Vesicular.
Massive Basalt.
25
30															Massive Basalt.
35															Large Vesicle.
Vesicular.

BORING # E-1 45 degree slant from vertical.		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 2/2	
DRILLED BY: INEL			LOGGED BY: Marque Mesa			NORTHING: 202.8 ft.		EASTING: 190.0 ft.	
SURFACE ELEVATION: 5249.6 ft.									

Lithological Log	vertical depth(ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
		15 25	3 6.5 10						40.3 41.0	2 Horizontal. Low angle fracture.			
Vertical Depth of Well E-1 42.4'													
	45	Not Gamma Logged	Not Caliper Logged	Not Cored									
	50												
	55												
	60												
	65												
	70												
	75												

Well E-2

BORING # E-2 40 degree slant from vertical.		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/2							
DRILLED BY: INEL			LOGGED BY: Marque Mesa			NORTHING: 199.8 ft.		EASTING: 188.0 ft.		SURFACE ELEVATION: 5249.6 ft.					
Lithological Log	vertical depth (ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments		
						Before Test	During Test		depths	description	depths	description			
		15 25	3 6.5 10												
								2.3					Vesicular.		
	5	Not Gamma Logged	Not Caliper Logged	Not Cored	4.5			3.8					Vesicular.		
										5.4					
	10									8.3					Vesicular. Massive Basalt.
										12.2 13.0					Vesicular.
	15				15.3				15.3	Horizontal fracture.			Massive Basalt.		
	20								19.1	Horizontal.					
									20.6	Low angle fracture.					
	25				23.5			22.2 23.6	24.4	Low angle fracture.			Vesicular.		
									27.4 28.3	2 Low angle fractures.			Massive Basalt.		
	30												Massive Basalt.		
								32.1	32.8	Low angle fracture.			Vesicular.		
	35							34.3	35.0	2 Low angle fractures.					
								35.9 37.1	35.3	High angle fracture.			Vesicular.		
					38.1						38.1	Rubble Zone.	Rubble Zone.		

BORING # E-2 40 degree slant from vertical.		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 2/2					
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 199.8 ft.		EASTING: 188.0 ft.		SURFACE ELEVATION: 5249.6 ft.					
Lithological Log	vertical depth(ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
		15 25	3 6.5 10										
								41.2			40.4	Rubble Zone.	Vesicular.
	45										43.9	Rubble Zone.	Rubble Zone.
Vertical Depth of Well E-2 46.0'													
	50												
	55												
	60												
	65												
	70												
	75												

Well E-3

BORING # E-3 35 degree slant from vertical.		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/2	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 196.9 ft.		EASTING: 184.4 ft.		SURFACE ELEVATION: 5249.6 ft.	

Lithological Log	vertical depth(ft)	total gamma (cps) 15 25	caliper (inches) 3 6.5 10	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments		
						Before Test	During Test		depths	description	depths	description			
													@2'-3' Large vesicles widely spaced.		
	5	Not Gamma Logged	Not Caliper Logged	Not Cored					5.6	Low angle fracture.			Massive Basalt.		
	10													Massive Basalt.	
	15							13.9			12.1	Low angle fracture.			
	20							18.0			17.4 18.7	2 Low angle fractures.			Sparse vesicles.
	25				23.7				25.4	Low angle fracture.	25.0 26.7	Low angle fracture zone.	Low angle fracture zone.		
	30							28.7 30.5	26.6	Low angle fracture.					
	35								35.6	Low angle fracture.	37.1 39.9	Rubble Zone.	Rubble Zone.		

BORING # E-3 35 degree slant from vertical.		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 2/2					
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 196.9 ft.		EASTING: 184.4 ft.		SURFACE ELEVATION: 5249.6 ft.					
Lithological Log	vertical depth(ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description
45	Not Gamma Logged	Not Caliper Logged	Not Cored					44.7 45.1 46.0	3 Low angle fractures.			Massive Basalt.
												46.6	Rubble Zone.
Vertical Depth of Well E-3 49.1'													
	50												
	55												
	60												
	65												
	70												
	75												

Well E-4

BORING # E-4 30 degree slant from vertical.		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/2			
DRILLED BY: INEL			LOGGED BY: Marque Mesa			NORTHING: 194.2 ft.		EASTING: 183.4 ft.		SURFACE ELEVATION: 5249.6 ft.	

Lithological Log	vertical depth(ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
		15 25	3 6 5 10										
	5	Not Gamma Logged	Not Caliper Logged	Not Cored.				3.5					Sparse Vesicles.
	10												
	15								13.0	Low angle fracture.			
	20					19.9		17.3 19.2 19.9					Large Vesicles.
	25					24.2							
	30												Massive Basalt.
	35								32.0 33.8	Low angle. 2 Horizontal fractures.			
									37.2	Low angle fracture.			
								39.0			38.1 39.0	Rubble Zone.	Rubble Zone.

BORING # E-4		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 2/2	
30 degree slant from vertical.									
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 194.2 ft.		EASTING: 183.4 ft.		SURFACE ELEVATION: 5249.6 ft.	

Lithological Log	vertical depth(ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description
45	Not Gamma Logged	Not Caliper Logged	Not Cored	43.3			42.4 44.2 45.0 46.8 47.6 48.5 50.2	Low angle fracture. Low angle. High-angle. 2 Low angle fractures.	43.3 44.2	3 High angle fractures.	Large Vesicles.	
	50												
Vertical Depth of Well E-4 52.0'													
	55												
	60												
	65												
	70												
	75												

Well R-2

BORING # R-2 41.4 degree slant from vertical		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/2	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 206.7 ft.		EASTING: 221.1 ft.		SURFACE ELEVATION: 5248.1 ft.	

Lithological Log	Vertical depth (ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
	5							4.5					
	10							6.0 6.7	5.2	Low angle fracture.			
	15										8.2 9.7	High angle fracture zone.	Massive Basalt.
	20												Massive Basalt.
	25								17.2	High angle fracture.			
	30							20.1 20.8	20.1	Low angle fracture.			Massive Basalt.
	35								25.3	Horizontal fracture.			
								27.6 28.4 29.0		3 Low angle fractures.			
								35.0 35.8					Massive Basalt.
									37.3	Low angle fracture.	37.3	Rubble Zone.	

BORING # R-2 (41.4 degree slant from vertical)		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 2/2	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 206.7 ft.		EASTING: 221.1 ft.		SURFACE ELEVATION: 5248.1 ft.	

Lithological Log	Vertical depth(ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
	15	25	3	6.5	10								
	45	Not Gamma Logged	Not Caliper Logged	Not Cored	No Lysimeters Installed			42.5 45.5	44.7	Low angle fracture.	40.2 42.5 44.0	Rubble Zone. Low angle fracture zone.	
Vertical Depth of Well R-2 48.5'													
	50												
	55												
	60												
	65												
	70												
	75												

Well R-3

BORING # R-3 (28.8 degree slant from vertical)		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/2					
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 222.8 ft.		EASTING: 235.6 ft.		SURFACE ELEVATION: 5250.2 ft.					
Lithological Log	Vertical depth (ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
	15	25	3	6.5	10								
	5									3.5	Low angle fracture.		Massive Basalt.
										6.9	Horizontal.		Massive Basalt.
										7.8	Low angle fracture.		Massive Basalt.
	10												
										12.2	Low angle fracture.		Massive Basalt.
	15												
	20								20.0 20.9	20.0	Low angle fracture.		Massive Basalt.
										21.8	High angle fracture.		
	25									25.3	High angle fracture.		
	30												Massive Basalt.
	35												
										37.5	Low angle fracture.	38.4 39.3	Rubble Zone.
													Rubble Zone.

BORING # R-3 (28.8 degree slant from vertical)		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 2/2	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 222.8 ft.		EASTING: 235.6 ft.		SURFACE ELEVATION: 5250.2 ft.	

Lithological Log	Vertical depth(ft)	total gamma (cps) 15 25	caliper (inches) 3 6.5 10	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
								40.2					
								41.9					
								42.8					
	45							43.7	Horizontal.				
								44.6	Low angle fracture.				
								47.1	Horizontal.				
	50							50.6	Horizontal.				
								51.5	Horizontal.				
								53.3					
								54.2	Low angle fracture zone.				
							55.9						
Vertical Depth of Well R-3 56.8'													
	60												
	65												
	70												
	75												

Well R-4

BORING # R-4 (29.8 degree slant from vertical)		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/2	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 221.8 ft.		EASTING: 217.1 ft.		SURFACE ELEVATION: 5249.6 ft.	

Lithological Log	Vertical depth(ft)	total gamma (cps) 15 25	caliper (inches) 3 6.5 10	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
	5	Not Gamma Logged	Not Caliper Logged	Not Cored	No Lysimeters Installed			3.0					Vesicular Zone.
						5.1	5.3 High angle. 6.1 Low angle.				Massive Basalt.		
						8.4 High angle. 8.6 Low angle.							
	10					8.9							
						10.3	Low angle.						
						11.9							
						12.3		12.1 Low angle fracture zone.					
	15					13.0	Low angle.						
						16.3	Low angle.	16.5 2 High angle fractures. 17.7 Highly fractured zone.					
						17.7							
	17.9												
20								20.5	2 Low angle fractures.			Massive Basalt.	
25												Massive Basalt.	
30												Massive Basalt.	
35								34.1					Massive Basalt.
								36.8					
								38.5					

BORING #: R-4 (29.8 degree slant from vertical)		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 2/2					
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 221.8 ft.		EASTING: 217.1 ft.		SURFACE ELEVATION: 5249.6 ft.					
Lithological Log	Vertical depth (ft)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
	15	25	3	6.5	10								
	45	Not Gamma Logged	Not Caliper Logged	Not Cored	No Lysimeters Installed			41.0	41.1	Low angle fracture.			Massive Basalt.
								42.7		Low angle fracture.			
								44.6		3 Low angle fractures.			
								45.3					
								46.2			46.4	Rubble Zone.	Rubble Zone.
											48.1		
	50							49.0					
								50.8					
								51.1					
Vertical Depth of Well R-4 53.4'													
	55												
	60												
	65												
	70												
	75												

Well R-5

BORING # R-5 25.9 degree slant from vertical		DATE DRILLED: July 1997		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/1	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 206.4 ft.		EASTING: 231.0 ft.		SURFACE ELEVATION: 5246.36 ft.	

Lithological Log	Vertical depth (ft)	total gamma (cps) 9 point average	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
	75	100	125	3	6.5	10							
	5												In 0'-4.5' zone the vesicle density decreases with depth.
								4.5					
								5.3					5.3'-Vesicular Band.
								6.7					5.4'-6.4' massive basalt with sparse vesicles.
								6.8					6.9'-9.8' massive basalt
	10							9.3					10'-11.6' massive basalt
								10.0					11.9' vesicular band.
								11.9	11.7	Low angle fracture.			12'-12.8' massive basalt
								14.7					13'-14.6' massive basalt
	15							15.6					14.8'-15.5' massive basalt
													15.7'-18.9' massive basalt
	20								18.9		18.9	Low angle fracture zone.	Fractures have vesicles.
									19.0		19.0		
													19.2'-31.5' massive basalt
	25												
	30												
								31.6					
	35										32.2	Highly fractured zone. Possibly rubble zone.	*Below 32.6' the caliper of the well decreased making it impossible for the camera to capture the underlying lithology. Depth of Well is 53 ft.
											32.5

Well R-6

Well T-1

BORING # T-1		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/1					
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 206.7 ft.		EASTING: 188.0 ft.		SURFACE ELEVATION: 5249.3 ft.					
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
		15 25	3 6.5 10										
	5							2.0 3.0					Massive Basalt with few vesicles. 4.0 One large vesicle.
	10							5.8 6.2					Massive Basalt with few vesicles.
	15							13.0 13.7	14.0	Horizontal Fracture.			Massive Basalt.
	20							19.7	18.1	Low Angle Fracture.			Massive Basalt.
Bottom of Well T-1 20.0'													
	25												
	30												
	35												

Well T-2

BORING # T-2		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/1					
DRILLED BY: INEL			LOGGED BY: Marque Mesa			NORTHING: 211.6 ft.		EASTING: 219.8 ft.		SURFACE ELEVATION: 5249.6 ft.			
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
		15 25	3 6.5 10										
					2.0			2.0 2.9	3.0	Low Angle Fracture.			Massive Basalt.
	5				6.0								One Large Vesicle.
	10				9.8				10.2	Low Angle Fracture.			Massive Basalt.
	15				14.5			13.0 14.0	15.1	Low Angle Fracture.			One Large Vesicle.
	20							19.3	19.0	Low Angle Fracture.			Massive Basalt.
Bottom of Well T-2 20.0'													
	25												
	30												
	35												

Well T-3

BORING # T-3		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/1					
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 227.0 ft.		EASTING: 207.7 ft.		SURFACE ELEVATION: 5249.0 ft.					
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
		15 25	3 6.5 10										
					2.0			3.0	3.0	Low Angle Fracture.			Vesicular Zone.
	5												Massive Basalt.
					6.0			6.0					Vesicular Band
								6.9					One Large Vesicle.
								7.3					
	10				10.0			8.1					
								10.1					Massive Basalt.
								12.0					
								13.0					
	15				15.0				15.0	High angle fracture.			Sparse Vesicles.
								17.0					Vesicular Band
													Massive Basalt.
	20				20.0			19.5					
Bottom of Well T-3 20.0'													
	25												
	30												
	35												

Well T-4

BORING # T-4		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/1					
DRILLED BY: INEL			LOGGED BY: Marque Mesa			NORTHING: 191.0 ft.		EASTING: 207.0 ft.		SURFACE ELEVATION: 5249.3 ft.			
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
		15 25	3 6.5 10										
					2.0			4.1					Highly spaced vesicles.
	5								5.7	Horizontal fracture.			Massive Basalt.
					9.0			8.7 9.3					Large Vesicles.
	10												Massive Basalt.
					14.0			13.1					Vesicular Zone.
	15							15.2					Massive Basalt.
					19.0			19.1					Vesicular Zone.
	20				Bottom of Well T-4 20.0'								
	25												
	30												
	35												

Well T-5

Well T-6

BORING #		T-6		DATE DRILLED:		May 2, 1996		LOGGED FROM:		T.V Borehole Camera		METHOD:		Air Percussion Method		PAGE:		1/1									
DRILLED BY:				INEL				LOGGED BY:				Marque Mesa				NORTHING:		207.0 ft.		EASTING:		199.2 ft.		SURFACE ELEVATION:		5249.8 ft.	
Lithological Log	depth (feet)	total gamma (cps)		caliper (inches)		core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments												
		15	25	3	6			5	10		Before Test	During Test	depths	description		depths	description
2.0			4.0					Spaced large vesicles.												
	5						6.0								Massive Basalt.												
	10						10.0				8.0	Horizontal fracture.
15						15.0			13.0	10.0	Low angle fracture.			Massive Basalt.												
															Massive Basalt.
20						21.0			20.0	20.0	2 Horizontal fractures.			Large Vesicles.												
Bottom of Well T-6 22.0'																											
	25																										
	30																										
	35																										

Well T-7

BORING # T-7		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/1					
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 206.0 ft.		EASTING: 195.8 ft.		SURFACE ELEVATION: 5248.2 ft.					
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
	5	Not Gamma Logged	Not Caliper Logged	Not Cored	2.0			3.8					Spaced large vesicles. 3.5' vesicular band. 4.9' vesicular band. 5.2' two large vesicles.
	10				6.0			7.8 8.2			6.1 6.3	Low angle and horizontal fracture zone.	
	15				10.0			12.1 14.0	10.8	Low angle fracture.			Massive Basalt. Vesicular.
	20				15.0			18.1 18.3	14.1	High angle fracture.			Massive Basalt. Large Vesicles.
	20				19.0			20.0	18.0 18.3	2 Low angle fractures. Horizontal fracture.			
Bottom of Well T-7 20.0'													
	25												
	30												
	35												

Well T-8

BORING # T-8		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/1						
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 195.9		EASTING: 202.4 ft.		SURFACE ELEVATION: 5249.3 ft.						
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments	
						Before Test	During Test		depths	description	depths	description		
		15 25	3 6.5 10											
					1.0			2.0			1.0	Low and High angle fracture zone.	Large Vesicles	
	5	Not Gamma Logged	Not Caliper Logged	Not Cored	5.0			4.0	5.0	High angle fracture.			Massive Basalt.	
										7.9	Horizontal fracture.			
										8.4	Low angle fracture.			
	10				9.0			9.0						
Bottom of Well T-8 10.0'														
	15													
	20													
	25													
	30													
	35													

Well T-8A

BORING # T-8a		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/1					
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 215.2 ft.		EASTING: 193.3 ft.		SURFACE ELEVATION: 5249.3 ft.					
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
		15 25	3 6 5 10										
	5	Not Gamma Logged	Not Caliper Logged	Not Cored	No Lysimeters Installed			1.0 3.0	3.1	Low angle fracture.			Massive Basalt.
	10					8.0					Vesicular Band Massive Basalt.		
	15					10.0 10.9	Horizontal. Low angle fracture.						
						12.2 13.1	High angle fracture.			Massive Basalt.			
	20					16.1 18.5				Vesicular Band Massive Basalt.			
Bottom of Well T-8a 20.0'													
	25												
	30												
	35												

Well T-9

BORING #		T-9		DATE DRILLED:		May 2, 1996		LOGGED FROM:		T.V Borehole Camera		METHOD:		Air Percussion Method		PAGE:		1/1									
DRILLED BY:				INEL				LOGGED BY:				Marque Mesa				NORTHING:		218.2 ft.		EASTING:		197.5 ft.		SURFACE ELEVATION:		5249.1 ft.	
Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments														
						Before Test	During Test		depths	description	depths	description															
		15 25	3 6.5 10																								
					1.0			1.0					Widely spaced vesicles.														
	5				5.0			4.0					Massive Basalt.														
	10				10.0			7.9	8.2 8.5 9.1	2 Horizontal fractures. 2 Low Angle fractures.			Massive Basalt.														
Bottom of Well T-9 10.0'																											
	15																										
	20																										
	25																										
	30																										
	35																										

Well T-10

BORING # T-10		DATE DRILLED: May 2, 1996		LOGGED FROM: T.V Borehole Camera		METHOD: Air Percussion Method		PAGE: 1/1	
DRILLED BY: INEL		LOGGED BY: Marque Mesa		NORTHING: 215.6 ft.		EASTING: 202.4 ft.		SURFACE ELEVATION: 5249.1 ft.	

Lithological Log	depth (feet)	total gamma (cps)	caliper (inches)	core run and recovery depth	Lysimeter	Water		vesicular intervals	Single Fracture		Fracture Zone		comments
						Before Test	During Test		depths	description	depths	description	
	15	25	3	6.5	10								
	5	Not Gamma Logged	Not Caliper Logged	Not Cored	No Lysimeters installed			4.1	5.1 Low angle.				Large Vesicles widely spaced apart.
	6.0								6.0 Horizontal.				Massive Basalt.
	7.1								7.1 Horizontal.				
	8.2								8.2 Low angle.				
Bottom of Well T-10 10.0'													
	10												
	15												
	20												
	25												
	30												
	35												