Appendix 1. Compilation of X-ray Diffraction (Task 1.2) and Oxygen Isotope Data (Task 1.3)

Task 1.2. X-ray Diffraction Analyses

Whole-rock and clay X-ray diffraction (XRD) analyses were performed on each sample in the XRD laboratory at the Energy & Geoscience Institute at the University of Utah, using a Bruker D8 Advance X-ray diffactometer. Phase quantification using the Rietveld method was performed using TOPAS software, developed by Bruker AXS. The Rietveld method fits the peak intensities calculated from a model of the crystalline structure to the observed X-ray powder pattern by a least squares refinement. This is done by varying the parameters of the crystal structures to minimize the difference between the observed and calculated powder patterns. Because the whole powder pattern is taken into consideration, problems of peak overlap are minimized and accurate quantitative analyses can be obtained.

The following operating parameters were used when analyzing the powdered samples: Cu-K-α radiation at 40 kV and 40 mA, 0.02°2θ step size, and 0.4 and 0.6 seconds per step, for clay and bulk samples respectively. Clay samples were examined from 2 to 45°2θ, and the bulk samples from 4 to 65°2θ. The instrument is equipped with a Lynx Eye detector, which collects data over 2.6 mm, rather than at a point, greatly increasing X-ray counts collected and decreasing acquisition time; a rotating sample stage, which increases the mineral grain orientations encountered by the incident electron beam; and an automated sample exchanger capable of holding up to 90 samples.

At a minimum, three analyses were conducted on each sample, two or more on the clay-sized fraction and one on the bulk sample.

The clay-sized fraction is prepared as follows:

- Samples are first ground in an electric mortar and pestle.
- The resulting powder is mixed with deionized water and further ground in a micronizing mill until fine enough to pass through a 325 mesh screen (particle size < 44 micrometers).
- The less than 5 micrometer size fraction is then separated using Stokes Law by placing the resulting slurry in a beaker (with a small amount of dispersant) and vigorously stirring. After allowing it to settle for 37 minutes, an aliquot (~100 ml) is pipetted out of the top ½ inch.
- The particles are removed from the water column by centrifuging for 15 min at 1500 rpm.
- The bulk of the clean water is decanted, and the sample is thoroughly mixed using an ultra-sonic homogenizer.
- The slurry is then applied to a glass slide using a pipette.
- Once the sample has dried, an ‘air dried’ XRD pattern is obtained.
- The sample is then allowed to interact with ethylene glycol vapors for at least 12 hours at 65°C to induce swelling of susceptible clays, after which a ‘glycolated’ XRD pattern is obtained.
- Additional heat treatments and scans that involve heating for 1 hour at 375 and/or 550°C may be required to confirm the presence of some clay species.

The fraction used for the bulk analysis is prepared as follows:

- Samples are first ground in an electric mortar and pestle.
- The resulting powder is mixed with deionized water and further ground in a micronizing mill until fine enough to pass through a 325 mesh screen (particle size < 44 micrometers).
- The sample is then rolled approximately 50 times to randomly orient the mineral grains.
- The powder is placed in a sample holder which has concentric ridges on the bottom to help decrease the effects of preferred orientation.
- The surface is smoothed with a razor blade to eliminate surface roughness.
- An XRD pattern of the bulk sample is obtained.

The air-dried, glycolated and heated scans of the clay-sized fraction are compared with each other to identify the clay minerals present in the sample, using methods described by Moore and Reynolds (1997). The mineralogy of the clay fraction is then used in the Rietveld refinement of the bulk sample to quantify the abundances of all crystalline phases that are present.

The results of the X-ray diffraction analyses are presented in Table 1.2.1 for Coso Hot Springs, in Table 1.2.2 for Lightning Dock, in Table 1.2.3 for Thermo Hot Springs, and Table 1.2.4 for Raft River. The results for the oxygen isotope analyses are presented in Tables 1.3.1, 1.3.2 and 1.3.3 for Coso Hot Springs, Lightning Dock and Thermo Hot Springs, respectively.

1.2.1. Coso Hot Springs

Table 1.2.1a. Rietveld refinement values for samples from 33A-7. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level.. Tr = trace amount.

Elevation (m)	Chlorite	Illite	Illite/ Smectite	Chlorite/ Smectite	Smectite	Plagioclase	Quartz	K-feldspar	Calcite	Titanite	Epidote	Biotite	Hornblende	Pyrite	Muscovite
1251	4.8	0.3			4.5	25.5	3.6	13.4			3.8		35.0		1.2
1175	15.4	0.3	tr		4.5	22.5	3.6	13.4			3.8	0.3	34.9		1.2
1022	5.4	5.3			8.1	15.5	37.2	23.3			2.5	2.1	0.7		
870	2.7	8.0			tr	31.0	37.1	25.7			1.5	0.5	1.4		
718		0.3		2.9	tr	24.8	3.5	30.3			3.7	0.3	33.9		
639	10.2	2.3	3.9			53.3	11.9	6.5	1.0		0.8	0.1	10.0		
261	8.3	6.9	tr			35.5	30.0	10.5	3.0	1.5	2.4	0.3	2.1		
185	15.1	6.4				34.3	23.5	9.4	3.7	1.1	4.4	0.4	1.3	0.5	
-41	10.3	3.8	5.9			38.7	12.3	6.4	10.3	0.7	1.9	0.4	8.7	0.7	
-283	11.0	4.7				32.1	18.0	5.6	16.1	3.2	2.1	0.7	5.0	0.6	1.0
-360	15.9	8.3	tr		0.2	39.1	8.0	5.5	4.2	1.0	5.9	0.6	11.1	tr	
-585	13.0	4.5	tr		tr	42.6	11.3	9.3	2.7	1.8	4.1	0.8	5.7		
-689	8.3	4.1	tr		tr	35.6	13.1	13.8	20.0	1.0	1.5	0.4	2.1		
-833	8.6	4.0			0.3	46.8	14.3	10.6	2.9		4.4	0.2	6.7		1.2
-904	7.4	14.3	tr		tr	46.1	1.0	10.0	1.6		7.4	0.7	11.5		
-1005	14.6	4.2	tr		tr	42.4	3.4	3.7	1.6		4.9	0.7	9.2		
-1031	12.3	5.0	tr		tr	49.1	4.3	10.1	1.5		4.2	0.8	9.8	tr	2.7
-1059	4.2	4.0				42.7	23.5	18.7			2.7	0.3	2.0	0.2	1.8
-1170	8.6	3.0				41.7	17.2	15.5			3.1	0.2	10.2		0.5
-1159	6.8	4.6	tr		0.4	53.1	5.2	6.6	0.5		6.6	0.6	15.2	tr	
-1195	5.3	1.9	tr			52.5	17.5	8.6	0.3		4.8	2.4	6.5	tr	
-1198	2.7	5.8	tr			60.8	5.7	7.3			3.1	0.2	12.8	0.3	
-1284	6.8	4.6	tr			53.0	5.3	6.6			6.6	0.6	15.2		
-1314	8.1	4.6	tr			53.0	5.2	6.6	0.5		6.6	0.6	15.2		
-1343	6.3	3.4				47.4	20.2	16.9	0.6		2.3	0.7	2.1	tr	
-1402	8.1	4.6	tr		0.4	52.9	5.2	6.6	0.5	0.3	6.6	0.6	15.2	tr	
-1487	4.2	5.6	tr			49.1	16.1	13.2	0.5	0.6	2.7	0.3	4.7	tr	2.8
-1603	7.0	6.5				52.3	3.3	4.4	1.3		1.5	0.9	22.4	0.4	
-1632	17.0	10.2				41.4	3.5	4.4	1.2		0.3	0.9	21.1		
-1690	14.1	3.6				42.9	2.5	6.2	1.0		1.6	0.7	17.3		10.1
-1721	8.1	3.0				43.7	6.3	4.9	0.3	0.6	1.3	1.0	21.1	0.3	9.3
-1751	10.8	2.1				42.1	11.2	9.3	1.9		1.5	0.4	16.7	tr	3.7
-1782	7.1	2.9				49.9	5.9	7.2	2.3		2.1	0.7	21.6	0.3	
-1812	14.2	2.8				35.9	4.4	5.7	2.8		3.8	0.5	29.6	0.4	
-1873	11.5	1.3				36.1	13.9	11.2	2.0		4.1	0.6	17.0	tr	2.0
-1934	12.6	11.7	tr			32.3	13.1	10.3	1.3		5.1	2.5	10.8	0.3	

Table 1.2.1b. Rietveld refinement values for samples from 68-6. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Elevation (m)	Chlorite	Illite	Illite/ Smectite	Smectite	Plagioclase	Quartz	K-feldspar	Calcite	Titanite	Epidote	Biotite	Hornblende	Pyrite	Muscovite
1025	4.9	5.3		8.3	35.5	22.2	8.2	8.2		1.6	0.6	4.8	0.4	
1004	2.8	4.3		2.8	53.2	24.0	4.5	2.5		1.6	0.8	3.1	0.4	
745	15.8	15.8			37.4	17.5	5.1	7.0			0.4		0.9	
668	3.0	5.1			20.5	39.9	18.8	8.9		0.4	1.0	1.1	0.5	tr
556	0.9	1.0			29.9	36.1	18.5	10.2		0.6	0.9	1.5	0.4	
94	1.9	4.2			38.2	28.4	20.5	2.3		1.0	0.6	1.9	tr	1.0
-60	7.5	7.0			37.9	21.7	11.4	6.1		1.9	2.2	2.7	1.5	
-165	6.6	6.4			35.6	20.1		3.5		1.5	3.0	1.7		
-381	7.1	8.8			35.5	26.0	13.0	2.5		1.7		2.2	tr	3.1
-706	3.2				53.6	17.8	7.6	0.9		2.4	2.3	5.9		
-911	3.8				47.2	16.6	10.0	0.9	tr	3.7				
-1020	5.1	4.6			49.0	13.1	7.9	3.1	1.0	3.4	2.8	8.2	tr	
-1090	9.9	6.0			43.9	15.7	5.1	6.5	2.5	3.5	2.2	3.8		tr
-1407	1.3	5.3			38.7	31.5	15.6	1.4	tr	1.7	0.3	3.8		
-1463	8.6	4.5			38.5	10.1	7.7	0.5	1.1	7.1	0.9	19.6	tr	1.3
-1551	2.9	2.3			66.3	11.6	10.6	2.0	tr	3.4	1.3	2.5	tr	
-1593	8.3	3.1			42.0	6.7	4.3	0.8	1.0	7.9	1.2	24.6		

Table 1.2.1c. Rietveld refinement values for samples from 73-19. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Elevation (m)	Chlorite	Illite	Illite/ Smectite	Smectite	Plagioclase	Quartz	K-feldspar	Calcite	Titanite	Epidote	Biotite	Hornblende	Pyrite	Muscovite
876	2.0	1.3		tr	55.4	11.6	0.9	0.4	0.4	7.8	6.6	8.4	0.6	4.7
734	1.1	1.1		0.1	38.0	30.6	23.0	0.5	TR	1.4	0.9	0.5	0.2	1.6
722	7.2	4.5		0.1	42.4	7.8	1.6	7.9	1.4	1.9	0.4	0.4	tr	2.1
490	1.0	1.7			34.5	36.4	20.4	0.8		3.8	0.9	1.8		3.3
469	1.4	2.4		0.1	54.2	16.3	1.8	2.8	1.1	6.7	9.6	3.3	0.3	
207	2.0	2.6			34.7	35.7	21.0	0.7	0.7	1.5	0.5	0.5	0.2	
195	1.4	2.2			18.3	34.6	17.5	0.7	1.0	2.3	0.4	0.2	tr	2.5
42	2.6	2.6	tr	tr	46.1	18.2	2.9	1.5	1.5	11.0	5.4	4.3	0.7	3.1
-49	3.7	1.7		tr	59.0	21.2	1.6	0.9	0.5	2.9	4.5	2.7	0.5	
-79	2.7	4.9		tr	36.7	35.2	15.0	1.0		1.4	0.2	0.3		2.7
-143	12.0	11.0	2.4	0.3	16.1	26.5	4.8	20.0		3.4	0.7	2.7		
-313	3.8	5.4			48.6	9.0	6.5	0.8		3.1	0.9	10.3	0.4	11.2
-440	2.8	6.5			52.1	21.0	5.3	0.8		3.6	1.2	5.8	0.9	
-544	3.3	7.5			27.6	46.5	10.7	1.7		0.5	0.3	1.5	0.4	
-586	3.8	2.4			30.1	34.4	9.7	4.4		1.0	0.4	0.7	0.1	

Table 1.2.2. Lightning Dock

Table 1.2.2a. Rietveld refinement values for samples from 45-7. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Illite	Chlorite	Quartz	K-feldspar	Plagioclase	Calcite	Hematite
150 - 160	3			11	1	32	25	25	Tr	1
330 - 340	1			11		43	26	18	Tr	Tr
390 - 400	Tr	21	80->90%		2	29	24	10	13	Tr
520 - 530	Tr	10	>90%		2	30	30	21	6	1
550 - 560	Tr			7	2	35	30	25	Tr	Tr
600 - 610		Tr	n.d.	8	2	23	35	31	Tr	1
630 - 640	Tr	9	>90%		2	34	30	24	Tr	1
720 - 730	Tr			11	4	30	29	24	1	1
800 - 810	Tr	11	>90%		3	29	27	30	Tr	Tr
930 - 940	Tr	10	>90%		3	30	29	24	3	1
1100 - 1110	Tr			8	3	28	26	33	1	1
1300 - 1310	Tr	9	>90%		2	27	32	28	1	1
1450 - 1460	Tr	Tr	80-90%	9	3	29	30	27	3	1
1590 - 1600	Tr	Tr	n.d.	9	2	26	36	21	4	2
1640 - 1650	Tr			7	2	34	35	20	1	2
1700 - 1710	Tr	Tr	80-90%	7	3	30	36	18	3	2
1810 - 1820		8	80->90%		3	23	42	17	3	2
1900 - 1910		9	80->90%		3	26	38	19	3	2
2000 - 2010		7	80->90%		3	25	43	15	4	2
2060 - 2070		7	80->90%		2	23	47	14	3	2
2110 - 2120	Tr	Tr	>90%	5	2	28	44	18	1	2

Table 1.2.2.b. Rietveld refinement values for samples from 47-07. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Sample Depth (ft)	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Illite	Chlorite	Kaolinite	Quartz	Plagioclase	K-feldspar	Clinopyroxene	Amphibole	Magnetite	Dolomite	Calcite	Pyrite
305	1			14	5	Tr	15	45	15					3	
395	Tr	Tr	>90%		1		24	2						73	
485				Tr	2		8	9	5					76	
600		2	50-70%	11	Tr		32	27	25					2	
700	3	12	>90%		2		29	21	26					5	
800	1	12	>90%		1		33	23	26					2	
900		9	>90%		1		34	27	27					1	
1000		Tr	50-70%	10	1		33	25	29					1	
1100	Tr	11	>90%		3		34	24	26					1	
1200	6			9	2		26	16	18	5		Tr	Tr	15	
1300	Tr	2	80-90%	9	Tr	4	54		3					28	
1400	Tr	5	>90%		9		17	43	14			2		9	
1500		Tr	80-90%	8	5		26	31	18			1		10	
1600					4		18	41	18		2	1		1	
1700					4		17	42	16		3	2		3	
1800					3		17	55	19			2		2	
1900				Tr	1		6	2					2	90	
2000							2	Tr					3	95	
2100		3	80-90%	13	Tr	1	39		2				10	32	
2200		1	80-90%	10	Tr	1	48	1	2				17	20	
2300		2	80-90%	10	2		48	1	2				8	26	
2400		2	80-90%	12	3	Tr	44	1	2				7	29	
2500		3	80-90%	14	2	Tr	44	Tr	2				7	29	
2600		4	80-90%	19	2		33	0	2				6	35	
2700		2	80-90%	6	Tr		10						1	81	
2800		3	80-90%	10	Tr		26		1				7	53	
2900		10	80->90%		Tr		13		1				4	72	
3000				2			9		Tr				8	81	
3100		3	>90%	9	Tr	Tr	14		1				7	66	
3200		4	80-90%	9		3	20		2				9	52	2

3300		1	80-90%	4	Tr	Tr	47		1				15	31	Tr
3400		4	80-90%	12	Tr		27		Tr				9	46	1
3500				4	Tr		18						7	70	Tr
3600				5			23		Tr				3	68	Tr

Table 1.2.2.c. Rietveld refinement values for samples from 53-07. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Sample ID	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Illite	Chlorite	Kaolinite	Quartz	Plagioclase	K-feldspar	Siderite	Dolomite	Calcite	Hematite	Clinoptilolite	Flourite	Magnetite	Cristobalite
100	2			11			28	30	24				1	3			
200	1			9			36	27	26				1				
300	1			10			35	24	29				1				
400				13			29	21	22			12	1		2		
500				12	1		30	25	28			4	1				
600				12	1		33	27	25			1	1				
700				9	1		31	29	27			1	1				
800				11	1		32	28	25			1	2				
900				10	1		31	32	25			1	1				
1000				11	2		31	30	24			1	2				
1100				12	1		30	26	27			2	2				
1200				11	Tr		29	29	27			3	1				
1300				11	Tr		32	27	27			1	2				
1400				10	1		31	29	26			1	2				
1500				11	1		29	27	28			2	2				
1600				10	Tr		26	27	34			1	2				
1700				9	1		26	24	38			1	2				
1800				11	1		26	25	34			2	2				
1900				11	1		23	26	36			2	2				
2000		Tr	?	11	1		29	25	32			1	2				
2100				11	1		26	29	30			2	2				
2200				10	1		31	33	22			1	2				
2300				11	1		31	36	18			1	2				
2340				11	3		29	33	13			9	2				
2370		4	>50%	17	3		35	21	14			5	2				
2400		3	>50%	10	5	Tr	44	17	12			7	2				
2430				10	2		41	10	6			31	2				
2500				7	1		31	11	9			40	1				

2600		4	90%	15	3	Tr	29	6	5		4	33	1				
2670		3	90%	11	2	4	39	Tr	2	1	4	33	1				
2700		2	90%	12		2	28	1	2		2	49	1				
2740		2	90%	13	3	6	28	15	12		2	18	1				
2770		7	90%	21	2	4	40	3	5		1	14	2				
2800		2	90%	9	Tr	3	53	3	3		Tr	24	Tr				
2830		2	90%	5	Tr	Tr	20	Tr	Tr		1	70	Tr				
2870					Tr		4					96					
2900				2	Tr	1	15					81					
3000				Tr	4	Tr	23	43	24			3				Tr	2
3100				2	Tr		12	2	1		36	48					
3200		2	90%	6	2		21	41	21			5				1	
3300		2	90%	9	2		16	49	17			3				2	
3400					Tr		24	2				73					
3500					1		8	10	6			76					
3600		3	90%	12	2	7	27	6	6		4	31	1				
3700		3	90%	10	2	5	40	Tr	2	Tr	4	33					
3800		3	90%	10	1	3	28	Tr	2		2	50					
3900		2	90%	12	3	5	29	11	16		2	18	1			Tr	
4000		6	90%	22	2	8	38	3	5		1	13	2			Tr	
4040		2	90%	9		6	54	3	4			23					
4100		Tr	90%	5		2	20				1	72					
4180						1	4					95					
4200				2		2	15					81					
4260				Tr	2		18	55	19			4				2	
4300				Tr	Tr		12	2	2		36	48					
4400		3	90%	6	2		22	42	19		Tr	5				1	

Table 1.2.2.d. Rietveld refinement values for samples from 53-07 ST-1. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Sample ID	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Illite	Interlayered chlorite/smectite	Chlorite	Kaolinite	Quartz	Plagioclase	K-feldspar	Dolomite	Calcite	Hematite	Laumontite	Clinoptilolite
1690		Tr	80->90%	6		Tr		25	25	37		4	2		
1790	Tr	8	>90%			1		27	27	34		2	2		
1850		Tr	80-90%	7		Tr		28	24	35		2	2		
1880		3	80-90%	7		1		7	30	48		2	2		
1980		9	80->90%			Tr		27	24	34		3	2		
2070		9	80->90%			1		28	27	32		2	2		
2130		8	>90%			Tr		28	29	30		2	2		
2220	Tr	6	>90%			2		27	38	24		2	2		
2260	4	13	>90%			2		23	32	20		2	2	2	
2340	13	8	80->90%		3			22	34	11		6	4		
2400	7	10	>90%			2		24	37	7		8	2	2	Tr
2460	13	10	>90%			Tr	2	21	32	16		5	2		
2490	4			5		Tr	Tr	17	7	4		62	Tr		
2550	3	Tr	80-90%	5		Tr	2	25	6	7		51	Tr		
2580	3	Tr	80-90%	7		1	1	31	10	12		34	Tr		
2610	2	1	80-90%	6			2	35	4	5	3	42	Tr		

Table 1.2.2.e. Rietveld refinement values for samples from 55-07. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Illite	Chlorite	Kaolinite	Quartz	Plagioclase	K-feldspar	Horneblende	Calcite	Dolomite	Aragonite	Pyrite	Hematite	Magnetite	Flourite	Laumontite	Prehnite	Epidote	Actinolite	Biotite	Muscovite	Titanite	, garnet at 6740	Zircon	Rutile	Apatite	Chalcedony	Anhydrite	Tourmaline
100	12			13			29	19	24		4				1					Tr									Tr		
260	6	9	>90%				55	9	18						Tr		3												Tr		
300	3	5	>90%				77	4	9						Tr		2												Tr		
450		12	80->90%		2		28	23	28		6				1																
580				10	1		31	25	30		1				2																
800				10			34	23	32		0				2					Tr											
1090				4	Tr		33	15	22		2		22		3																
1290		9	>90%	9			38	19	32		0				2																
1440		21	80->90%		3		20	6	33		15				3																
1570		23	70-90%		3	5	30	Tr	3		35				1																
1770		2	80-90%	7	1	3	46	1	4		37				Tr														Tr		
1900		4	80-90%	10	Tr	3	27	2	6		47				Tr																
1920		6	50-70%	4	Tr	9	25	18	19		17				2																
1950	Tr	17	80->90%		Tr	3	40	2	4		31	3			Tr																
2000		17	80->90%		5	3	35	3	5		29	3			Tr																
2090		4	80-90%	12	3	3	46	4	3		21	4			Tr																
2100		17	80->90%		7		40	3	2		26	5			Tr								Tr								Tr
2150		18	80->90%		8		38	4	4		23	4			Tr								Tr								Tr
2180		17	80->90%		9		37	3	3		25	4			Tr																
2270		7	80-905	14	6		27		3		27	15			Tr																
2490		3	80-90%	4	2		31				53	7			Tr														Tr		
2550				4			32				60	3			Tr														Tr		
2630		3	80-90%	4	2		19				65	7			Tr																
2670	Tr	3	80-90%	5	3		20				63	7			Tr														Tr		
2680				2			6				90	1			Tr																

2770		6	80-90%	16	4		26		4		28	16			Tr																	
2780				Tr	Tr		19				70	10																				
2860				3			31				46	19			Tr														Tr		
2970	Tr	4	80-90%		3		18	46	21		6			Tr		2		Tr						Tr				Tr			
3190		3	80-90%	5	3		21	9	4		52	2			Tr			Tr											Tr		
3270		1	80-90%	2	3		16	3	1		75	Tr						Tr											Tr		
3470		4	80-90%	1	4		12	20	7	Tr	49					2		1		Tr				Tr				Tr			
3580		8	80-90%	7	6		31	6	3		38	Tr			Tr			Tr											Tr		
3780		Tr	n.d.		3		12				85	Tr																	Tr		
3970				Tr	1		13				85	Tr																	Tr		
4060		1	50-90%	5	Tr		28	13	11		41	Tr		Tr						Tr				Tr							
4100		10	>90%		Tr		38	21	28		2									Tr											
4160		1	Tr 50-70; 80-90%	7	1		17	38	21	Tr	9			Tr				3	1	Tr				Tr							
4320		13	80->90%		2		23	42	16	Tr	3							Tr		Tr				Tr							
4390		11	80->90%		4		21	30	10		12							13		Tr											
4590				7	4		14	43	17		8					1		1		3											
4620				4	7		11	51	18		3					1		1		4											
4820				3	0		16	3	4		75	Tr																			
4890				Tr	Tr		14	Tr	Tr		83	1																			
5180				Tr			32				67	1																			
5390				2			6				79	14																			
5590				14	Tr		23	Tr	1		31	30		Tr																	
5700				20	3		26		2		32	17																			
5870				21	1		26	Tr	2		29	21																			
6140				3			6	Tr	Tr		4	85																			
6220		1	50-70%	3			9		Tr		79	8						1													
6470				3			20		Tr		3	74																			
6520				14	Tr		21	14	1		2	47								Tr							Tr	Tr	Tr		
6620		19	Tr 50-70; >90%		2		23	16	2	Tr	5	31			2					Tr	Tr	Tr		Tr		Tr		Tr		Tr	
6740		10	Tr 50-70; >90%		Tr		28	1	Tr	Tr	2	59								Tr		Tr		Tr	Tr		Tr				

6880				8	Tr		40	15	34		2	2									Tr	Tr		Tr							
6980				6	Tr		29	25	36		2	1										Tr		Tr							

Table 1.2.2.f. Rietveld refinement values for samples from 63-07. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

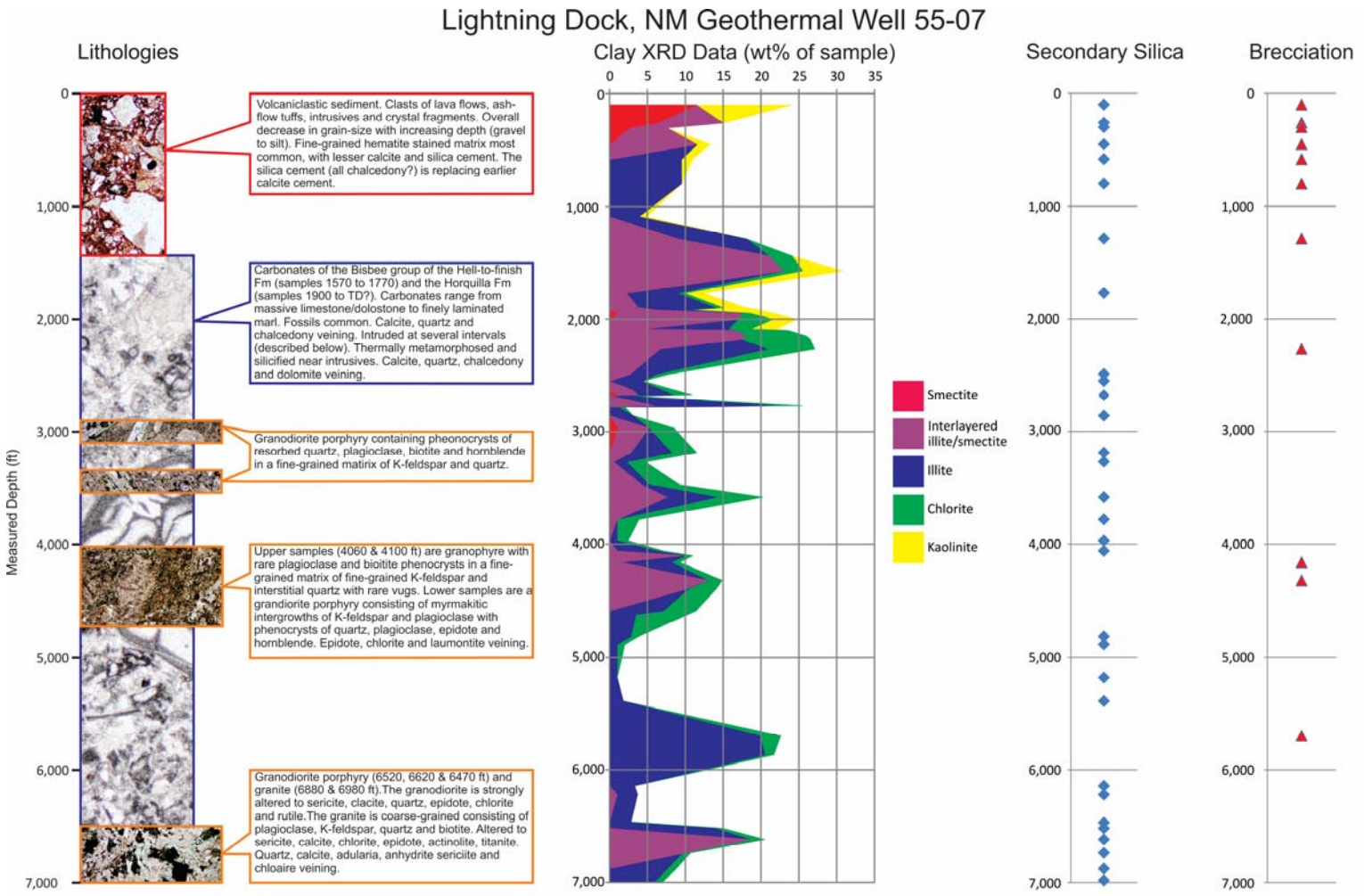
Depth (ft)	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Interlayered chlorite/smectite	% chlorite in interlayered C/S	Illite	Chlorite	Kaolinite	Cristobalie	Quartz	Plagioclase	K-feldspar	Horneblende	Calcite	Dolomite	Hematite	Magnetite	Stilbite	Clinoptilolite	Laumontite	Analcime	Mica
70	Tr					5.5	Tr	Tr	7.9	25.9	23.8	24.6		9.7		1.6						
100	5					9.9				31.5	24.8	25.9		1.1		1.6						Tr
160	3					8.4				39.2	20	27.1				1.1			1.2			
190	3.7					11.3				33.5	19.2	30		1.2		1.2						
230	7.5					11.3				36.1	15.8	28.2		Tr		Tr						
300	Tr	15.2	0.9				Tr			39	16.6	27.3		Tr		1						
360	Tr	11.1	0.9				Tr			32.8	13.8	30.3		11.2		Tr						
400	Tr	7.6	0.9				Tr			29	11.2	29.7		21.5		1						
450	Tr	11.1	0.9				1.9			36.9	18.7	29		1.1		1.4						
500	Tr	12.3	0.9				3.7			29.1	19.9	32.7		Tr		1.7						
600		9.9	0.9				Tr			31.2	18.3	33.8		5.4		1						
670	Tr	12	0.9				Tr			29.3	25.2	29.3		2.2		1.3						
800	Tr	9.7	0.9				2.2			28.4	26.4	30.5		1.3		1.5						
890						11.3	1.9			30	27.7	25.4		2.3		1.3						
1000	Tr	8.7	0.9				Tr			29	26.3	32.1		1.7		1.4						
1100	Tr	9.4	0.9				Tr			30.9	28	28		1.8		1.7						
1160	Tr	6.8	0.9				2.4			30.6	27	31.4		Tr		1.3						
1250	1	7.2	0.9				Tr			17.3	41.2	25.3	2.3	Tr		1			3.3			

1300	1.3					1.3	4.4			6.6	49.9	20.3	3.5	1		2.6				9.1		
1400	2.2					2.7	2.2			13.1	44.1	28.1	2.6	Tr		2.1		Tr		1.3		Tr
1500	6.2					5.5	6.3			3.6	38.7	33.1		Tr		1.9		Tr		4.1		
1600	4.2					4.8	6.5			15.4	45.2	17		1.3		2.6				3.1		
1650	1			4.9	50-60%	3.1				11.6	48.8	22.8	6	Tr		1						
1760	2.5			7.9	n.d.					8.7	50.8	24.4	3.4	Tr		1.4						
1860	1			5.2	n.d.	3.1				9.7	36.7	26	1.4	2.4		2.3				12.2		
1910	6.4			1	n.d.					11.2	28.5	6	1.5	5.8		2.5		1.2		33.7	2.2	
2050	23.2					5.5	5.6			26.9	15.1	13.6		1.6		Tr		Tr	7.4			
2160	3.4					5	Tr			23.1	35.1	18.2	1.1	1.2		1		Tr		10.8		
2260	Tr					Tr	1.8			45.5	5.4	5.7		38.4		Tr		Tr		1.5		
2320	1.1	5	~70%			4.1	3.3	3.2		24.9	5.7	3.7		46.3		Tr				2.1		
2410	Tr	7.4	n.d.			4.6	3.1	7.7		24.6		4.4		27.5	20	Tr						
2590	Tr	6.2	~70%			2.6	6.9			38.6	2.8	5.7		31.4	4.7	Tr						
2640		6.2	80-90%			18.2	Tr	2.2		20.6		2.1		23.7	24.6	Tr						
2710		9.8	90% & 50-70%					7.8		36.1	19.5	15.5		8.4	2.5	Tr						
2850		Tr	50-70% & 80-90%			6.5				38.6		Tr		47.9	5.2	Tr						
2950	Tr					1.4	1			12.8		1.1		80.3	3.2							
3050		1.8	>90%	6	n.d.					17.3	22.7	11.8		38.8	1.2	Tr						
3150	Tr	2.5	0.9	2.7	0.9	4.1				19.2	44.2	16.7		7.6			1.8			1.2		
3250				2.5	0.9	4.9				33.6	Tr	Tr		51.3	5.7	Tr						
3310	1.6	Tr	n.d.	5.6	0.9	2.6				24.6	6.2	3.7		55.2	Tr	Tr						
3400										6				86.1	7.9							

Table 1.2.2.g. Rietveld refinement values for samples from TG-52-07. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Interlayered chlorite/smectite	% illite in interlayered C/S	Chlorite	Quartz	K-feldspar	Plagioclase	Calcite	Hematite	Hornblende	Mica
400	1	10	>90%				22	26	15	24	1	1.4	
500	2	10	>90%			Tr	31	28	23	4	1		
600	6	11	>90%			3	26	28	23	3	2		Tr
700	2	10	>90%			Tr	29	29	28	Tr	2		
800	2	9	>90%			2	28	26	31	1	2		
900	2	8	>90%			2	29	25	31	2	2		
1000	2	11	>90%			3	29	22	28	3	1		
1100	2	9	>90%			Tr	32	25	30	Tr	1		
1200	1	9	>90%			1	29	27	26	4	2		
1300	1	10	>90%	2	>80%		29	29	26	1	2		
1400	1	12	>90%			2	28	25	30	2			
1500	Tr	9	>90%			1	29	29	28	2	2		
1600	1	10	>90%			Tr	28	29	28	2	2		
1700	1	11	>90%			Tr	27	32	24	3	2		
1800	1	9	>90%			Tr	26	33	26	2	2		
1900	Tr	9	>90%			4	26	29	28	1	2		

Fig. 1.2.2. Petrographic despcriptions of rocks in 55-07, distribution of clays, brecciation and secondary silica. The well is representative of those from Lightning Dock.



1.2.3. Thermo Hot Springs

Table 1.2.3a. Rietveld refinement values for samples from 13-14A. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Sample (ft)	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Interlayered chlorite/smectite	% chlorite in interlayered C/S	Illite	Chlorite	Kaolinite	Biotite	Quartz	Cristobalite	Tridymite	Plagioclase	K-feldspar	Calcite	Dolomite	Clinoptilolite	Laumontite	Analcime	Hematite	Clinopyroxene	Hornblende	Talc	Actinolite	Muscovite	Andalusite	Epidote
50	2								Tr	4	12	8	40	28	3		3			Tr							
160	5								Tr	27			30	33	2		Tr			2							
260	3								1	20			46	23	3					2		3					
360	3								1	18			47	20	5					2		4					
460		3	<50%						Tr	23			44	22	4					2		2					
560		3	<50%						2	19			26	24			17			1		7					
660		2	<50%						1	23			43	28	1					2							
760		1	<50%						2	25			43	25	2					2							
860		Tr	<50%						Tr	27			41	25	2			Tr		2							
960		Tr	<50%						Tr	23			42	25	2			Tr	4	3							
1060		2	<50%						Tr	23			41	27	4					3							
1160		2	<50%						1	21			43	25						2		7					
1260		4	<50%						Tr	21			38	29	3					3		2					
1360		3	<50%						Tr	26			38	25	3			Tr		3							
1460		5	<50%						Tr	24			37	27	1					4		2					
1560		4	<50%						1	24			38	26	4					3							
1640		5	<50%						1	24			38	25	2					3		3					
1760	5			Tr	n.d.				Tr	27			32	28	3			1		3		2					
1860		1	<50%	Tr	60%				Tr	25			40	25	Tr			2		2		3					
1960	2			Tr	60%	4			Tr	16			33	13	2		8	12		2		8					
2060	Tr	Tr		Tr	50-60%	5			Tr	28			35	23	2			4		2		Tr					
2160	Tr			2	60%	4			Tr	18			40	9	24			2		2							
2260		2	50%	1	50-60%	1				18			49	21	4			2		2							
2360	16								Tr	16			38	21	6					3							
2460	12			5	n.d.	9				21			39	9	2					1	Tr	3					
2560	Tr			Tr	n.d.				Tr	26			42	18	4			6.6		3							
2660	Tr			1	60%	5				25			28	17	13			7.8		2							

2760	Tr	Tr	n.d.	1	60%	4				25			25	20	15			7.4		2							
2860	Tr	Tr	n.d.	2	60%	3				39			12	11	30					2							
2960	Tr			2	n.d.	1				40			3	3	36	14				2							
3010				Tr	n.d.	2				13			Tr		37	47											
3040		3	60%			4	2			53			24	3	9					2							
3160	Tr	13	70-80%			Tr	3			38			28	4	9				3.0	Tr							
3260	Tr	5	70-80%			6	3			36			2	2	29	17				1							
3310	1	5	n.d.				3			14			3	6	27	41				1							
3410						1				8			Tr	Tr	18	71											
3560										3					62	35											
3660										1			Tr		19	79											
3760										1					9	90											
3860										Tr					2	97											
3960										Tr					6	94											
4060		Tr	n.d.			4				85			Tr	2	4	4				Tr							
4160	Tr	3	90%	3	90%					76			Tr	4	9	4				Tr							
4260	Tr	Tr	n.d.			5		Tr		86			Tr	3	2	2				Tr							
4360		Tr	n.d.	1	80%	3				88			Tr	3	2	2				Tr							
4460		Tr	n.d.	Tr	90%	4				93			Tr	2	Tr	Tr				Tr							
4560				Tr	90%	3				28				Tr	45	23											
4660				Tr	n.d.					4			Tr	Tr	8	88											
4760							Tr			Tr					4	95											
4860						6	4			15				23	47	4				Tr							
4960	Tr					6	1			36			20	33	2	Tr											
5060				3	90%					6			Tr	Tr	5	84							1				
5160				1	90%					3			Tr	Tr	2	93							Tr				
5260										Tr			Tr		Tr	99											
5360	Tr	9	90%				1			47			Tr	36	4	3				Tr							
5460				4	80-90%					4			Tr	Tr	12	75				Tr			3				
5560						4	5			14			9	22	14	23							4	4			
5660				3	90%	2				2			Tr	Tr	10	73							5	4			Tr
5760							1			Tr			Tr		6	88				Tr			2	1			
5860				1	90%	Tr							Tr		7	88				Tr			2				
5960				3	80-90%	2				1			Tr	3	19	66							4	Tr			
6060							2			6			Tr		2	91											
6160				Tr	1	Tr				2					17	76							4				

6260						15	2			5			7	46	20	5											
6360				Tr	80-90%	2				1				Tr	84	13											
6460						7	Tr			Tr			2	6	81	2											
6560		Tr	90%			16	Tr			16			9	28	18	3								Tr	2	5	
6660		Tr	90%			8	Tr			47			6	29	5	Tr								Tr	1		
6760				2	1	2				38			19	20	16	2								2			
6850						7	Tr			44			12	28	1										2	5	

Table 1.2.3b. Rietveld refinement values for samples from 63-33. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Sample (ft)	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Interlayered chlorite/smectite	% chlorite in interlayered C/S	Illite	Chlorite	Kaolinite	Vermiculite	Biotite	Quartz	Cristobalite	Tridymite	Plagioclase	K-feldspar	Calcite	Dolomite	Clinoptilolite	Laumontite	Analcime	Hematite	Talc	Actinolite	Muscovite	Pyrite	Fluorite	Garnet
410		2	n.d.			2					16			37	26	10		5			3						
550	2					3					11	4	5	35	21	3		15			1						
650	3					4					8	8	4	37	22	1		13			Tr						
750	4					4					9	6	4	35	23	1		12			1						
850	2					3					8	7	4	41	22	Tr		13			1						
950	8										22	Tr	2	24	29	3		11			1						
1050		9	<50%	2						Tr	18			21	24	Tr		23			Tr						
1150	12					7				Tr	10			41	22	2		7			1						
1250		14	<50%			5				Tr	18			33	19	4		6			Tr						
1350		13	<50%			6				Tr	24			22	28	2		Tr		2	2						
1450		3	<50%	Tr	50-60%	3		3		Tr	27			28	33	3					3						
1550		2	<50%	Tr	50-60%	5				Tr	26			36	25	3					3						
1650		2	50%			3				Tr	28			32	29	3					3						
1750		3	≤60%	Tr	n.d.	8				Tr	38			15	29	3					3						
1850		4	<50-80%	2	80%	8				Tr	30			20	26	7					3						
1950		4	<50-80%	2	80%	6				Tr	31			21	26	6					4						
2050	Tr	8	<50-80%	3	80%	12				3	32			17	17	7					2						

2150	Tr	9	<50-80%			12	2				32			8	14	19					4						
2250		2	n.d.	2	90%	5					17			41	18	9			3		3						
2350		9	<50-80%			0	4				15			42	11	7			7		4						
2450		7	70-80%	4	90%	13					32			21	10	9					4						
2550		6	70-80%	4	80-90%	12					34			18	11	10					5						
2650		2	70-80%	13	80-90%	7					32			9	11	17	6				2						
2750		Tr	70-80%	8	50-60%	6					32			6	11	30	5				2						
2850	Tr	Tr	70-80%			15	11				45			Tr	2	24					2						
2950		Tr	n.d.	Tr	80-90%						34				1	37	27				Tr						
3000	Tr	Tr	n.d.			5	Tr				90				2	2	1				Tr						
3140		1	90%	3	50-60%	5					86			Tr	2	2											
3250		2	<50-90%	Tr	90%	7					33				2	40	16										
3350	Tr	Tr	n.d.	Tr		2					12				Tr	9	76										
3450	Tr	Tr	~50%			3	Tr				9				Tr	8	79					Tr					
3550		Tr	~50%			3	Tr				19				Tr	10	67					Tr					
3650	Tr	Tr	n.d.								6			Tr	Tr	86	7										
3750				1	~50%						5					19	74					Tr			Tr		
3850							1				1					16	82										
3950							Tr				1					3	96										
4050							2				Tr					2	95										
4150						Tr	2				Tr					2	95					Tr					
4250						2	Tr				Tr					7	90								Tr		
4350											Tr					Tr	99										
4450							Tr				Tr			Tr		3	96								Tr		
4550				6	~50%	8					25				22	17	11					10		1			
4650				Tr	~50%				Tr		4					8	88										
4750				1	~50%				Tr	Tr	5			Tr	5	9	78					1					
4850		Tr	<50%	2	80%	Tr					4			Tr		5	85					2		1			
4950		Tr	<50%	3	80%	5					2			Tr	6	8	71					2		Tr	1		

5050		2	<50%	2	50-60%	1					2					7	80					4		2	Tr		
5180		2	<50%	Tr	~50%	5					8			8	21	18	30					3	1	2	Tr		
5250									2		2			Tr	Tr	4	88					1	2	Tr			
5350									2		1			Tr	Tr	5	87					2	2	1			
5450				4	90%	2					Tr			3	2	25	57					5	1	1	Tr		
5550						Tr	Tr				1					4	93					Tr					
5670		Tr	<50%			12	1				51			2	26	4	4										
5750		Tr	n.d.			6	10				5			9	22	8	1										40
5850				2	90%	2					1			3	5	71	7										8
5950		Tr	<50%			3	8				3			5	6	34	2					Tr					39
6040						13	4				24			25	22	3											
6050		Tr	70%			6	1				39			18	32	3								Tr			
6150		Tr	n.d.			6	Tr				46			14	28	3								2			
6250		Tr	70%			6	Tr				51			9	28	Tr								4		1	
6290						8	1				49			11	29	2											
6320						7	Tr				49			12	30	Tr								2			

Table 1.2.3c. Rietveld refinement values for samples from 17-34 Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Smectite	Interlayered illite/smectite	% illite in interlayered I/S	Interlayered chlorite/smectte	% chlorite in interlayered C/S	Vermiculite	Illite	Chlorite	Biotite	Quartz	Plagioclase	K-feldspar	Calcite	Dolomite	Pyrite	Zeolite	Hematite	Clinopyroxene	Hornblende	Anhydrite	Talc	Amphibole	Mica
100	5						5			23	37	26	2			Tr	1						
200	11						8			4	49	14				6	2	7					
300	13						8			2	45	8				15	2	7					
400		4	<50%				9			7	48	12				14	2	6					
500		6	<50%				9			7	48	10				11	2	8					
600		4	<50%				5			7	47	9				18	1	9					
700		6	<50%				8			10	42	7				18	1	8					
800			<50%			3	7			10	46	15				12	1	6					
900		1	<50%				6			7	55	13				10	2	7					
1000	5						8			9	49	9				12	1	7					
1100		Tr	<50%			4	6			11	51	9				9	2	9					
1200		Tr	<50%			4	2			9	59	6				6	3	12					
1300						4	3			11	55	10				8	2	7					
1400		3	<50%, 60%				3			28	17	41				6	2						
1500		2	<50%				2		4	19	41	21	2			3	3	1	2				
1600		1	<50%				4		10	14	31	15	3			16	2	2	2				
1700		2	<50%				3		6	21	34	23	2			4	2	2	1				
1790		Tr	<50%			1	2		4	19	38	25	3			4	3	1					
1900		Tr	<50%			1	2		4	22	40	22	2			4	2	Tr	1				
2000		Tr	<50%			2	2		7	15	38	21	2			7	3	Tr	2				
2100		3	<50%				4		2	25	29	26	1			6	3	1	Tr				
2200		Tr	<50%				6		3	43	28	19	1					Tr					
2300		Tr	<50%				6	Tr	2	44	28	18	1										
2400		4	<50%, 70%	8	>90%		11		1	35	3	5	13	21									
2500		Tr	n.d.				3			28		5	3	62									
2700							2			27		4	4	63	Tr	Tr							
2900		3	~90%				8			18		2	33	37	Tr								
3000	Tr						9			29	1	5	40	15	Tr								

3200	Tr	Tr	n.d.				9			15	4	7	47	17	1	Tr							
3400							1			12		2	16	69									
3600										3		2	5	90									
3800										5		Tr	4	90									
4000										1		Tr	3	95									
4200							Tr			Tr		Tr	1	97									
4350										Tr			1	99									
4550										Tr			3	96									
4650		Tr	n.d.				7			78		6	Tr	9									
4750		Tr	n.d.				9			57		6	2	26									
4850		Tr	<50%				19	7		40		13	1	17			2			Tr			
5050							10	6		70		2	4	9									
5250		11	90%	12	90%					55		5	14	3						Tr			
5300							36	9		39		7	5	3									
5500		Tr	<50%				2			15		2	2	79									
5750		Tr	<50%				Tr			30		2	13	55									
5925		Tr; 11	<50%; >90%					7		30		4	17	30			1						
6200										2			66	32									
6400		Tr; 8	<50%; >90%					4		21		2	12	54	Tr						Tr		
6600		Tr	<50%					1		Tr			2	96									
6800						Tr		4		5	1	13	10	55							6	1	4

7000						Tr	Tr	3		3		4	7	77							3	Tr	2
7200		Tr	<50%			Tr	Tr	6		3	Tr	4	6	76							1	1	Tr
7400		Tr	<50%			Tr	Tr	3		2		2	6	84							1		1
7600						Tr	Tr	1		Tr		1	4	90							Tr		1
7800		Tr	<50%			Tr		2		1			2	94							Tr		
7900		Tr	<50%					2		Tr			3	93							Tr		
8100		Tr	<50%				3	7		3	4	11	63	7							Tr	Tr	2
8175		Tr	<50%				4	8		3	9	10	54	6									6
8275							4	5		30	22	29	3	2								Tr	
8325							6	9		17	20	26	5	1								5	10
8400							5	11		22	16	31	8	2								3	3
8500							14	15		19	11	27	4	4								2	4
8600							3	6		6	4	8	65	4								1	2
8700							7	5		33	23	26	3	2								Tr	1
8800							5	1		41	22	26	2	1									Tr
8900							3	4		36	29	27	1	1									Tr
9000							4	3		36	30	26	1										
9100							3	2		41	26	27	1										
9200							2	2		37	29	29	Tr										
9300							5	2		41	26	26	Tr										

Table 1.2.3d. Rietveld refinement values for samples from 11-34, 24-34 & 52-34. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Well	Depth	Smectite	Illite	Biotite	Illite/Smectite	Chlorite	Quartz	Plagioclase	K-feldspar	Calcite	Dolomite	Grossular	Diopside
11-34	**6060-6070**	Tr		5		6	Tr	22	13	8	Tr	35	10
11-34	**6560-6570**	Tr	2			1	90		7	Tr			
24-34	**7750-7760**		2		Tr	2	40	27	30				
52-34	**7090-7100**	Tr	9			2	33	21	29	3	4		

1.2.4 Raft River

Table 1.2.4a. Rietveld refinement values for samples from RRG-1. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Chlorite	Interlayered chlorite/smectite	Quartz	Plagioclase	K-feldspar	Calcite	Muscovite	Biotite	Tridymite	Fluorite	Epidote	Titanite	Hematite
4500.0	2		38	32	22	Tr	5				Tr	1	
4503.0	3		30	20	25	5	11	3	1		Tr	Tr	2
4506.0	2		35	31	30	1	1				Tr	Tr	
4507.0		8	14	7	22	9	36			3	Tr	Tr	1

Table 1.2.4b. Rietveld refinement values for samples from RRG-2. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Interlayered Chlorite/Smectite	Chlorite	Mica	Analcime	Quartz	Plagioclase	K-feldspar	Calcite	Epidote	Titanite	Magnetite	Hematite	Apatite	Amphibole	Hornblende	Clinopyroxene
4900-4910	1		Tr		80	2	15	Tr	Tr	Tr		Tr	Tr			
4950-4960	1		Tr	Tr	91	2	6	Tr	Tr	Tr						
5000-5010	3		16		48	10	21	2	Tr	Tr			Tr			
5050-5060		2	4		31	26	31	4	1	Tr	Tr		Tr	Tr		Tr
5100-5110	2		7		29	34	24	Tr	3	Tr	Tr		Tr			
5150-5160	2		6		34	25	26	6	2	Tr	Tr	Tr	Tr	Tr		
5200-5210		5	5		32	29	27		2	Tr	Tr		Tr	Tr		
5250-5260	2		5		30	26	32	5	Tr	Tr	Tr		Tr	Tr		
5300-5310		5	2		21	31	39	1	1	Tr	Tr					
5340-5350	3		3		31	28	33	Tr	Tr	Tr	Tr					
5400-5410	3		2		33	27	33	Tr	Tr	Tr	Tr					
5400-5410	4		4		31	28	32	1	Tr		Tr		Tr			
5450-5460		4	5		29	29	32	Tr	1	Tr	Tr	Tr	Tr			
5500-5510		3	2		35	26	32	1	Tr	Tr	Tr					
5540-5550		5	3		31	24	26	9	1	Tr	Tr					
5600-5610	4		1		34	26	34	1	Tr	Tr	Tr		Tr			
5650-5660	3		3		33	25	34	1	1	Tr	Tr	Tr	Tr			
5700-5710	10		14		26	13	5			3					24	5
5750-5760		10	1		11	18	1			3					50	6
5800-5810	5		3		30	32	29	1	Tr	Tr	Tr	Tr				
5850-5860		5	3		28	36	26	Tr	Tr	Tr	1					
5900-5910		2	5		37	31	23	Tr	1	Tr	Tr					
5900-5910		2	4		36	31	24	Tr	2	Tr	Tr					
5900-5910		4	4		31	35	25	Tr	Tr	Tr	Tr					
5950-5960		5	3		31	31	27	1	1	Tr	Tr					
5950-5960		6	3		30	30	28	1	1	Tr	Tr					
6000-6006		2	4		31	37	24	Tr	Tr	Tr	Tr		Tr			
6000-6006		2	4		31	37	23	Tr	Tr	Tr	Tr		Tr			
6050-6060		3	2		35	28	31	Tr	Tr	Tr	Tr		Tr			
6100-6110		6	2		32	31	26	Tr	1	Tr	Tr	Tr				
6150-6160		3	1		32	27	33	4	Tr	Tr	Tr					
6200-6210		5	2		30	30	33	1	Tr	Tr	Tr					
6200-6210		3	3		31	28	34	Tr	Tr	Tr	Tr					
6200-6210		3	2		30	27	34	4	Tr	Tr	Tr					
6200-6210		5	3		24	34	32	Tr	1	Tr	Tr					

Table 1.2.4c. Rietveld refinement values for samples from RRG-3 ST-1. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Interlayered Illite/Smectite	Interlayered Chlorite/Smectite	Chlorite	Mica	Analcime	Laumontite	Quartz	Plagioclase	K-feldspar	Calcite	Dolomite	Pyrite
4360-4380	Tr		Tr	3	2		52	11	17	15		
4440-4460			Tr	3	2		49	15	23	7		
4500-4510	Tr	2		2	2		43	5	37	9		
4640-4650	Tr		1	3	9	6	42	3	36	2		
4670-4680	Tr		1	4	9	6	40	3	35	2		
4710-4720	Tr		1	2	9	6	41	4	35	2		
4860-4880		2		3	2	22	41	3	25	2		
4980-5000		4		5		1	35	9	25	21		Tr
5060-5080		2		3	14	5	36	8	27	5		Tr
5100-5110		3		1	7	3	39	8	28	10		2
5160-5180		4		2	11	2	35	12	26	8		1
5260-5280	Tr	3		2	10	2	34	12	26	9		Tr
5320-5340		2		2	2		48	20	21	6		Tr
5400-5420	Tr	3		5			68	11	5	4	4	
5540-5550	Tr	0		7			82		10	1		
5580-5590		0		3			87		9	Tr		
5660-5670		1		4			79		16	1		
5710-5720		0		1			94		5	Tr		
5770-5780		9		22			48	11	10			

Table 1.2.4d. Rietveld refinement values for samples from RRG-3A. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Interlayered Chlorite/Smectite	Chlorite	Mica	Analcime	Quartz	Plagioclase	K-feldspar	Calcite	Pyrite	Fluorite	Epidote	Titanite
2812-2815	6		9	14	31	7	29	5			Tr	
3975.5-3976.5	5		5	4	33	17	28	9	Tr			Tr

Table 1.2.4e. Rietveld refinement values for samples from RRG-3C. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Interlayered Chlorite/Smectite	Chlorite	Mica	Analcime	Quartz	Plagioclase	K-feldspar	Calcite	Pyrite	Fluorite	Epidote	Titanite	Hematite
4506	5		4		20	8	36	27			Tr	Tr	Tr
4676	7		10		34	6	21	22	1	Tr			
4981	3		3	Tr	45	4	19	24	1				
4995	7		7		23	2	39	21	1				
5270-5272	6		5		29	2	56	1	Tr				
5270-5272	1		3		26	2	42	15	1	10			
5270-5272	8		6		38	2	28	17	Tr				
5270-5272	4		4		25	2	61	3	Tr				

Table 1.2.4f. Rietveld refinement values for samples from RRG-3D. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Smectite	Interlayered Illite/Smectite	Interlayered Chlorite/Smectite	Chlorite	Mica	Analcime	Laumontite	Quartz	Plagioclase	K-feldspar	Calcite	Pyrite
2520-2530				2	Tr	1		44	23	28	2	
2620-2630			4		Tr	9		40	12	29	6	Tr
2710-2720			5		Tr	12		36	11	28	6	Tr
2810-2820			4		Tr	6		44	13	25	7	Tr
2910-2920			3		Tr	19		34	11	26	5	Tr
3010-3020			5		Tr	5		38	10	29	12	Tr
3110-3120			2		Tr	4		37	37	12	8	Tr
3220-3230			3		Tr	8		49	6	24	10	Tr
3320-3330				5		26		36	3	27	3	Tr
3410-3420				3	Tr	28		34	3	29	3	Tr
3510-3520		Tr		3	Tr	25		35	2	31	2	Tr
3600-3610			4		Tr	8		37	18	29	4	Tr
3710-3720			2		Tr	5		39	20	28	4	Tr
3810-3820		Tr	1		Tr	4		43	18	25	9	Tr
3910-3920			2		Tr	2		46	17	30	4	Tr
4010-4020			1		Tr	2		48	16	27	5	Tr
4110-4120			2		Tr	2		52	16	24	4	Tr
4210-4220		Tr	4		Tr	8		40	17	24	7	Tr
4310-4320			3		Tr	4		44	18	27	4	Tr
4410-4420			4		Tr	33		36	4	21	2	Tr
4510-4520			4		Tr	25		34	5	29	2	Tr
4610-4620				3	Tr	32		33	3	28	Tr	Tr
4710-4720			10		Tr	8		38	9	26	8	Tr
4810-4820				5	Tr	25	3	37	3	25	2	Tr
4910-4920	Tr		7		Tr	11	2	41	6	23	10	Tr
5010-5020	Tr			4	Tr	25	1	38	3	23	4	Tr
5110-5120	Tr	Tr	3		Tr	22	2	39	3	27	3	Tr
5210-5220	Tr		5		Tr	9	3	41	5	24	11	Tr
5250-5260		Tr	4		Tr	8	2	42	5	27	9	1
5310-5320			6		Tr	11	11	38	4	25	3	Tr
5330-5340		Tr	7		Tr	14	5	34	5	31	4	Tr
5410-5420			6		Tr	5	3	35	15	31	4	Tr
5510-5520			7		Tr	3	3	34	22	26	5	Tr
5610-5620			7		Tr	1	1	31	22	28	7	1
5710-5720			8		Tr	Tr		33	23	29	6	1
5800-5810			4		Tr	Tr		39	28	26	2	Tr
5900-5910			4		10			57	5	21	4	
6010-6020			Tr		8			75	1	14	Tr	
6120-6130			2		2	2	3	76	3	12	2	
6210-6220			Tr		2	1		81	2	13	Tr	
6310-6320				Tr	8	2		79	2	8	Tr	
6400-6410				1	10	1		57	13	19	Tr	
6500-6510		Tr		3	3	14	5	35	4	32	4	Tr
6600-6610		Tr		2	5	1		37	22	32	Tr	
6670-6680		Tr		1	5	Tr		36	23	33	Tr	

Table 1.2.4g. Rietveld refinement values for samples from RRG-7. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Interlayered Chlorite/Smectite	Chlorite	Mica	Analcime	Quartz	Plagioclase	K-feldspar	Calcite	Pyrite	Fluorite	Dolomite
5550-5560	3		2	Tr	39	22	23	10	1		
5650-5660	2		2	Tr	39	24	26	6	Tr		
5750-5760	3		7		52	5	30	1	Tr	1	
5850-5860	Tr		9		76		13	1			
5950-5960	2				82	Tr	13	1			
6050-6060		1	10		82	Tr	6				
6150-6160		4	11		46	30	9				
6240-6250		3	15		55	20	7		1		
6350-6360		1	12		55	22	9				
6440-6450		Tr	6		52	25	16	Tr			Tr
6460-6470		Tr	5		56	20	18				

Table 1.2.4h. Rietveld refinement values for samples from RRG-9. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Smectite	Interlayered Illite/Smectite	illite	Interlayered Chlorite/Smectite	Chlorite	Mica	Clinoptilolite	Analcime	Laumontite	Quartz	Plagioclase	K-feldspar	Calcite	Pyrite	Clinopyroxene	Titanite	Dolomite	Cristobalite	Hornblende
290-320	Tr					2	Tr			57	16	22	1						
380-410	3					3	1			47	25	19	2						
500-530	Tr					1	5			46	15	25	4					4	
590-620	Tr					4	3			50	20	21	2						
680-710	Tr				Tr	4	5			51	21	16	3						
800-830		Tr				3	13			47	14	15	7						
890-920		2				Tr	2			58	12	20	6						
980-1010		Tr				2	Tr			60	12	20	5						
1100-1130		Tr				2	Tr			55	16	21	5						
1190-1220		Tr				Tr	Tr			55	16	24	4						
1280-1310		Tr				2	Tr			53	17	23	4						
1400-1430		Tr				Tr	13			39	16	21	8	2					
1490-1520		Tr				2	8			32	11	43	3	Tr					
1580-1610		Tr				3	34			28	15	18	Tr						
1700-1730				2		2	9			41	Tr	44	Tr						
1800-1810		Tr			Tr	3	2	Tr		50	17	22	6	1					
1900-1910		Tr		Tr		1	1	1		52	16	21	7	Tr					
2000-2010		Tr		1		4	2	Tr		47	20	20	5	Tr					
2100-2110		Tr		Tr		2				55	15	25	3						
2200-2210		Tr		Tr		5				50	14	23	7	Tr					
2250-2260		Tr		1		3		2		54	14	19	6	Tr					
2300-2310		Tr		1		3		1		53	15	19	7	Tr					
2350-2360		Tr		1		3		2		50	10	14	19	Tr					
2400-2410		Tr		2		3		3		53	11	16	12	Tr					
2450-2460					1	2		1		51	13	23	10						
2500-2510		Tr		Tr		4		2		52	12	20	10						
2550-2560		Tr		4		5		3		46	13	15	14						
2600-2610					1	5		1		54	11	17	11						
2650-2660		Tr		3		3		8		37	9	35	4						
2700-2710		Tr		Tr		2		40		36	4	17	2						
2750-2760		Tr		3		2	4	14		38	2	31	5						
2800-2810				2		3		3		49	11	21	10						
2850-2860				Tr		2		1		59	12	15	11						
2900-2910				1		3		2		51	14	20	10						
2950-2960				4		3	Tr	10		47	5	20	10						
3050-3060				2		3	1	10	3	39	6	28	6	Tr					
3100-3110		Tr		3		5	32	9		32	2	15	3						
3150-3160		2		7		4	1	2		46	5	24	9						
3200-3210				7		7		3		44	2	18	17	2					
3300-3310				2		3		22		39	3	26	4	1					
3350-3360				2		2		36		36	1	20	2	Tr					
3400-3410				8		5		1		43	4	23	15	Tr					
3500-3510				2		1		3	22	40	2	30							
3550-3560				Tr		2		8	10	46	1	32							
3600-3610				8	2	4		1	7	47	3	21	6	Tr					
3650-3660				9		4		3	3	46	2	15	17	1					

3700-3710				10		5		1	2	35	1	11	24	1			9		
3750-3760				7		8				39	2	18	26	Tr					
3800-3810				7		5				49	2	26	9	Tr					
3850-3860				4		3			4	46	3	37	2	Tr					
3900-3910				Tr		2		Tr		36	28	32	Tr						
3950-3960				5		2		11	3	40	5	27	6	1					
4000-4010				2		1		4	2	39	5	39	7	2					
4050-4060				6		3		4	1	32	6	37	9	2					
4100-4110					4	2		14	7	36	6	26	3	1					
4150-4160				2		2		1	4	39	2	46	3	1					
4200-4210		Tr			1			1	2	45	13	35	2						
4250-4260		Tr			1			Tr	1	39	26	29	1	Tr					
4300-4310			Tr		0			Tr	2	41	29	26	1	Tr					
4400-4410			Tr		3			Tr	3	39	26	27	1	Tr					
4500-4510		Tr	Tr		3			Tr	3	37	25	30	Tr	Tr					
4600-4610			Tr		1				2	39	25	31	Tr	Tr					
4700-4710		Tr	Tr		1					38	31	28	1	Tr					
4800-4810			Tr		2					34	37	26	1						
4900-4910			2		1			1		36	37	21	1	Tr					
4950-4960			Tr	2				Tr		33	35	27	2	Tr					
5000-5010		Tr		1				Tr		33	44	19	1	Tr					
5100-5110			Tr	2		2			Tr	39	23	32	Tr	1					
5150-5160			Tr	Tr		3			2	39	20	34	Tr	Tr					
5200-5210		Tr	Tr		Tr	3			3	39	20	33	Tr	Tr		Tr			
5250-5260			Tr		Tr	2			3	42	19	32	Tr	Tr		Tr			
5300-5310		Tr		2		4			Tr	41	21	29	2	Tr		Tr			
5350-5360					1	6				57	7	29	Tr						
5400-5410					1	18				55	3	22	Tr						
5450-5460					0	9				82		8	Tr						
5500-5510				Tr		2				90		7	Tr						
5550-5560						2				91	Tr	7	Tr						
5600-5610					0	1				88	Tr	10	Tr						
5650-5660				Tr		1				74	5	14	Tr		4				
5700-5710				Tr		1				86	1	11	Tr						
5750-5760					Tr	1				88	1	9	Tr						
5800-5810				Tr		1				94		5	Tr						
5850-5860						1				94		5							
5900-5910				2		1			Tr	71	6	9	1		8				2
5940-5950				Tr		12				76	4	7	Tr						
6000-6010				Tr		11				65	12	11	Tr						
6040-6050					Tr	7				47	17	28	Tr						
6070-6080					Tr	6				42	20	31	Tr						

Table 1.2.4i. Rietveld refinement values for samples from RRG-9 ST-1. Values are reported in weight percent of the sample, and reported in meters above or below mean sea level. Tr = trace amount.

Depth (ft)	Smectite	Interlayered Chlorite/Smectite	% Chlorite in C/S	Chlorite	illite	Muscovite	Biotite	Analcime	Laumontite	Quartz	Plagioclase	K-feldspar	Apatite	Clinopyroxene	Magnetite	Calcite	Pyrite	Titanite	Hematite	Amphibole	Epidote
4151	Tr	2	80-90%			5		2	2	36	24	26	Tr			3		Tr	Tr		
4213	Tr	2	~90%			5		2	2	36	20	31				3		Tr	Tr		
4303				1	2	3		2	2	35	23	28	Tr			3	Tr	Tr	Tr		
4393				2	1	3		1	3	32	27	27	Tr			2	Tr	Tr	Tr		
4513				Tr	Tr	3		Tr	3	36	25	30	Tr			1	Tr	Tr	Tr		
4592				3	Tr				3	32	36	24	Tr			2		Tr	Tr		
4717				Tr	3					34	36	24				1	Tr	Tr	Tr		
4807	Tr			2	Tr				2	37	30	26	Tr			2	Tr	Tr	Tr		
4907	Tr			2	Tr				3	36	29	26				2		1	Tr		
4999		1	50-60%						2	35	34	26				1	Tr	Tr			
5099	Tr	3	~80%		2	1			1	35	18	37				1	Tr	Tr			
5199	Tr	Tr	80-90%		2	2	Tr		4	47	16	24				3	Tr	Tr			
5299	Tr	5	n.d.			Tr	9		3	51	6	22	Tr			1	Tr	2		Tr	
5399		1	n.d.			2	Tr		3	82	2	8	Tr			Tr	Tr	Tr			
5531	Tr	Tr	n.d.			3	Tr		3	80	3	9				Tr	Tr	1			
5565						3				95		3									
5605				Tr		3				95		3									
5650				Tr		28				68		4									
5660				Tr		20				76		4						Tr			
5700				Tr		10	1			46	23	16	Tr			1		Tr			1
5890				Tr		4	Tr			36	25	32				1	Tr	1			Tr
5900		5	n.d.		3	2	Tr			23	33	17		10	2	2		2		Tr	Tr
5930				4		3	1			31	32	22		3	1	1		Tr		Tr	Tr

1.3. Oxygen Isotope Data

Table 1.3.1a: Preexisting measured d18O values from Coso Hot Springs, CA.

Well	Well Depth	$\delta^{18}O$ (‰)
BLM 84-30	173.7	8.03
	246.9	7.21
	396.2	4.23
	673.6	1.22
	838.2	7.54
	935.7	6.07
	1088.1	8.47
	1231.4	7.38
	1246.6	9.32
	1417.3	6.74
	1527.0	6.82
	1688.6	7.15
	1783.1	7.52
	1895.9	6.04
	1935.5	7.88
	2030.0	7.70
	2133.6	7.66
	2255.5	6.92
	2328.7	7.17
	2386.6	7.02
BLM33B-19	182.9	7.98
	243.8	8.19
	396.2	7.50
	518.2	7.22
	658.4	7.28
	819.9	8.43
	890.0	6.83
	1039.4	7.79
	1200.9	8.55
	1356.4	7.65
	1505.7	6.51
	1588.0	8.06
	1743.5	5.12
	1822.7	7.03
	1905.0	5.85
	2087.9	7.43
	2173.2	7.55
	2261.6	5.54
	2401.8	5.79
	2529.8	6.77
	2633.5	5.10

Well	Well Depth	$\delta^{18}O$ (‰)
	2694.4	4.48
NVY51A-16	158.5	6.91
	268.2	9.60
	457.2	6.84
	661.4	9.60
	819.9	7.66
	920.5	6.66
	1054.6	7.44
	1231.4	7.24
	1234.4	5.94
	1405.1	5.00
	1508.8	7.63
	1597.2	5.83
	1722.1	6.60
	1783.1	9.44
	1877.6	6.60
	1956.8	7.23
	2094.0	6.33
	2133.6	5.71
	2261.6	4.51
	2392.7	6.65
	2453.6	4.41
	2529.8	2.70
NVY34A-9	164.6	9.07
	259.1	7.60
	426.7	7.38
	560.8	6.63
	679.7	6.08
	856.5	4.95
	914.4	6.18
	1088.1	7.81
	1118.6	5.89
	1222.2	5.90
	1280.2	7.81
	1353.3	6.39
	1402.1	8.91
	1463.0	6.97
	1554.5	7.82
	1649.0	6.86
	1737.4	8.82
	1828.8	7.35
	1923.3	4.55
	2078.7	7.41
	2212.8	6.61

Well	Well Depth	$\delta^{18}O$ (‰)
	2289.0	6.11
	2368.3	5.87
	2465.8	7.10
	2618.2	8.60
	2734.1	7.69
	2798.1	5.38
	2883.4	6.77
	2913.9	4.77
	2959.6	5.91
NVY68-6	256.0	4.36
	423.7	4.03
	542.5	3.32
	609.6	6.35
	722.4	6.60
	801.6	5.16
	960.1	4.26
	1082.0	5.33
	1188.7	5.31
	1271.0	4.77
	1371.6	4.45
	1484.4	2.72
	1554.5	3.77
	1700.8	4.39
	1798.3	5.22
	1935.5	5.15
	2066.5	3.82
	2121.4	4.59
	2194.6	3.56
	2270.8	2.99
	2392.7	1.48
	2465.8	0.99
	2566.4	0.57
	2636.5	0.35
	2709.7	0.66
	2792.0	4.02
	2849.9	-0.52
	2941.3	-4.06
	2984.0	0.52
	3063.2	0.57
NVY73A-7	185.9	6.20
	298.7	6.72
	420.6	6.83
	515.1	6.23
	551.7	5.72

Well	Well Depth	$\delta^{18}O$ (‰)
	637.0	5.48
BLM 58A-18	182.9	7.78
	307.8	7.82
	429.8	7.41
	563.9	7.17
	685.8	7.55
	789.4	6.78
	914.4	7.43
	1045.5	7.23
	1219.2	7.11
	1350.3	6.14
	1493.5	7.61
	1609.3	5.88
	1764.8	6.56
	1850.1	5.96
	1959.9	7.02
	2042.2	5.47
	2133.6	6.26
	2225.0	5.06
	2325.6	3.47
	2423.2	6.15
	2572.5	7.43
	2636.5	6.03
BLM 43-7	338.3	6.16
	451.1	6.94
	524.3	5.9
	612.6	5.8
	707.1	4.73
	7778.5	5.06
	850.4	4.74
NVY 76B-18	219.5	7.34
	323.1	7.89
	429.8	7.48
	615.7	7.08
	920.5	4.41
	1164.3	4.52
	1399.0	7.42
	1514.9	5.99
	1725.2	7.08
	1844.0	9.8
	2063.5	8.54
	2173.2	1.62
	2249.4	4.48
	2386.6	4.12

Well	Well Depth	$\delta^{18}O$ (‰)
	2535.9	4.96
	2575.6	5.02
BLM 66-6	429.8	7.08
	637.0	6.78
	810.8	4.21
	947.9	4.38
	1112.5	3.02
	1258.8	3.62
	1405.1	4.28
	1728.2	0.37
	1819.7	2.83
	1944.6	0.23
BLM 88-1	189.0	7.67
	347.5	6.79
	438.9	7.24
	597.4	7.95
BLM 88-1RD	707.1	5.41
	865.6	7.50
	987.6	5.55
	1170.4	6.67
	1399.0	1.75
BLM 23A-19	478.5	7.00
	640.1	8.35
	868.7	9.00
	1191.8	6.82
	1429.5	7.60
	1685.5	6.55
	1828.8	4.50
	2130.6	6.09
	2493.3	5.68
	2688.3	5.32
NVY 63A-18	292.6	6.88
	521.2	6.18
	713.2	5.54
	862.6	4.85
	1063.8	5.17
	1213.1	5.74
	1487.4	6.22
	1645.9	4.39
	1877.6	4.39
	2203.7	4.47
NVY 41B-8	210.3	7.06
	429.8	6.54
	624.8	6.58

Well	Well Depth	$\delta^{18}O$ (‰)
	850.4	7.15
	1136.9	6.65
	1347.2	6.65
	1600.2	7.56
	1777.0	9.47
	2011.7	7.66
NVY 66-7	164.6	6.07
	295.7	7.88
	466.3	6.24
	621.8	6.29
	768.1	4.78
	893.1	5.62
	1057.7	5.60
	1216.2	6.05
NVY 63B-18	426.7	6.50
	759.0	5.89
	1033.3	6.06
	1246.6	2.42
	1524.0	5.13
	1859.3	4.83
NVY 63B-18D	2090.9	6.13
	2301.2	6.97
	2514.6	4.70
	2682.2	4.09
NVY 78B-6RD	298.7	7.66
	570.0	6.97
	792.5	5.08
	1036.3	3.40
	1234.4	3.26
NVY 78B-6ST	1453.9	3.25
	1633.7	4.06
	1905.0	3.23
	2097.0	2.18
BLM CGEH1	155.4	6.02
	268.2	6.36
	423.7	7.88
	576.1	6.26
	701.0	6.87
	899.2	7.02
	1051.6	7.45
	1252.7	6.46
	1441.7	5.62
NVY 23A-17	243.8	5.59
	499.9	6.05

Well	Well Depth	$\delta^{18}O$ (‰)
	618.7	6.30
	813.8	7.20
	1024.1	5.90
	1338.1	6.82
	1618.5	5.73
	1871.5	6.18
	2118.4	4.63
	2386.6	4.28
NVY 13A-16	280.4	8.45
	493.8	7.30
	612.6	7.29
	838.2	7.84
	960.1	7.11
	1109.5	7.28
	1344.2	7.04
	1554.5	7.04
	1804.4	7.37
	2045.2	7.01
NVY 64-16	228.6	6.41
	426.7	7.38
NVY 64-16RD	859.5	6.24
	932.7	7.05
	1140.0	7.78
	1441.7	8.05
	1703.8	7.63
	1892.8	7.58
	2133.6	5.84
	2423.2	3.22
	2551.2	2.05
	2804.2	5.25
BLM 54-7RD	594.4	5.42
	740.7	5.61
	963.2	4.28
	1094.2	5.79
	1246.6	5.54
	1636.8	4.52
	1767.8	7.32
	2026.9	5.77
	2283.0	3.29
	2502.4	2.82
NVY 38-9	240.8	4.52
	545.6	7.07
	838.2	6.92
	1155.2	7.11

Well	Well Depth	$\delta^{18}O$ (‰)
	1460.0	7.21
	1764.8	6.83
	2078.7	6.51
	2356.1	4.65
	2679.2	5.48
	2962.7	5.78
NVY 38A-9	1612.4	6.35
	1917.2	5.28
	2243.3	4.23
	2468.9	4.60
	2697.5	5.81
NVY 47A-8RD	438.9	5.55
	548.6	4.44
	765.0	6.98
	853.4	6.17
	100.6	6.98
	1194.8	7.39
	1414.3	2.75
NVY 78-7	335.3	7.40
	688.8	5.29
	823.0	6.14
	999.7	4.84
	1243.6	5.00
	1377.7	4.65
	1545.3	6.31
	1688.6	5.85
	1847.1	5.75
BLM 46A-19RD	896.1	6.98
	1188.7	6.77
	164.6	7.90
	1764.8	7.12
	2036.1	5.17
	2261.6	7.14
	2560.3	6.51
	2871.2	6.71
	3169.9	7.56
	3404.6	0.45
	3468.6	0.41
	3627.1	5.22
	3739.9	7.02
	3956.3	5.20
Navy I 87A-7	213.4	8.92
	310.9	9.15
	457.2	5.81

Well	Well Depth	$\delta^{18}O$ (‰)
	652.3	5.94
	777.2	5.23
	947.9	6.24
	1130.8	5.46
Navy I 24A-8	189.0	6.05
	381.0	6.59
	634.0	6.28
	880.9	6.15
	1066.8	4.41
	1213.1	6.12
	1359.4	4.08
	1563.6	1.52
	1709.9	2.90
	1880.6	1.42
Navy I 41A-8	213.4	6.34
	402.3	6.80
	621.8	6.81
	804.7	5.65
	996.7	7.76
	1158.2	6.94
	1356.4	5.72
	1566.7	6.81
	1807.5	7.32
	2017.8	6.60
Navy II 81A-18	228.6	6.94
	359.7	7.67
Navy II 81A-18RD	487.7	6.33
	624.8	6.13
	841.2	4.90
	938.8	5.33
	1063.8	4.28
	1170.4	5.71
Navy II 67C-17	256.0	7.84
	454.2	7.95
	658.4	7.35
	859.5	7.79
	1094.2	7.30
	1365.5	7.50
	1719.1	7.63
	1908.0	7.00
	2072.6	6.06
	2145.8	5.60
	2283.0	6.60

Well	Well Depth	$\delta^{18}O$ (‰)
	2347.0	7.50
Navy II 86-17	356.6	7.89
	728.5	7.19
	1015.0	7.19
	1289.3	8.21
	1597.2	8.93
	1944.6	6.65
	2286.0	6.73
	2639.6	6.69
	2813.3	5.66
	3069.3	5.67
Navy II 83-16	210.3	7.37
	518.2	8.00
	841.2	6.56
	1149.1	7.77
	1469.1	6.77
	1780.0	6.65
	2026.9	7.32
	2331.7	6.99
	2633.5	6.45
	2971.8	7.08
Navy II 83B-16	265.2	7.37
	609.6	6.88
	902.2	7.79
	1234.4	7.09
	1508.8	6.14
	1877.6	5.13
	2158.0	5.47
	2438.4	5.72
	2743.2	7.25
	3197.4	6.97
Navy II 64A-16	323.1	8.16
	609.6	7.11
	914.4	7.76
	1219.2	6.98
	1478.3	6.94
	1801.4	6.78
	2075.7	6.04
	2444.5	3.95
	2697.5	7.75
	2956.6	6.82
Navy II 67-17	381.0	7.59
	643.1	8.33
	929.6	7.16
	1146.0	7.04

Well	Well Depth	$\delta^{18}O$ (‰)
	1341.1	7.37
	1569.7	7.11
	1773.9	6.58
	1981.2	7.23
	2331.7	7.19
	2728.0	6.90
Navy II 37B-17	201.2	8.32
	475.5	6.43
	679.7	5.41
	929.6	5.76
	1173.5	6.33
	1383.8	6.64
	1618.5	6.22
	1859.3	6.68
	2133.6	
BLM 52-20	301.8	7.68
	539.5	8.07
	792.5	7.21
	996.7	7.34
	1222.2	6.26
	1441.7	6.68
	1688.6	7.20
	1883.7	6.98
	2115.3	7.53
	2365.2	5.70
BLM 47B-20	274.3	6.46
	460.2	6.02
	710.2	5.18
	914.4	6.99
	1167.4	7.17
	1295.4	7.59
	1536.2	6.74
	1795.3	6.31
	1962.9	6.71
BLM 16A-20	289.6	7.97
	557.8	7.33
	746.8	8.14
	1066.8	6.84
	1307.6	4.27
	1554.5	6.31
	1731.3	6.36
	1962.9	7.12
	2295.1	7.09

Well	Well Depth	$\delta^{18}O$ (‰)
BLM 24-20	259.1	7.76
	579.1	7.40
	883.9	7.17
BLM 24-20RD	1176.5	6.83
	1374.6	6.28
	1719.1	5.23
	1865.4	4.20
	2054.4	4.99
BLM 88-20	213.4	6.41
	502.9	8.18
	731.5	6.15
	1005.8	6.15
	1246.6	6.02
	1463.0	7.59
	1722.1	7.81
	1950.7	7.53
	2191.5	7.33
	2438.4	6.71
BLM 81A-19	320.0	7.51
	530.4	7.88
BLM 81A-19RD	810.8	7.31
	990.6	7.41
	1225.3	5.87
	1356.4	7.06
	1536.2	6.94
	1688.6	6.25
NVY 38B-9	1926.3	5.52
	2118.4	5.56
	2261.6	4.35
	2322.6	6.62
	2453.6	5.80
	2514.6	5.58
	2639.6	5.75
	2712.7	6.06
BLM 84-30	990.6	8.03

Table 1.3.1b: Measured $\delta^{18}O$ values for whole rock and mineral samples and calculated W/R ratios from well 68-6, Coso Hot Springs, CA.. "*" indicates chloritized biotite

Well: 68-6						
Depth (m)	Whole-Rock (‰)	Feldspar (‰)	Chlorite (‰)	Biotite (‰)	Hornblende (‰)	W/R Ratio
271.3	3.88					0.43
335.3	4.47	6.04				0.31
423.7	2.55					0.69
487.7	3.49	6.59	2.12			0.51
563.9	5.08					0.19
685.8	5.78					0.05
722.4	6.02	6.29				0.00
883.9	3.57					0.49
984.5	4.07					0.39
1069.8	4.30					0.34
1271.0	4.43					0.32
1371.6	2.44	5.24				0.72
1432.6	2.87					0.79
1484.4	1.50	4.96				0.63
1554.5	2.60					0.90
1700.8	3.78	5.64	0.16			0.68
1798.3	4.67	6.76				0.45
1935.5	4.46					0.27
2066.5	2.94					0.31
2270.8	2.70					0.62
2392.7	0.75					0.66
2465.8	0.75	3.09				1.05
2566.4	0.61					1.05
2709.7	0.75	3.08		-3.18*		1.08
2792.0	2.83	3.59				1.05
2849.9	0.54					0.64
2895.6	0.26					1.10
2941.3	-4.60	-3.88	-1.53			1.15
2984.0	-1.05	1.76	1.01		3.58	2.12
3173.0	0.64					1.41

Table 1.3.1c: Measured $\delta^{18}O$ values for whole rock and mineral samples and calculated W/R ratios from well 33A-7, Coso Hot Springs, CA.. "*" indicates chloritized biotite

Well: 33A-7						
Depth (m)	Whole-Rock (‰)	Feldspar (‰)	Chlorite (‰)	Biotite (‰)	Hornblende (‰)	W/R Ratio
33.5	7.62	7.50				0.00
109.7	3.7					0.68
262.1	5.39					0.39
414.5	7.45					0.03
566.9	4.84					0.48
646.2	5.34					0.40
871.7	0.2					1.29
1024.1	3.59					0.70
1100.3	3.00	5.49	1.98			0.80
1325.9	4.18					0.60
1569.7	3.89					0.65
1649.0	2.71					0.86
1877.6	1.03					1.15
1984.2	3.93					0.64
2136.6	1.60					1.05
2212.8	-0.44					1.40
2322.6	-0.02					1.33
2322.6	-1.02					1.51
2350.0	-0.98					1.50
2380.5	0.14					1.30
2471.9	0.51	-2.37			4.35	1.24
2502.4	-2.35					1.74
2529.8	-3.08	-0.03	0.32	-3.83*	4.31	1.86
2566.4	0.94	4.16				1.16
2593.8	2.15	4.20			3.32	0.95
2624.3	1.55					1.06
2654.8	2.92					0.82
2685.3	2.10	4.60				0.96
2746.2	3.91					0.65
2837.7	4.48	5.49				0.55
2959.6	4.60					0.53
2990.1	4.25					0.59
3020.6	4.05					0.62
3051.0	1.78					1.02
3081.5	4.21					0.59
3112.0	4.03					0.63
3142.5	4.61					0.52
3173.0	4.10					0.61
3233.9	4.49					0.55
3294.9	3.88	5.90	4.12			0.65

Table 1.3.1d: Measured $\delta^{18}O$ values for whole rock and mineral samples and calculated W/R ratios from well 73-19, Coso Hot Springs, CA.. "*" indicates chloritized biotite

Well: 73-19						
Depth (m)	Whole-Rock (‰)	Feldspar (‰)	Chlorite (‰)	Biotite (‰)	Hornblende (‰)	W/R Ratio
271.3	6.98	7.79		3.84	4.62	0.08
381.0	6.61					0.13
390.1	6.37					0.16
445.0	7.48	8.12				0.01
545.6	5.52					0.28
777.2	7.57					0.00
798.6	6.36					0.16
1060.7	7.16					0.06
1072.9	7.41					0.02
1225.3	6.07					0.20
1316.7	6.63					0.13
1347.2	5.91					0.23
1386.8	4.61	6.14	-0.45	1.97		0.40
1411.2	2.38					0.71
1481.3	6.30	7.26		3.78	4.21	0.17
1581.9	5.94					0.22
1664.2	6.85					0.10
1709.9	5.13					0.33
1813.6	5.14	6.20				0.33
1834.9	3.30	6.34				0.58
1856.2	3.30					0.58

Table 1.3.2: Measured $\delta^{18}O$ values and W/R ratios from 47-07, 53-07, 53-07ST1, 55-07 and 63-07 from Lightning Dock, NM.

Lightning Dock, NM		
Sample (m)	$\delta^{18}O$ (‰)	W/R_{closed}
47-07		
120	23.50	0.02
120	23.74	0.01
148	34.78	0.00
396	22.02	0.10
396	21.88	0.10
579	22.79	0.06
610	21.84	0.11
640	21.20	0.14
671	22.76	0.06
701	21.85	0.11
732	22.34	0.08
762	21.85	0.11
792	20.44	0.19
823	27.59	0.00
853	22.01	0.10
884	23.24	0.04
914	23.68	0.01
945	21.94	0.10
975	20.25	0.20
1006	20.37	0.19
1036	18.64	0.31
1067	21.63	0.12
1097	21.99	0.10

53-07		
741	20.66	0.18
762	23.65	0.02
792	23.63	0.02
814	21.95	0.10
823	23.77	0.01
835	20.24	0.20
844	20.88	0.16
853	19.72	0.24
863	23.75	0.01
875	21.63	0.12
875	21.62	0.12
884	21.95	0.10
945	22.21	0.09
1036	19.56	0.25
1067	20.90	0.16
1097	20.11	0.21
1128	21.43	0.13
1158	20.11	0.21
53-07ST1		
759	18.21	0.35
777	20.37	0.19
777	21.08	0.15
786	21.61	0.12
796	22.38	0.08

55-07		
479	23.22	0.036
539	24.37	0.000
539	24.23	0.000
579	23.33	0.031
594	22.99	0.047
610	22.27	0.084
655	22.61	0.066
664	22.58	0.068
692	22.71	0.061
63-07		
689	22.72	0.06
707	23.46	0.02
735	20.49	0.19
805	22.24	0.09
826	17.75	N/A
826	17.42	N/A
869	22.21	0.09
899	27.39	N/A
930	19.16	N/A
960	18.42	N/A
991	23.86	0.01
1009	22.24	0.09
1036	21.57	0.12

Table 1.3.3: Measured $\delta^{18}O$ values and W/R ratios for 13a-34 and 63-33 from Thermo Hot Springs, UT.

Sample (m)	$\delta^{18}O$ (‰)	W/R_{closed}
13a-34		
1006	16.93	0.35
1036	14.94	0.50
1082	13.80	0.60
1082	13.42	0.63
1113	16.11	0.41
1143	19.40	0.20
1173	23.89	0.00
1204	22.39	0.06
1387	10.40	0.83
1387	7.15	1.28
1417	16.56	0.33
1448	19.07	0.20
1478	13.30	0.56
1478	10.49	0.82
1509	15.76	0.38
1539	19.07	0.20
1570	21.84	0.08
1600	22.79	0.04
1631	22.44	0.05
1661	18.67	0.22
1692	20.40	0.14
1722	18.79	0.21
1753	20.21	0.14
1783	20.08	0.15
1814	15.02	N/A
1844	17.37	0.28
1875	15.17	0.42
1875	13.35	0.55

Sample (m)	$\delta^{18}O$ (‰)	W/R_{closed}
63-33		
991	14.71	0.51
1021	24.33	0.00
1052	27.24	0.00
1082	20.22	0.16
1082	20.27	0.16
1113	9.32	1.13
1143	15.09	0.48
1173	18.18	0.27
1204	22.09	0.07
1234	22.52	0.05
1265	21.30	0.10
1295	22.52	0.05
1326	23.91	0.00
1326	23.46	0.02
1356	23.32	0.02
1387	11.86	0.68
1387	11.40	0.73
1417	22.59	0.05
1448	23.43	0.02
1478	23.75	0.01
1509	15.48	0.40
1539	19.11	0.19
1579	14.17	0.49
1600	20.84	0.12
1631	19.48	0.18
1661	16.63	0.33
1692	21.66	0.08
1728	3.49	N/A
1753	3.08	N/A
1783	17.63	N/A
1814	15.11	N/A

References:

Moore, D. M. and R. C. Reynolds Jr. (1997) X-ray Diffraction and the Identification and Analysis of Clay Minerals. Oxford University Press, New York, New York. 378 p.