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Final Report
Reservoir Property Assessment

Noble Energy, Incorporated
Child VO 30-9
Niobrara Formation
Denver Basin
Laramie County, Wyoming

Submitted to:
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Figure 1. **Canister Gas Content Data Summary**

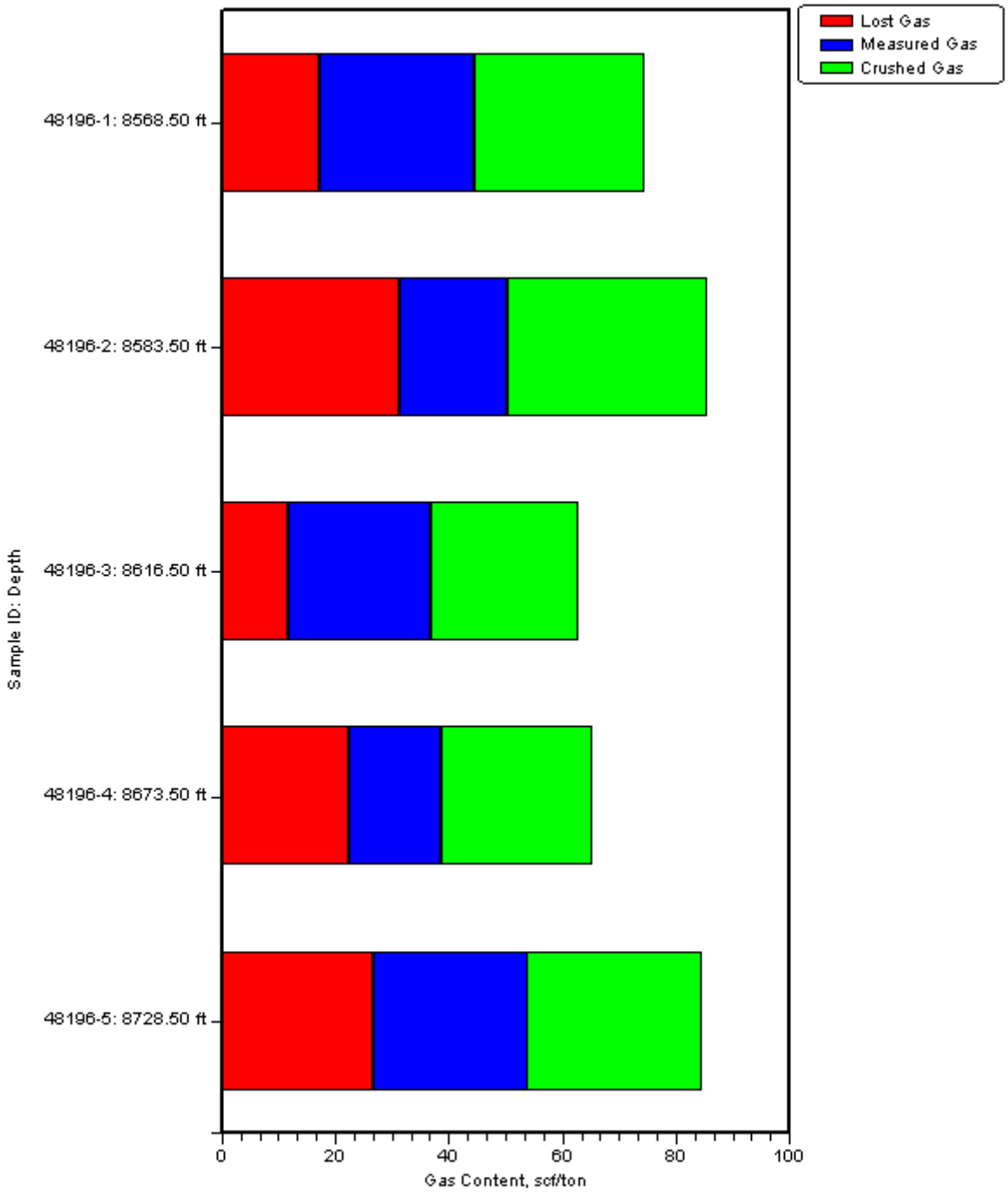


Table 1. **Canister Gas Content Summary**

Sample ID	Top Depth	Bottom Depth	Air-Dry Weight	Lost Gas Time	Lost Gas Fraction	Measured Gas Fraction	Crushed Gas Fraction	Lost Gas Content	Measured Gas Content	Crushed Gas Content	Canister Gas Content
	ft	ft	g	hours	%	%	%	scf/ton	scf/ton	scf/ton	scf/ton
Niobrara Formation											
48196-1	8,568.00	8,569.00	5,970	10.42	23.32	36.48	40.19	17.4	27.2	30.0	74.7
48196-2	8,583.00	8,584.00	5,970	10.00	36.86	22.10	41.03	31.6	18.9	35.1	85.6
48196-3	8,616.00	8,617.00	6,132	8.93	18.97	39.76	41.27	12.0	25.1	26.0	63.1
48196-4	8,673.00	8,674.00	5,946	6.20	34.70	24.54	40.76	22.7	16.0	26.7	65.4
48196-5	8,728.00	8,729.00	5,776	6.35	31.62	31.94	36.45	26.8	27.1	30.9	84.8
Average	***-***	***-***	***5,959***	***8.38***	***29.10***	***30.96***	***39.94***	***22.1***	***22.9***	***29.7***	***74.7***

Table 2. **Diffusivity and Sorption Time Summary**

Sample ID	Top Depth	Bottom Depth	Sorption Time	Diffusivity
	ft	ft	hr	1/µs
Niobrara Formation				
48196-1	8,568.00	8,569.00	141.6	0.131
48196-2	8,583.00	8,584.00	55.0	0.337
48196-3	8,616.00	8,617.00	180.2	0.103
48196-4	8,673.00	8,674.00	38.7	0.479
48196-5	8,728.00	8,729.00	47.0	0.394
Average	***-***	***-***	***92.5***	***0.289***

Table 3. **Contaminant Corrected Extrapolated Time Zero Gas Composition**

Sample ID	Midpoint Depth	C_1	C_2	C_3	iC_4	nC_4	C_{5+}	O_2	N_2	CO_2	H_2	Total
	ft	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
48196-1	8,568.50	0.8847	0.0107	0.0000	0.0084	0.0000	0.0000	0.0000	0.0000	0.0962	0.0000	1.0000
48196-2	8,583.50	0.8878	0.0950	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0171	0.0000	1.0000
48196-3	8,616.50	0.7608	0.0753	0.0560	0.0048	0.0251	0.0119	0.0000	0.0000	0.0662	0.0000	1.0000
48196-4	8,673.50	0.7793	0.0108	0.0000	0.0024	0.0000	0.0000	0.0000	0.0000	0.2075	0.0000	1.0000
48196-5	8,728.50	0.8525	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1451	0.0000	1.0000
Average	**-**	***0.8330***	***0.0388***	***0.0112***	***0.0031***	***0.0050***	***0.0024***	***0.0000***	***0.0000***	***0.1064***	***0.0000***	***1.0000***

Table 4. **Integrated Contaminant Corrected Gas Composition**

Sample ID	Midpoint Depth	C_1	C_2	C_3	iC_4	nC_4	iC_{5+}	O_2	N_2	CO_2	H_2	Total
	ft	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
48196-1	8,568.50	0.4466	0.0625	0.1477	0.0057	0.1268	0.1341	0.0000	0.0000	0.0765	0.0000	1.0000
48196-2	8,583.50	0.3571	0.0834	0.1405	0.0338	0.1608	0.1734	0.0000	0.0000	0.0510	0.0000	1.0000
48196-3	8,616.50	0.5468	0.1285	0.1631	0.0145	0.0664	0.0326	0.0000	0.0000	0.0480	0.0000	1.0000
48196-4	8,673.50	0.4168	0.0587	0.1204	0.0217	0.0889	0.1079	0.0000	0.0000	0.1855	0.0000	1.0000
48196-5	8,728.50	0.4665	0.0681	0.1334	0.0232	0.1014	0.1161	0.0000	0.0000	0.0912	0.0000	1.0000
Average	**-**	***0.4468***	***0.0803***	***0.1410***	***0.0198***	***0.1089***	***0.1128***	***0.0000***	***0.0000***	***0.0905***	***0.0000***	***1.0000***

Figure 2. **Comparison of Time Zero Gas Composition**

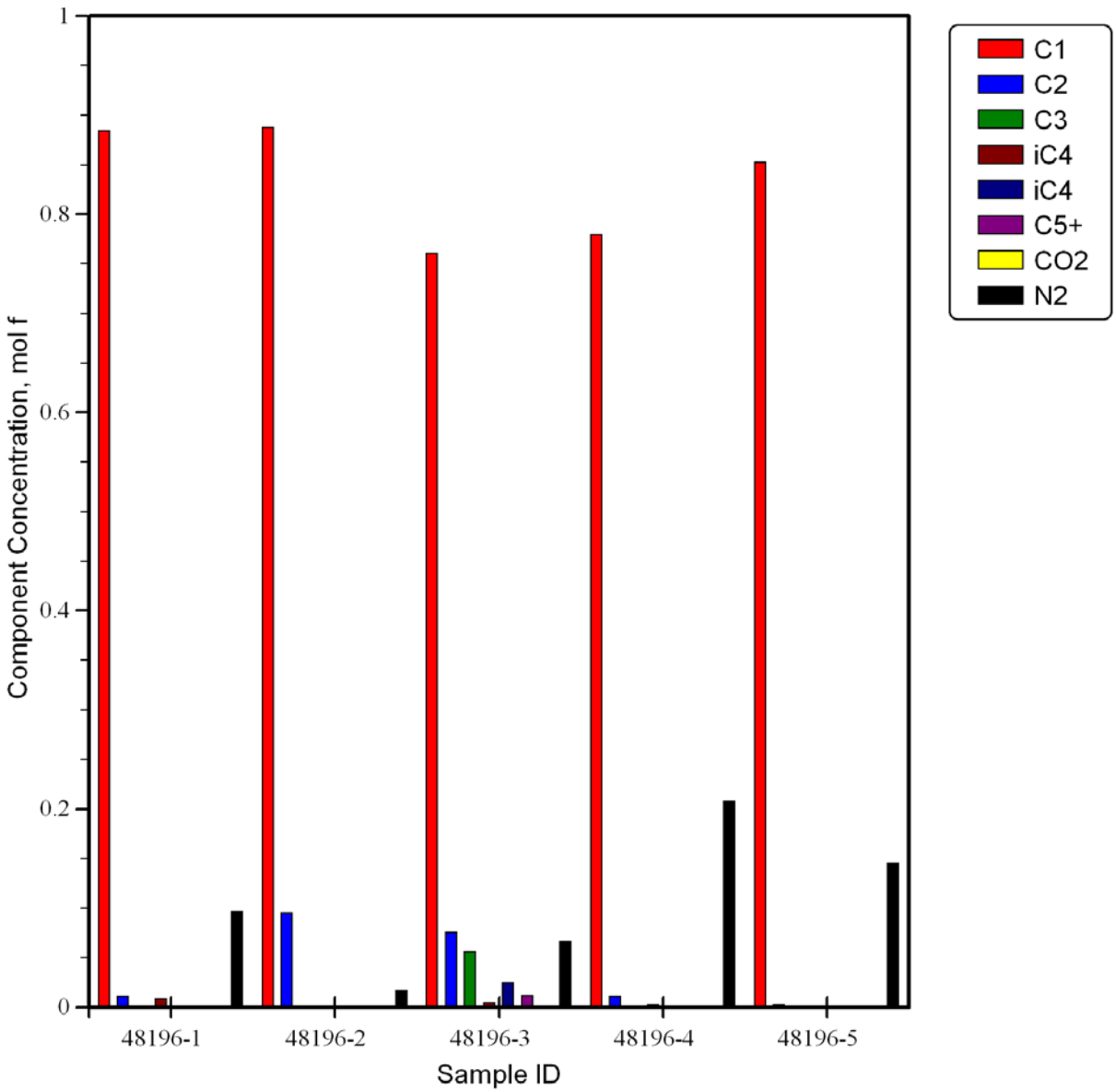


Figure 3. **Comparison of Integrated Gas Composition**

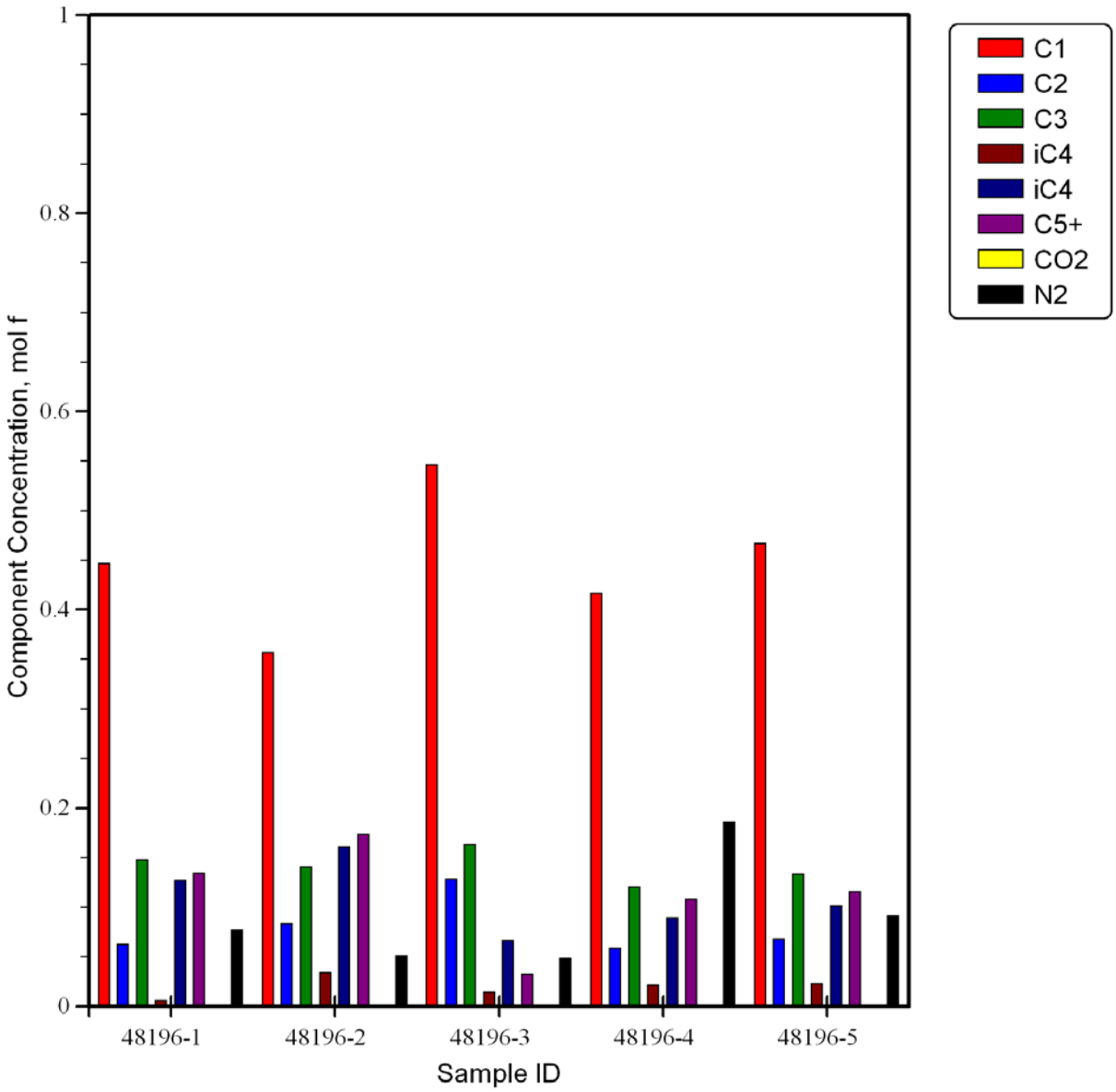


Figure 4. **Natural Gas Source Classification**

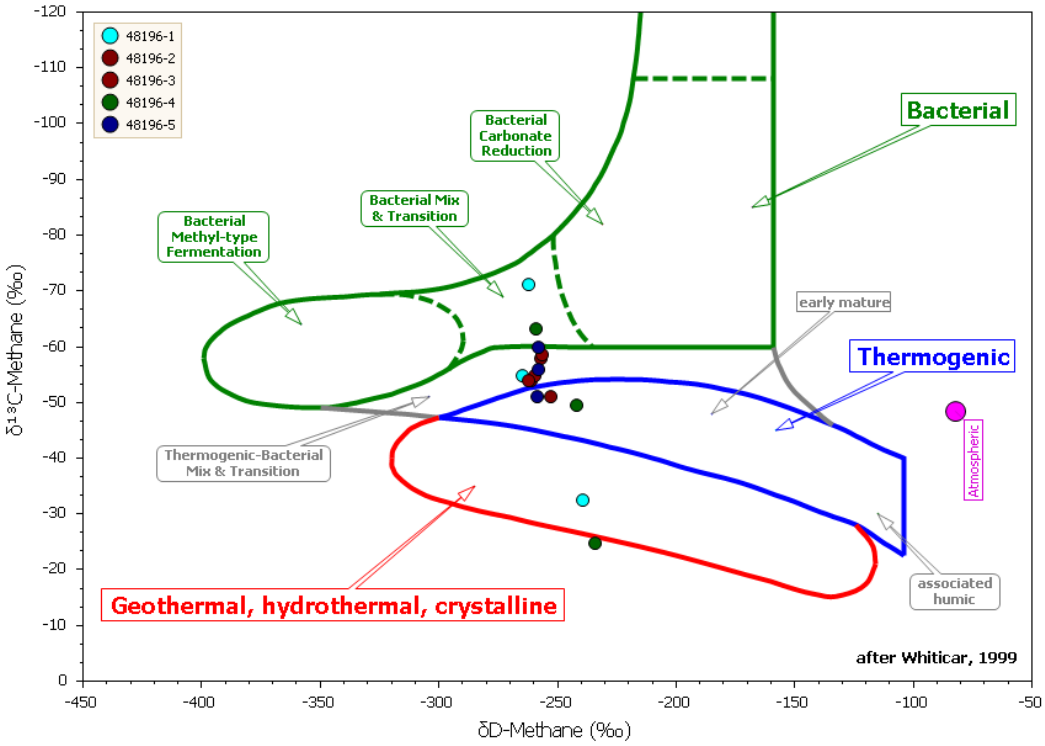


Figure 5. **Carbon-13 Concentration vs. Time**

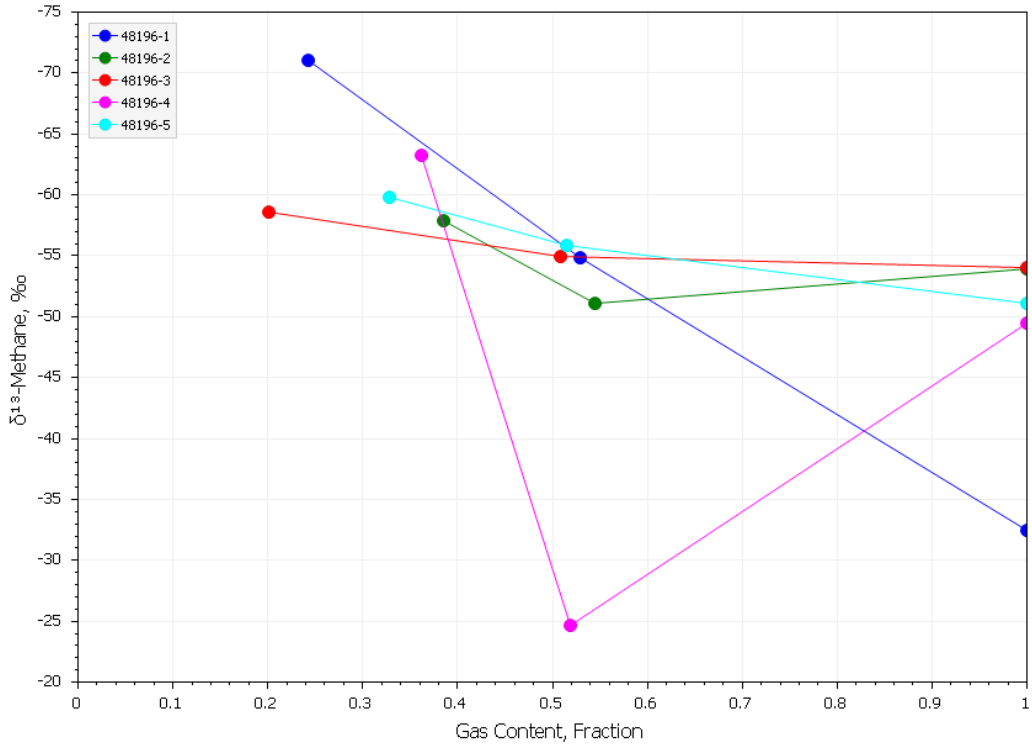


Table 5. **Isotope Analysis Summary, Part 1**

Parameter	Unit	48196-1-1	48196-1-2	48196-1-3	48196-2-1	48196-2-2	48196-2-3
Midpoint Depth	ft	8,568.50			8,583.50		
Formation	-	Niobrara Formation			Niobrara Formation		
Date/Time Sampled	mm/dd/yyyy hh:mm	08/04/2010 11:25	08/05/2010 18:40	08/17/2010 11:36	08/04/2010 11:27	08/05/2010 18:43	08/17/2010 11:24
Isotope Data							
$\delta^{13}C_1$	‰	-71.1	-54.8	-32.5	-57.9	-51.1	-53.9
δDC_1	‰	-262	-265	-240	-257	-253	-261
$\delta^{13}C_2$	‰	-45.7	-38.6	-30.5	-40.2	-36.7	-40.2
$\delta^{13}C_3$	‰	-37.9	-34.0	-30.4	-34.7	-33.0	-32.5
$\delta^{13}CO_2$	‰	-12.9	-6.8	-5.7	-8.7	-5.6	-11.6
Fractionation Factor	αCO_2-CH_4	1.0627	1.0508	1.0277	1.0522	1.0480	1.0447

Table 6. **Isotope Analysis Summary, Part 2**

Parameter	Unit	48196-3-1	48196-3-2	48196-3-3	48196-4-1	48196-4-2	48196-4-3
Midpoint Depth	ft	8,616.50			8,673.50		
Formation	-	Niobrara Formation			Niobrara Formation		
Date/Time Sampled	mm/dd/yyyy hh:mm	08/04/2010 12:32	08/05/2010 18:45	08/17/2010 13:09	08/05/2010 06:02	08/06/2010 11:06	08/17/2010 15:18
Isotope Data							
$\delta^{13}C_1$	‰	-58.6	-54.9	-54.0	-63.3	-24.7	-49.5
δDC_1	‰	-257	-260	-262	-259	-234	-242
$\delta^{13}C_2$	‰	-39.6	-38.4	-37.2	-41.2	-27.4	-38.6
$\delta^{13}C_3$	‰	-34.1	-33.7	-33.4	-34.5	-27.7	-33.8
$\delta^{13}CO_2$	‰	-8.6	-4.8	-9.8	-10.0	-2.2	-7.4
Fractionation Factor	αCO_2-CH_4	1.0531	1.0530	1.0467	1.0569	1.0231	1.0443

Table 7. Isotope Analysis Summary, Part 3

Parameter	Unit	48196-5-1	48196-5-2	48196-5-3
Midpoint Depth	ft	8,728.50		
Formation	-	Niobrara Formation		
Date/Time Sampled	mm/dd/yyyy hh:mm	08/05/2010 23:00	08/06/2010 12:30	08/17/2010 15:56
Isotope Data				
$\delta^{13}C_1$	‰	-59.8	-55.9	-51.1
δDC_1	‰	-258	-258	-258
$\delta^{13}C_2$	‰	-39.1	-38.1	-36.7
$\delta^{13}C_3$	‰	-33.0	-32.7	-31.8
$\delta^{13}CO_2$	‰	-8.1	-5.3	-5.9
Fractionation Factor	αCO_2-CH_4	1.0550	1.0536	1.0476

Table 8. Density, TOC Content, and Total Gas Content Summary

Sample ID	Top Depth	Bottom Depth	Crushed Density	Total Organic Carbon Content	Total Gas Content
	ft	ft	g/cm^3	wt frac	scf/ton
Niobrara Formation					
48196-1	8,568.00	8,569.00	2.554	0.0413	74.7
48196-2	8,583.00	8,584.00	2.533	0.0396	85.6
48196-3	8,616.00	8,617.00	2.552	0.0376	63.2
48196-4	8,673.00	8,674.00	2.583	0.0269	65.4
48196-5	8,728.00	8,729.00	2.534	0.0416	84.8
Average	**-**	**-**	***2.551***	***0.0374***	***74.7***

Table 9. **Programmed Pyrolysis Data Summary, Part 1**

Sample ID	Midpoint Depth	TOC	S1	S2	S3	Tmax	Hydrogen Index	Oxygen Index	S2-S3 Ratio	S1-TOC Ratio	Production Index (PI)
	ft	wt frac	mg/g	mg/g	mg/g	°C	-	-	-	-	-
Niobrara Formation											
1-3G	8,419.35	0.0265	1.16	10.68	0.63	433	403.2	23.8	17.0	43.8	0.098
1-9G	8,425.30	0.0284	1.18	7.29	0.57	434	257.0	20.1	12.8	41.6	0.139
1-19G	8,435.76	0.0231	1.72	9.05	0.79	432	391.4	34.2	11.5	74.4	0.160
2-9G	8,445.62	0.0323	2.09	12.17	1.13	431	377.4	35.0	10.8	64.8	0.147
2-15G	8,451.20	0.0486	5.06	23.91	1.17	429	491.7	24.1	20.4	104.1	0.175
2-22G	8,458.20	0.0448	3.47	21.16	0.85	430	472.2	19.0	24.9	77.4	0.141
2-27G	8,463.70	0.0478	4.79	25.94	1.23	433	542.1	25.7	21.1	100.1	0.156
2-33G	8,469.30	0.0299	3.51	15.96	1.17	435	534.7	39.2	13.6	117.6	0.180
2-39G	8,475.30	0.0224	2.33	13.97	1.25	435	622.8	55.7	11.2	103.9	0.143
2-42G	8,478.50	0.0202	2.58	9.68	1.30	431	479.7	64.4	7.4	127.8	0.210
2-48G	8,484.35	0.0149	3.40	6.34	1.13	424	424.9	75.7	5.6	227.9	0.349
2-57G	8,493.40	0.0206	3.38	9.61	1.08	429	465.8	52.4	8.9	163.8	0.260
2-69G	8,505.33	0.0468	5.52	27.87	1.49	431	595.1	31.8	18.7	117.9	0.165
2-78G	8,514.35	0.0316	2.64	11.34	1.28	433	359.3	40.6	8.9	83.7	0.189
2-87G	8,523.63	0.0320	3.81	15.76	1.10	432	491.9	34.3	14.3	118.9	0.195
2-93G	8,529.35	0.0181	1.85	6.83	1.10	430	376.5	60.6	6.2	102.0	0.213
3-4G	8,533.42	0.0316	3.34	17.63	1.20	431	557.2	37.9	14.7	105.6	0.159
3-9G	8,538.43	0.0286	2.48	16.94	0.81	431	592.5	28.3	20.9	86.7	0.128
3-27G	8,556.42	0.0221	5.03	12.22	0.82	430	552.7	37.1	14.9	227.5	0.292
3-35G	8,567.53	0.0293	6.45	17.55	1.09	433	598.2	37.2	16.1	219.8	0.269
3-39G	8,571.22	0.0286	4.65	15.20	1.00	434	532.2	35.0	15.2	162.8	0.234
3-42G	8,574.80	0.0198	5.59	8.74	1.04	432	441.0	52.5	8.4	282.0	0.390
3-55G	8,586.35	0.0457	3.20	26.63	1.59	430	583.2	34.8	16.7	70.1	0.107
3-59G	8,589.75	0.0177	4.09	8.62	1.00	432	488.4	56.7	8.6	231.7	0.322

Table 10. **Programmed Pyrolysis Data Summary, Part 2**

Sample ID	Midpoint Depth	TOC	S1	S2	S3	Tmax	Hydrogen Index	Oxygen Index	S2-S3 Ratio	S1-TOC Ratio	Production Index (PI)
	ft	wt frac	mg/g	mg/g	mg/g	°C	-	-	-	-	-
Niobrara Formation											
3-65G	8,595.25	0.0330	3.56	22.26	1.28	436	674.7	38.8	17.4	107.9	0.138
3-68G	8,598.75	0.0137	1.01	3.09	0.75	437	224.9	54.6	4.1	73.5	0.246
3-74G	8,604.28	0.0095	0.88	2.09	2.22	434	219.1	232.7	0.9	92.2	0.296
3-83G	8,613.45	0.0159	0.71	4.11	0.63	433	259.1	39.7	6.5	44.8	0.147
4-3G	8,625.90	0.0236	1.35	11.09	0.76	433	470.9	32.3	14.6	57.3	0.109
4-24G	8,646.57	0.0283	1.97	14.68	0.78	434	519.5	27.6	18.8	69.7	0.118
4-48G	8,670.65	0.0457	4.39	24.39	1.28	434	533.6	28.0	19.1	96.0	0.153
4-75G	8,697.85	0.0224	1.55	6.60	0.79	434	294.4	35.2	8.4	69.1	0.190
4-84G	8,706.30	0.0464	4.55	25.20	0.81	436	543.1	17.5	31.1	98.1	0.153
4-92G	8,715.40	0.0352	3.76	19.41	0.81	434	551.0	23.0	24.0	106.7	0.162
5-11G	8,725.85	0.0363	3.88	19.88	0.85	433	548.0	23.4	23.4	106.9	0.163
5-17G	8,731.80	0.0479	6.73	26.13	0.76	434	546.0	15.9	34.4	140.6	0.205
5-21G	8,735.25	0.0735	8.08	37.65	0.70	433	512.0	9.5	53.8	109.9	0.177
5-26G	8,740.17	0.0498	6.21	27.05	0.86	435	543.2	17.3	31.5	124.7	0.187
6-9G	8,759.85	0.0012	0.17	0.09	0.76	421	76.3	644.1	0.1	144.1	0.654
6-12G	8,762.15	0.0043	0.88	0.87	1.71	420	201.9	396.8	0.5	204.2	0.503
6-27G	8,777.85	0.0054	0.64	0.83	1.00	434	153.1	184.5	0.8	118.1	0.435
6-30G	8,780.45	0.0061	0.95	1.53	0.88	432	249.2	143.3	1.7	154.7	0.383
6-35G	8,785.85	0.0065	0.60	0.91	0.67	438	139.6	102.8	1.4	92.0	0.397
6-39G	8,789.85	0.0056	1.05	1.14	0.78	431	205.0	140.3	1.5	188.8	0.479
6-42G	8,792.15	0.0066	1.22	1.66	2.59	436	251.1	391.8	0.6	184.6	0.424
Average	***-***	***0.0273***	***3.05***	***13.37***	***1.06***	***432***	***429.9***	***79.0***	***13.9***	***120.9***	***0.234***

Table 11. **X-Ray Diffraction Composition Data Summary, Part 1**

Parameter	Unit	1-3P	1-9P	1-19P	2-9P	2-15P	2-22P	2-27P	2-33P	2-39P	2-42P
Midpoint Depth	ft	8,419.35	8,425.30	8,435.76	8,445.62	8,451.20	8,458.20	8,463.70	8,469.30	8,475.30	8,478.50
Rock Composition											
Apatite	wt frac	0.03	0.03	0.03	0.03	0.02	0.02	0.01	0.02	0.01	0.01
Calcite	wt frac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.68
Chlorite	wt frac	0.09	0.09	0.09	0.08	0.07	0.07	0.07	0.06	0.02	0.02
Dolomite	wt frac	0.02	0.03	0.02	0.04	0.05	0.03	0.07	0.04	0.03	0.02
Illite	wt frac	0.36	0.35	0.36	0.34	0.30	0.28	0.30	0.27	0.08	0.08
Kaolinite	Wt frac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K Feldspar	wt frac	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
Mixed Illite-Smectite	wt frac	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.00	0.01
Plagioclase	wt frac	0.09	0.08	0.08	0.07	0.07	0.08	0.11	0.11	0.01	0.01
Pyrite	wt frac	0.09	0.09	0.10	0.15	0.19	0.24	0.11	0.08	0.08	0.10
Quartz	wt frac	0.28	0.29	0.28	0.25	0.26	0.25	0.29	0.39	0.07	0.07
Computed Properties											
Matrix Density	g/cm^3	2.787	2.790	2.802	2.877	2.931	3.005	2.811	2.768	2.812	2.835
Bound Water Content	vol frac	0.0365	0.0357	0.0367	0.0358	0.0329	0.0299	0.0315	0.0266	0.0069	0.0089
Clay Content	wt frac	0.48	0.47	0.48	0.45	0.40	0.37	0.40	0.35	0.10	0.11
Clay Content	vol frac	0.5016	0.4916	0.5042	0.4857	0.4402	0.4167	0.4221	0.3635	0.1050	0.1171
Clay Density	g/cm^3	2.667	2.668	2.667	2.665	2.664	2.668	2.664	2.666	2.677	2.663
Quartz Content	vol frac	0.2945	0.3053	0.2960	0.2714	0.2876	0.2835	0.3076	0.4074	0.0743	0.0749
Carbonate Content	wt frac	0.02	0.03	0.02	0.04	0.05	0.03	0.07	0.04	0.73	0.70

Table 12. **X-Ray Diffraction Composition Data Summary, Part 2**

Parameter	Unit	2-48P	2-57P	2-69P	2-78P	2-87P	2-93P	3-9P	3-27P	3-35P	3-39P
Midpoint Depth	ft	8,484.35	8,493.40	8,505.33	8,514.35	8,523.63	8,529.35	8,538.43	8,556.42	8,567.53	8,571.22
Rock Composition											
Apatite	wt frac	0.01	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01
Calcite	wt frac	0.72	0.70	0.63	0.65	0.52	0.81	0.49	0.65	0.14	0.46
Chlorite	wt frac	0.01	0.02	0.03	0.03	0.04	0.01	0.05	0.02	0.06	0.03
Dolomite	wt frac	0.14	0.01	0.02	0.02	0.03	0.02	0.04	0.03	0.04	0.04
Illite	wt frac	0.04	0.08	0.11	0.12	0.17	0.07	0.21	0.10	0.25	0.17
Kaolinite	Wt frac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K Feldspar	wt frac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Mixed Illite-Smectite	wt frac	0.00	0.01	0.01	0.01	0.01	0.00	0.02	0.01	0.02	0.01
Plagioclase	wt frac	0.01	0.02	0.01	0.01	0.02	0.01	0.02	0.03	0.07	0.03
Pyrite	wt frac	0.03	0.07	0.09	0.07	0.09	0.02	0.04	0.04	0.05	0.09
Quartz	wt frac	0.04	0.09	0.09	0.08	0.12	0.06	0.12	0.10	0.35	0.15
Computed Properties											
Matrix Density	g/cm^3	2.766	2.787	2.819	2.793	2.811	2.729	2.747	2.750	2.735	2.809
Bound Water Content	vol frac	0.0034	0.0087	0.0115	0.0122	0.0167	0.0058	0.0214	0.0102	0.0247	0.0164
Clay Content	wt frac	0.05	0.11	0.15	0.16	0.22	0.08	0.28	0.13	0.33	0.21
Clay Content	vol frac	0.0517	0.1151	0.1585	0.1675	0.2341	0.0819	0.2886	0.1343	0.3384	0.2215
Clay Density	g/cm^3	2.677	2.663	2.668	2.667	2.669	2.667	2.665	2.661	2.667	2.663
Quartz Content	vol frac	0.0417	0.0946	0.0958	0.0843	0.1286	0.0618	0.1244	0.1038	0.3612	0.1590
Carbonate Content	wt frac	0.86	0.71	0.65	0.67	0.55	0.83	0.53	0.68	0.18	0.50

Table 13. **X-Ray Diffraction Composition Data Summary, Part 3**

Parameter	Unit	3-42P	3-55P	3-59P	3-65P	3-68P	3-74P	3-83P	4-3P	4-24P	4-48P
Midpoint Depth	ft	8,574.80	8,586.35	8,589.75	8,595.25	8,598.75	8,604.28	8,613.45	8,625.90	8,646.57	8,670.65
Rock Composition											
Apatite	wt frac	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcite	wt frac	0.75	0.87	0.89	0.65	0.91	0.91	0.56	0.22	0.33	0.39
Chlorite	wt frac	0.01	0.01	0.00	0.03	0.00	0.00	0.04	0.08	0.06	0.05
Dolomite	wt frac	0.02	0.01	0.00	0.04	0.00	0.00	0.05	0.02	0.02	0.07
Illite	wt frac	0.08	0.04	0.04	0.13	0.04	0.04	0.15	0.32	0.28	0.20
Kaolinite	Wt frac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K Feldspar	wt frac	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Mixed Illite-Smectite	wt frac	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.03	0.02	0.02
Plagioclase	wt frac	0.02	0.01	0.01	0.02	0.01	0.00	0.04	0.02	0.02	0.02
Pyrite	wt frac	0.02	0.02	0.02	0.03	0.01	0.01	0.05	0.05	0.04	0.04
Quartz	wt frac	0.08	0.03	0.03	0.08	0.02	0.03	0.08	0.24	0.21	0.19
Computed Properties											
Matrix Density	g/cm^3	2.728	2.736	2.734	2.742	2.722	2.722	2.764	2.741	2.733	2.745
Bound Water Content	vol frac	0.0066	0.0034	0.0033	0.0128	0.0032	0.0032	0.0146	0.0325	0.0271	0.0206
Clay Content	wt frac	0.09	0.05	0.04	0.17	0.04	0.04	0.20	0.43	0.36	0.27
Clay Content	vol frac	0.0921	0.0511	0.0413	0.1748	0.0411	0.0411	0.2070	0.4420	0.3691	0.2781
Clay Density	g/cm^3	2.665	2.677	2.650	2.666	2.650	2.650	2.670	2.666	2.665	2.665
Quartz Content	vol frac	0.0824	0.0310	0.0309	0.0828	0.0205	0.0308	0.0834	0.2482	0.2166	0.1968
Carbonate Content	wt frac	0.77	0.88	0.89	0.69	0.91	0.91	0.61	0.24	0.35	0.46

Table 14. **X-Ray Diffraction Composition Data Summary, Part 4**

Parameter	Unit	4-75P	4-84P	4-92P	5-11P	5-17P	5-21P	5-26P	6-9P	6-12P	6-27P
Midpoint Depth	ft	8,697.85	8,706.30	8,715.40	8,725.85	8,731.80	8,735.25	8,740.17	8,759.85	8,762.15	8,777.85
Rock Composition											
Apatite	wt frac	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01
Calcite	wt frac	0.29	0.58	0.55	0.52	0.59	0.50	0.48	0.83	0.82	0.03
Chlorite	wt frac	0.07	0.03	0.04	0.04	0.03	0.03	0.03	0.01	0.01	0.02
Dolomite	wt frac	0.01	0.01	0.02	0.01	0.02	0.02	0.01	0.02	0.01	0.00
Illite	wt frac	0.29	0.17	0.17	0.17	0.12	0.17	0.17	0.05	0.07	0.15
Kaolinite	Wt frac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
K Feldspar	wt frac	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01
Mixed Illite-Smectite	wt frac	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01
Plagioclase	wt frac	0.02	0.02	0.02	0.02	0.05	0.04	0.04	0.01	0.00	0.09
Pyrite	wt frac	0.03	0.03	0.03	0.04	0.05	0.08	0.07	0.00	0.01	0.01
Quartz	wt frac	0.25	0.13	0.14	0.18	0.11	0.13	0.17	0.07	0.07	0.64
Computed Properties											
Matrix Density	g/cm^3	2.717	2.730	2.732	2.743	2.758	2.793	2.776	2.703	2.720	2.656
Bound Water Content	vol frac	0.0278	0.0160	0.0161	0.0162	0.0120	0.0163	0.0162	0.0041	0.0058	0.0143
Clay Content	wt frac	0.38	0.21	0.22	0.22	0.16	0.21	0.21	0.06	0.08	0.21
Clay Content	vol frac	0.3869	0.2153	0.2252	0.2261	0.1654	0.2203	0.2189	0.0607	0.0816	0.2126
Clay Density	g/cm^3	2.668	2.663	2.669	2.669	2.667	2.663	2.663	2.672	2.667	2.624
Quartz Content	vol frac	0.2563	0.1339	0.1443	0.1863	0.1145	0.1370	0.1781	0.0714	0.0719	0.6416
Carbonate Content	wt frac	0.30	0.59	0.57	0.53	0.61	0.52	0.49	0.85	0.83	0.03

Table 15. X-Ray Diffraction Composition Data Summary, Part 5

Parameter	Unit	6-30P	6-35P	6-39P	6-42P
Midpoint Depth	ft	8,780.45	8,785.85	8,789.85	8,792.15
Rock Composition					
Apatite	wt frac	0.01	0.01	0.01	0.01
Calcite	wt frac	0.04	0.02	0.02	0.00
Chlorite	wt frac	0.02	0.02	0.02	0.02
Dolomite	wt frac	0.00	0.00	0.00	0.00
Illite	wt frac	0.14	0.16	0.13	0.18
Kaolinite	Wt frac	0.03	0.03	0.03	0.04
K Feldspar	wt frac	0.01	0.01	0.01	0.01
Mixed Illite-Smectite	wt frac	0.01	0.01	0.01	0.02
Plagioclase	wt frac	0.09	0.09	0.11	0.11
Pyrite	wt frac	0.05	0.01	0.02	0.02
Quartz	wt frac	0.60	0.64	0.64	0.59
Computed Properties					
Matrix Density	g/cm^3	2.708	2.656	2.667	2.662
Bound Water Content	vol frac	0.0138	0.0151	0.0128	0.0187
Clay Content	wt frac	0.20	0.22	0.19	0.26
Clay Content	vol frac	0.2065	0.2225	0.1933	0.2646
Clay Density	g/cm^3	2.623	2.626	2.622	2.616
Quartz Content	vol frac	0.6131	0.6414	0.6441	0.5928
Carbonate Content	wt frac	0.04	0.02	0.02	0.00

Figure 6. **Mineral Composition**

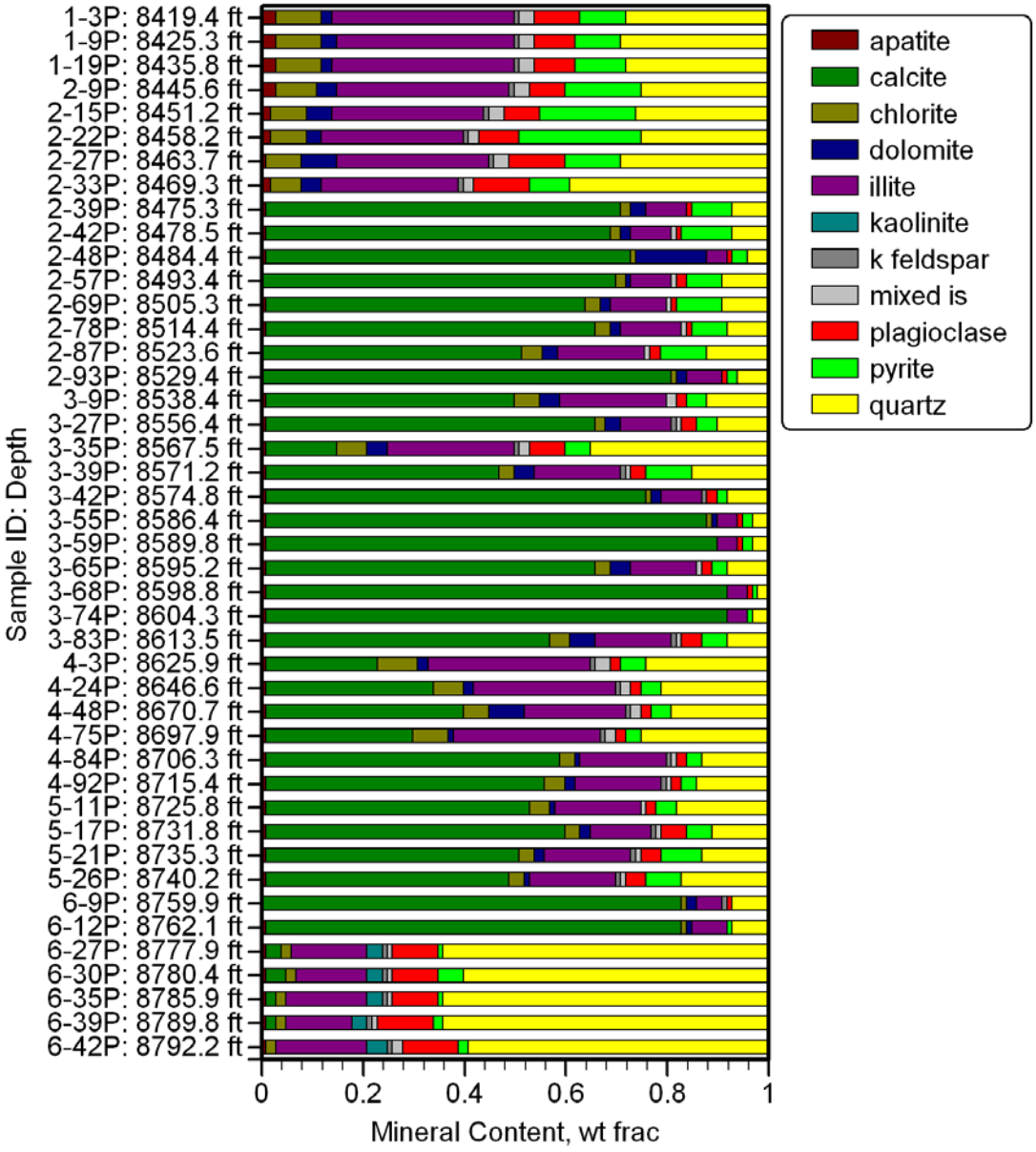


Table 16. **Shale Rock Property Data, Part 1**

Sample ID	Depth	Bulk Density	Crushed Bulk Density	Water Saturation	Oil Saturation	Gas Saturation	Total Porosity	Gas-Filled Porosity	Dry Bulk Density	Apparent Grain Density	Pressure Decay Perm
	ft	g/cm^3	g/cm^3	vol frac	vol frac	vol frac	vol frac	vol frac	g/cm^3	g/cm^3	nd
Niobrara Formation											
1-3SRP	8,419.35	2.477	2.507	0.7439	0.1451	0.1110	0.1062	0.0118	2.387	2.671	1.98
1-9SRP	8,425.30	2.522	2.542	0.7243	0.1951	0.0806	0.0984	0.0079	2.436	2.702	1.80
1-19SRP	8,435.76	2.518	2.533	0.8172	0.1179	0.0649	0.0920	0.0060	2.435	2.682	1.72
2-9SRP	8,445.62	2.499	2.520	0.6570	0.2606	0.0825	0.0999	0.0082	2.413	2.681	3.17
2-15SRP	8,451.20	2.502	2.523	0.6068	0.2972	0.0959	0.0873	0.0084	2.429	2.661	1.60
2-22SRP	8,458.20	2.529	2.549	0.6129	0.2993	0.0879	0.0855	0.0075	2.457	2.687	2.61
2-27SRP	8,463.70	2.414	2.431	0.6170	0.3136	0.0694	0.0990	0.0069	2.329	2.585	1.20
2-33SRP	8,469.30	2.472	2.483	0.7360	0.2119	0.0521	0.0882	0.0046	2.393	2.624	1.19
2-39SRP	8,475.30	2.492	2.549	0.3924	0.3656	0.2420	0.0928	0.0225	2.429	2.677	2.71
2-42SRP	8,478.50	2.525	2.585	0.3589	0.3713	0.2699	0.0851	0.0230	2.470	2.700	1.43
2-48SRP	8,484.35	2.524	2.596	0.2416	0.4662	0.2922	0.0949	0.0277	2.466	2.725	0.85
2-57SRP	8,493.40	2.487	2.548	0.2951	0.4356	0.2693	0.0891	0.0240	2.430	2.667	0.62
2-69SRP	8,505.33	2.463	2.513	0.2308	0.5244	0.2448	0.0808	0.0198	2.411	2.623	0.79
2-78SRP	8,514.85	2.476	2.515	0.1170	0.6736	0.2094	0.0748	0.0157	2.427	2.623	0.45
2-87SRP	8,523.63	2.504	2.550	0.3466	0.4222	0.2312	0.0766	0.0177	2.452	2.656	0.97
2-93SRP	8,529.35	2.489	2.549	0.2822	0.4377	0.2801	0.0845	0.0237	2.436	2.660	1.61
3-9SRP	8,538.43	2.483	2.507	0.2829	0.5627	0.1544	0.0620	0.0096	2.438	2.599	0.36
3-27SRP	8,556.42	2.494	2.541	0.1096	0.6590	0.2314	0.0803	0.0186	2.443	2.656	1.74
3-35SRP	8,567.53	2.500	2.514	0.2758	0.6479	0.0764	0.0685	0.0052	2.446	2.626	0.16
3-39SRP	8,571.22	2.503	2.522	0.2897	0.6029	0.1075	0.0697	0.0075	2.449	2.633	0.47
3-42SRP	8,574.80	2.475	2.551	0.0412	0.6312	0.3277	0.0909	0.0298	2.425	2.668	2.03
3-48SRP	8,580.60	2.482	2.529	0.2711	0.4638	0.2651	0.0693	0.0184	2.438	2.619	1.12
3-55SRP	8,586.35	2.473	2.539	0.1299	0.5539	0.3162	0.0816	0.0258	2.427	2.642	1.65
3-59SRP	8,589.75	2.467	2.570	0.1544	0.4331	0.4125	0.0968	0.0399	2.419	2.678	3.06

Table 17. **Shale Rock Property Data, Part 2**

Sample ID	Depth	Bulk Density	Crushed Bulk Density	Water Saturation	Oil Saturation	Gas Saturation	Total Porosity	Gas-Filled Porosity	Dry Bulk Density	Apparent Grain Density	Pressure Decay Perm
	ft	g/cm^3	g/cm^3	vol frac	vol frac	vol frac	vol frac	vol frac	g/cm^3	g/cm^3	nd
Niobrara Formation											
3-65SRP	8,595.25	2.483	2.534	0.2771	0.4611	0.2619	0.0769	0.0201	2.434	2.637	1.16
3-68SRP	8,598.75	2.483	2.585	0.3112	0.2730	0.4158	0.0946	0.0393	2.433	2.687	2.32
3-74SRP	8,604.28	2.477	2.553	0.4696	0.2280	0.3024	0.0984	0.0298	2.413	2.677	2.65
3-83SRP	8,613.45	2.561	2.596	0.3911	0.3661	0.2428	0.0561	0.0136	2.523	2.672	0.81
4-3SRP	8,625.90	2.530	2.538	0.7603	0.1999	0.0398	0.0739	0.0029	2.463	2.660	1.00
4-24SRP	8,646.57	2.504	2.517	0.4980	0.4196	0.0824	0.0659	0.0054	2.449	2.622	0.16
4-48SRP	8,670.65	2.550	2.563	0.5372	0.3830	0.0799	0.0598	0.0048	2.500	2.659	0.78
4-75SRP	8,697.85	2.546	2.564	0.5892	0.3036	0.1072	0.0655	0.0070	2.492	2.667	1.14
4-84SRP	8,706.30	2.458	2.474	0.3813	0.5077	0.1111	0.0586	0.0065	2.412	2.563	0.14
4-92SRP	8,715.40	2.488	2.503	0.3211	0.5808	0.0980	0.0625	0.0061	2.439	2.602	0.37
5-11SRP	8,725.85	2.421	2.443	0.2961	0.5731	0.1309	0.0702	0.0092	2.368	2.547	0.29
5-17SRP	8,731.80	2.443	2.462	0.2760	0.6163	0.1077	0.0714	0.0077	2.388	2.572	0.43
5-21SRP	8,735.25	2.429	2.440	0.4402	0.4759	0.0839	0.0502	0.0042	2.388	2.515	0.05
5-26SRP	8,740.17	2.455	2.459	0.4191	0.5541	0.0268	0.0592	0.0016	2.404	2.555	0.21
Average	**-**	***2.489***	***2.526***	***0.4027***	***0.4219***	***0.1754***	***0.0794***	***0.0144***	***2.431***	***2.642***	***1.23***

Table 18. Methane Adsorption Isotherm Parameters

Parameter	Unit	2-78M	3-68M	5-21M
Sample Parameters				
Measurement Temperature	°F	199.94	199.94	199.94
Total Organic Content	wt frac	0.0372	0.0169	0.0767
Crushed Density	g/cm^3	2.476	2.483	2.429
Langmuir Parameters				
Langmuir Storage Capacity, organic fraction	scf/ton	3,645.4	2,583.9	2,581.4
Langmuir Storage Capacity, In-Situ	scf/ton	135.61	43.67	197.99
Langmuir Pressure	psia	7,885.95	2,663.15	5,947.27
Adsorbed Gas Storage Capacity				
Reservoir Pressure	psia	3,928.2	3,967.1	4,029.9
Storage Capacity, organic fraction	scf/ton	1,212.09	1,546.06	1,042.66
Storage Capacity, in-situ	scf/ton	45.09	26.13	79.97

Figure 7. Organic Fraction Adsorption Isotherm Comparison

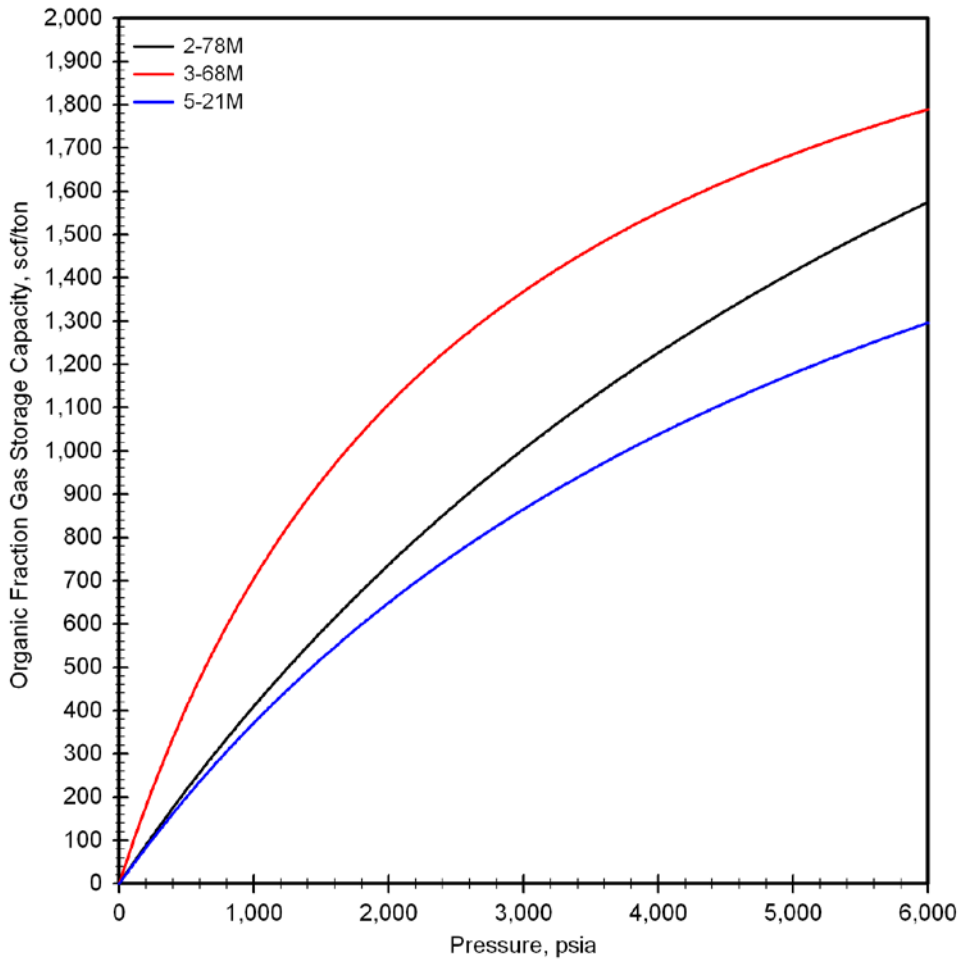


Figure 8. **In-Situ Adsorption Isotherm Comparison**

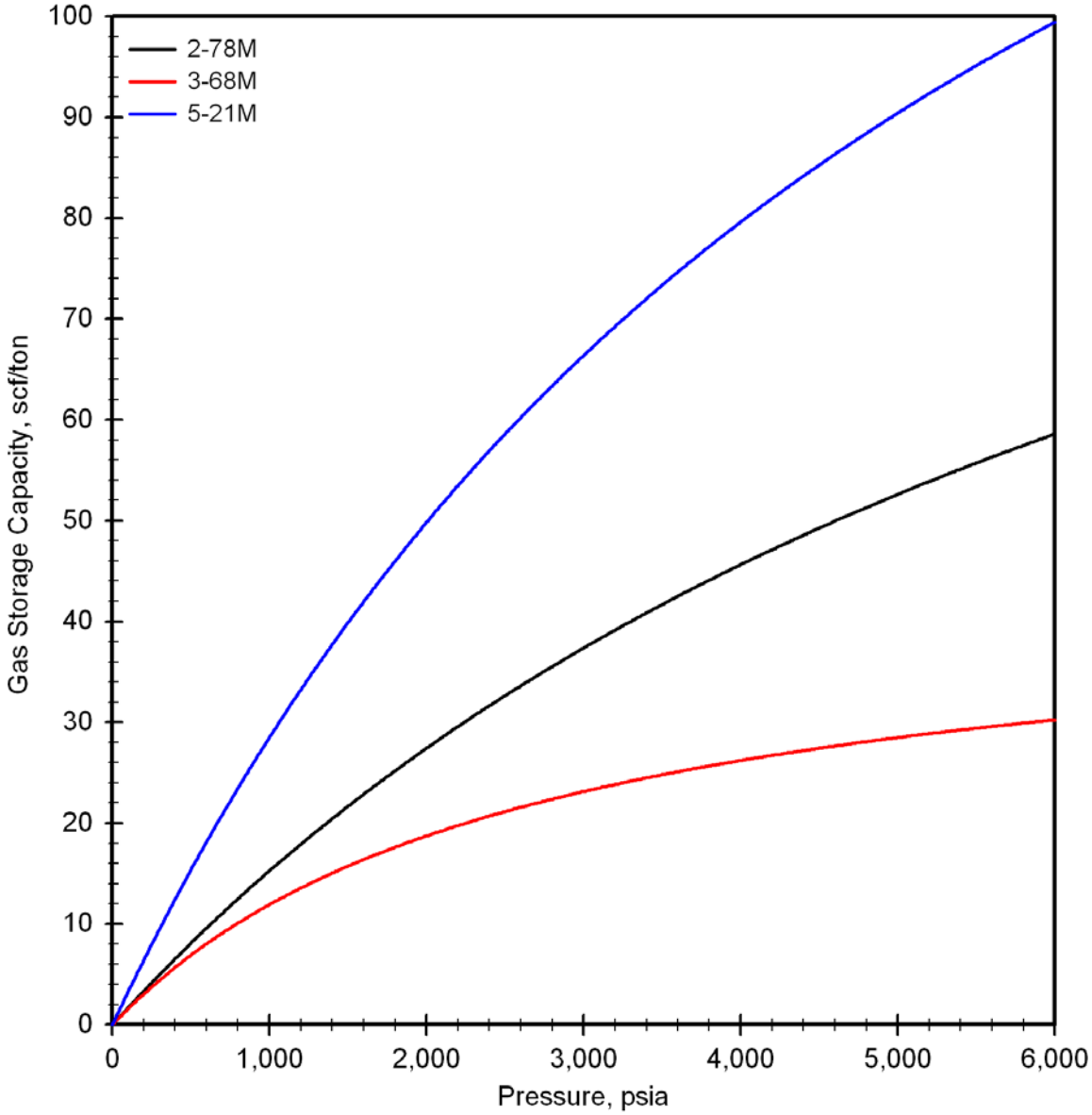
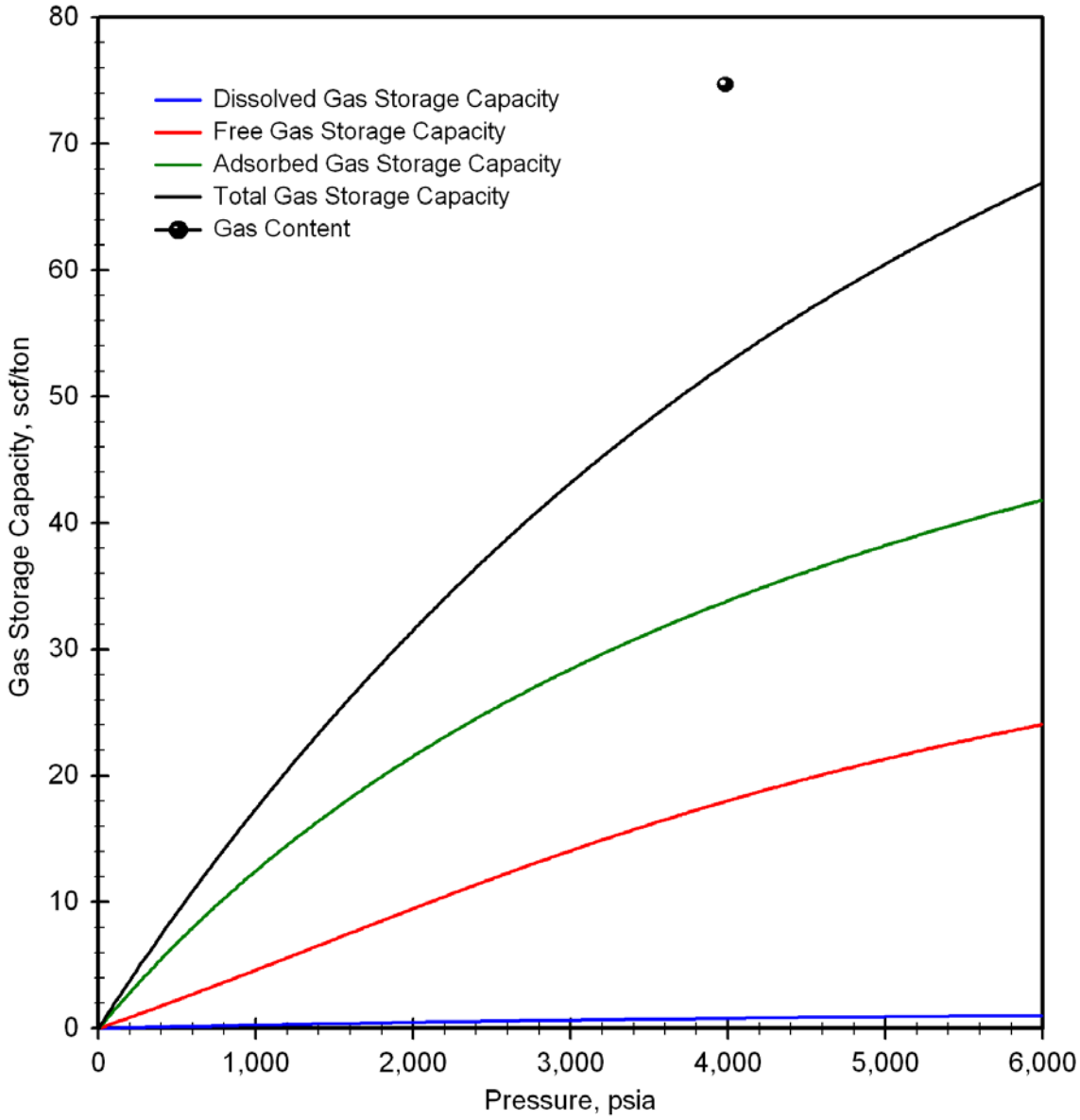


Table 19. Estimated Total Storage Capacity

Parameter	Unit	Value
Adsorption Isotherm Data		
Organic Fraction Methane Langmuir Storage Capacity	scf/ton	2,703.71
Methane Langmuir Pressure	psia	5,327.67
Free Gas Composition and Gas Properties		
Methane	mol frac	1.00
Gravity	air=1	0.5537
Molecular Weight	lbm/lbmole	16.04
Gas Formation Volume Factor	res vol/surf vol	0.00456
Water Properties		
Salinity*	ppm vol	50,000
Salinity*	ppm wt	48,299
Solution Gas-Water Ratio	scf/STB	13.92
Water Formation Volume Factor	res vol/surf vol	0.998
Reservoir Conditions and Properties		
Average Reservoir Pressure	psia	3,981.35
Reservoir Temperature	°F	200.0
Average Total Organic Carbon Content	wt frac	0.0292
Total Porosity	vol frac	0.0633
Water Saturation	vol frac	0.4027
Corrected Gas Saturation	vol frac	0.1005
Bulk Density	g/cm^3	2.489
Corrected Gas-Filled Porosity	vol frac	0.0064
Gas Storage Capacity		
Dissolved Gas Storage Capacity	scf/ton	0.82
Free Gas Storage Capacity	scf/ton	17.96
Adsorbed Gas Storage Capacity	scf/ton	33.77
Total Gas Storage Capacity	scf/ton	52.54
Average Canister Gas Content	scf/ton	74.7

**Salinity values assumed*

Figure 9. Comparison of Storage Capacity and Canister Gas Content



Appendix I

Noble Energy, Incorporated
Child VO 30-9
Niobrara Formation

Core Lithology and Photography

Weatherford®
LABORATORIES

Lithology Description

Weatherford Labs File: CO-48196-1
Niobrara Formation
8,568.0-8,569.0 ft

Dark gray, carbonaceous, slightly pyritic, argillaceous limestone

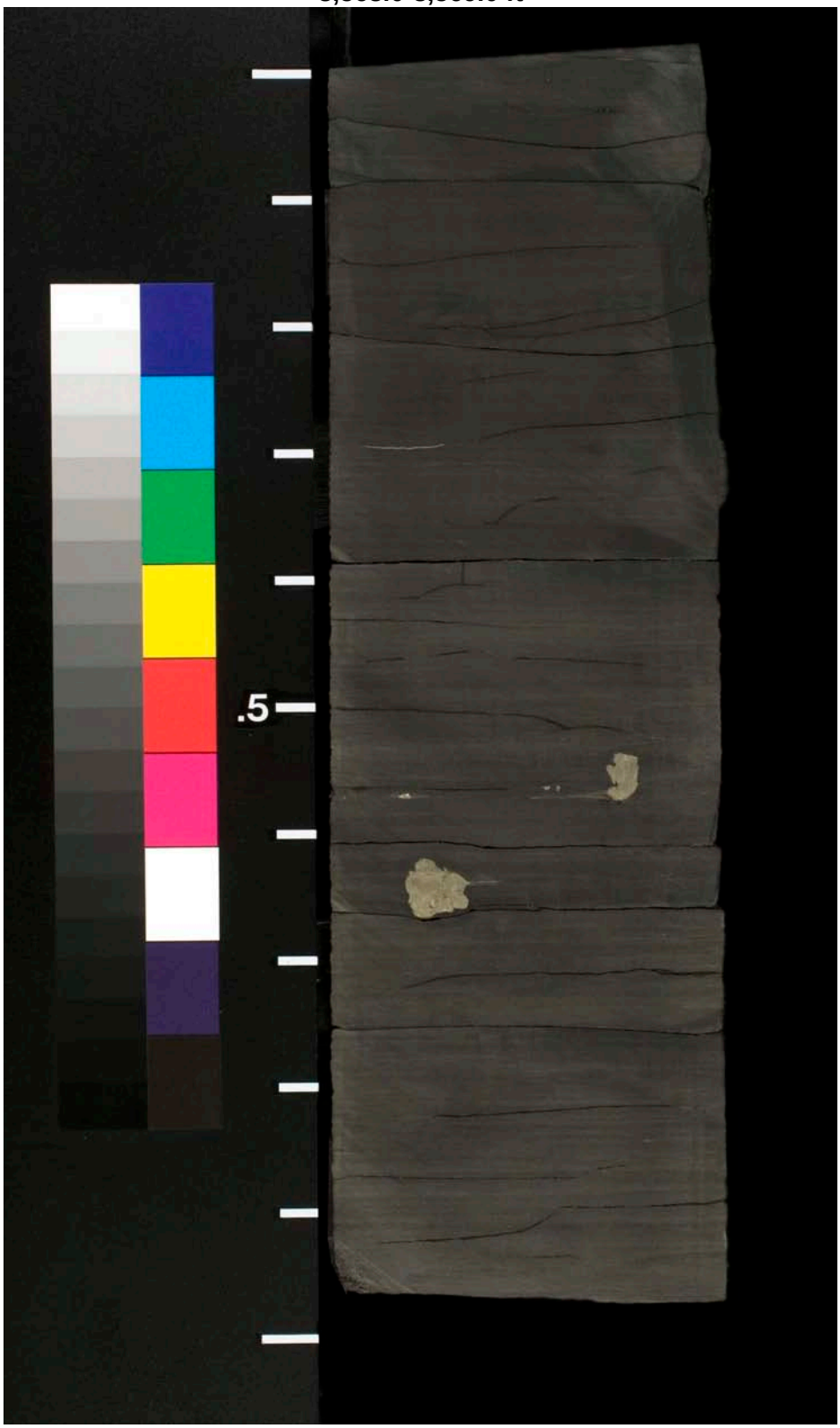
Length (inches): 11.7
Diameter (inches): 3.5
Exterior: Slightly rough with bit and catcher marks

Dark gray, carbonaceous, slightly pyritic, grain-rich, argillaceous limestone; core is broken along bedding plane partings; thin horizontal planar laminations; abundant, matrix supported, flattened calcareous pellets; very thin bioclasts along bedding; rare pyrite nodules up to 2 cm across 8,568.5'-8,568.7'); no observed natural fractures

Geologist: T. Jackson

Noble Energy, Incorporated, Child VO 30-9

Weatherford Labs File: CO-48196-1
8,568.0-8,569.0 ft



Weatherford
LABORATORIES

Lithology Description

Weatherford Labs File: CO-48196-2
Niobrara Formation
8,583.0-8,584.0 ft

Dark gray, carbonaceous, argillaceous limestone

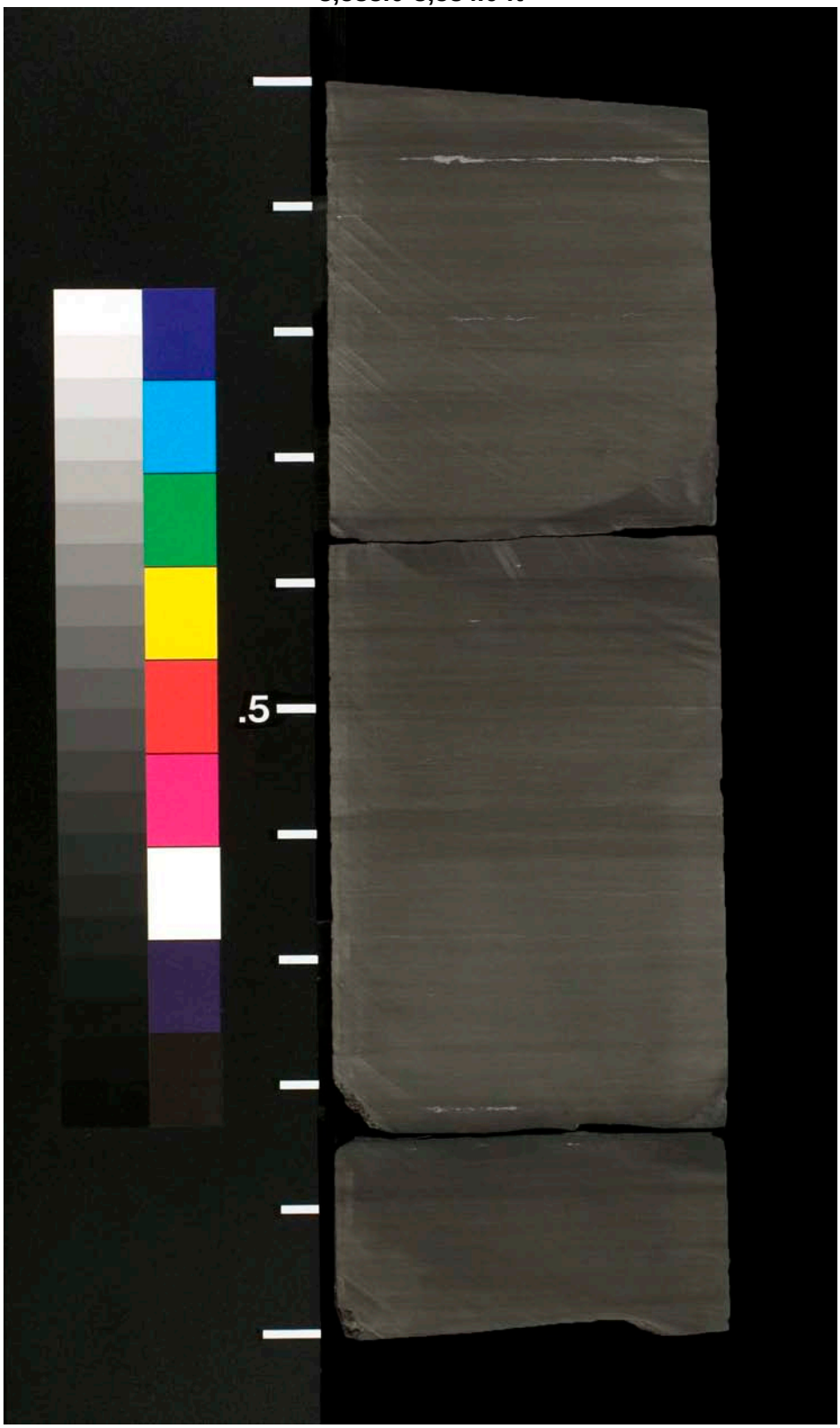
Length (inches): 11.9
Diameter (inches): 3.5
Exterior: Smooth with catcher marks

Dark gray, carbonaceous, grain-rich, argillaceous limestone; core is broken along bedding plane partings; thin horizontal planar laminations; abundant, matrix supported, flattened calcareous pellets; very thin bioclasts along bedding; no observed natural fractures

Geologist: T. Jackson

Noble Energy, Incorporated, Child VO 30-9

Weatherford Labs File: CO-48196-2
8,583.0-8,584.0 ft



Weatherford
LABORATORIES

Lithology Description

Weatherford Labs File: CO-48196-3
Niobrara Formation
8,616.0-8,617.0 ft

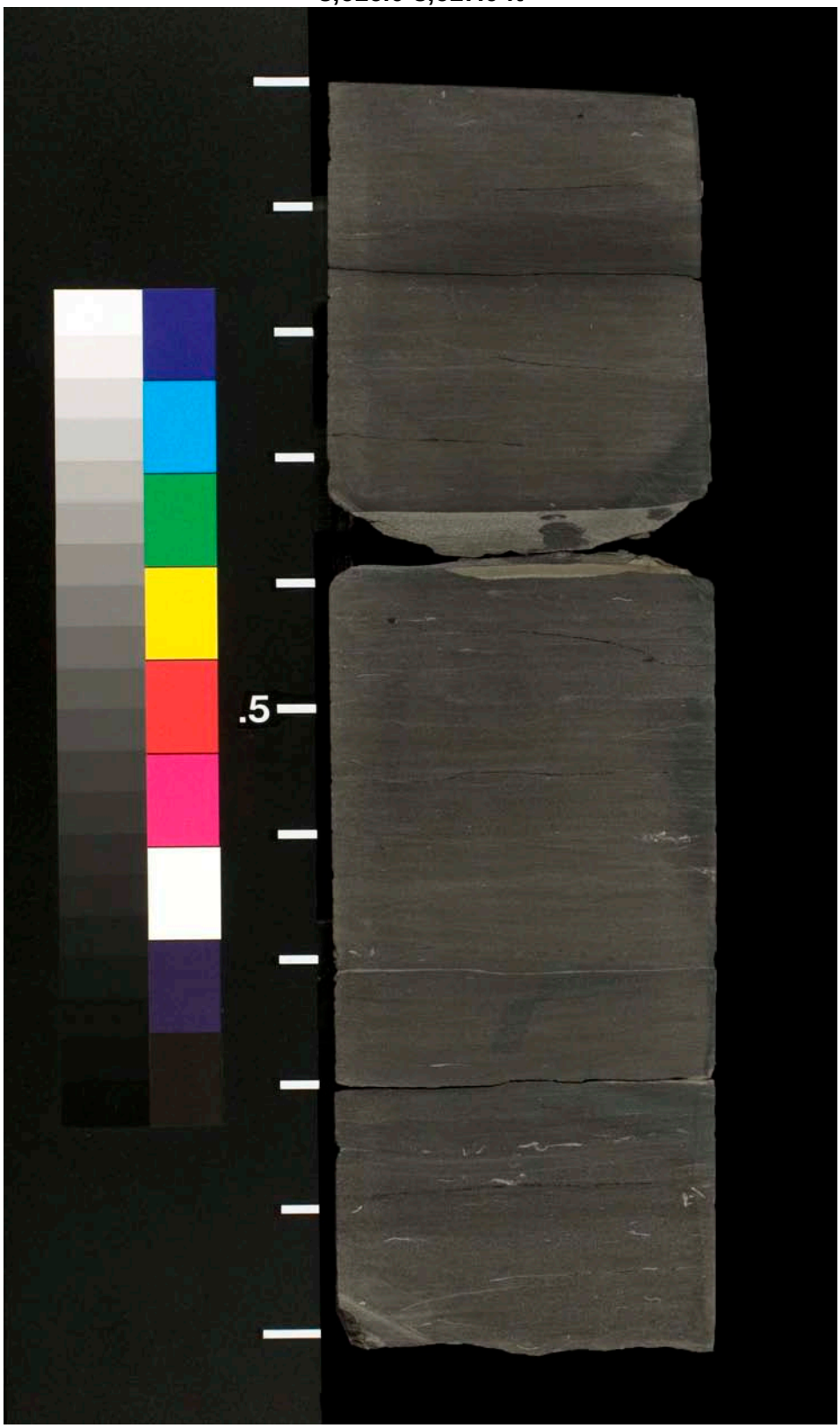
Dark gray, carbonaceous, argillaceous limestone with a very thin bed of altered volcanic ash

Length (inches): 11.9
Diameter (inches): 3.5
Exterior: Smooth with catcher marks, minor washout

Dark gray, carbonaceous, grain-rich, argillaceous limestone with a very thin bed of altered volcanic ash; core is broken along bedding plane partings and washed out along ash bed from 8,616.35' to 8,616.5'; thin horizontal planar laminations; abundant, matrix supported, flattened calcareous pellets; minor very thin bioclasts along bedding; abundant microfossils (foraminifera); no observed natural fractures

Geologist: T. Jackson

Weatherford Labs File: CO-48196-3
8,616.0-8,617.0 ft



Lithology Description

Weatherford Labs File: CO-48196-4
Niobrara Formation
8,673.0-8,674.0 ft

Dark gray, calcareous mudstone

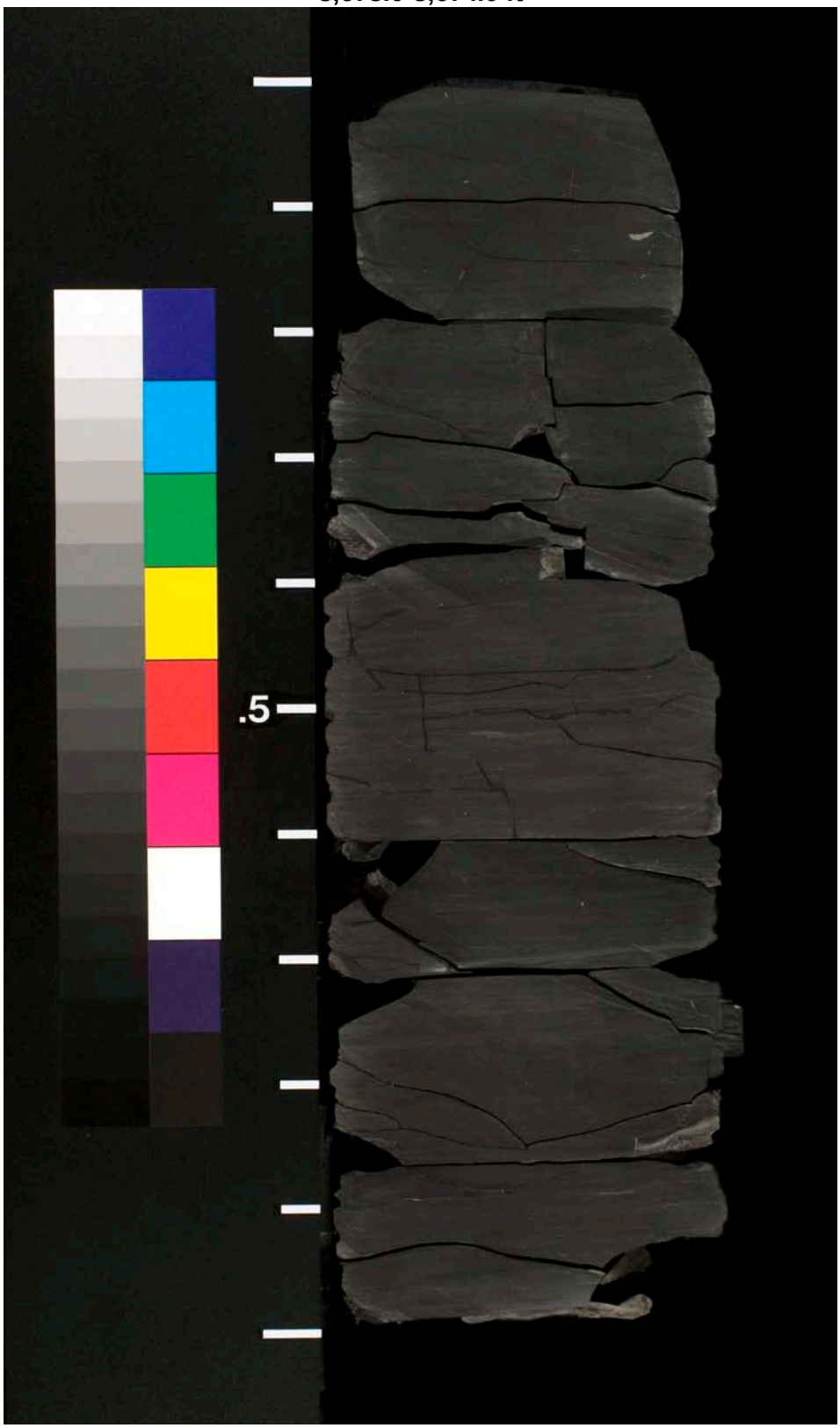
Length (inches): 11.9
Diameter (inches): 3.5
Exterior: Rough with washout and rubble

Dark gray, calcareous mudstone; core is partially rubblized, broken along bedding plane partings; thin horizontal planar laminations; rare pyrite replaced bioclasts; no observed natural fractures

Geologist: T. Jackson

Noble Energy, Incorporated, Child VO 30-9

Weatherford Labs File: CO-48196-4
8,673.0-8,674.0 ft



Weatherford
LABORATORIES

Lithology Description

Weatherford Labs File: CO-48196-5
Niobrara Formation
8,728.0-8,729.0 ft

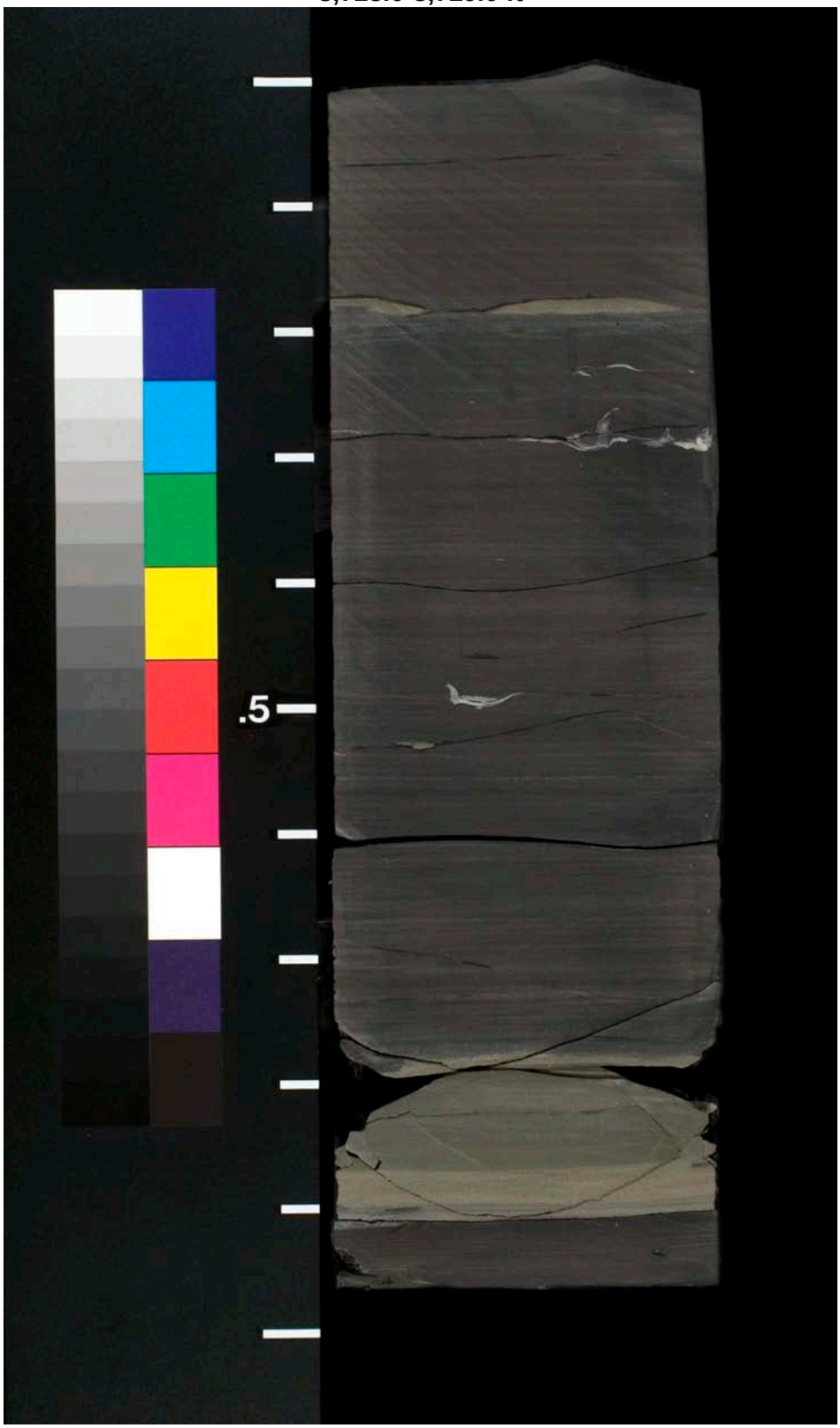
Dark gray, carbonaceous, argillaceous limestone with a very thin bed of altered volcanic ash

Length (inches): 11.7
Diameter (inches): 3.5
Exterior: Smooth with catcher marks, minor washout

Dark gray, carbonaceous, grain-rich, argillaceous limestone with a very thin bed of altered volcanic ash; core is broken along bedding plane partings and partially washed out along ash bed from 8,728.8' to 8,728.93'; thin horizontal planar laminations are grain-rich and grain-poor; abundant, matrix supported, flattened calcareous pellets; rare calcareous bioclasts along bedding; no observed natural fractures

Geologist: T. Jackson

Weatherford Labs File: CO-48196-5
8,728.0-8,729.0 ft



Appendix II

Noble Energy, Incorporated
Child VO 30-9
Niobrara Formation

Canister Gas Content Data and Graphs

Weatherford®
LABORATORIES

Sample 48196-1 Desorption Parameters

Parameter	Unit	Value
Sample Top Depth	ft	8,568.00
Sample Bottom Depth	ft	8,569.00
Reservoir Pressure	psia	3,956.21
Reservoir Pressure Gradient	psi/ft	0.460
Mud Hydrostatic Pressure	psia	3,842.70
Mud Density	lbm/gal	8.60
Sample Mass	g	5,970.0
Sample Headspace Volume	cm^3	610.0
Date Time Sample Cored	mm/dd/yyyy hh:mm:ss	08/04/2010 00:12:00
Date Time Sample Start Out of Well	mm/dd/yyyy hh:mm:ss	08/04/2010 03:56:12
Date Time Desorption Time Zero	mm/dd/yyyy hh:mm:ss	08/04/2010 00:12:00
Date Time Sample at Surface	mm/dd/yyyy hh:mm:ss	08/04/2010 08:06:59
Date Time Sample Canister Sealed	mm/dd/yyyy hh:mm:ss	08/04/2010 10:37:00
Lost Gas Time	hours	10.42
Desorption Time Correction	hours	0.22
Fit Start Time	hours	10.42
Fit End Time	hours	10.58
Fit Start Time	$hours^{0.5}$	3.23
Fit End Time	$hours^{0.5}$	3.25
Lost Gas Content	scf/ton	17.4
Measured Gas Content	scf/ton	27.2
Crushed Gas Content	scf/ton	30.0
Total Gas Content	scf/ton	74.7
Lost Gas Fraction	vol frac	0.2332
Measured Gas Fraction	vol frac	0.3648
Crushed Gas Fraction	vol frac	0.4019
Diffusivity	1/us	0.131
Sorption Time	hours	141.6

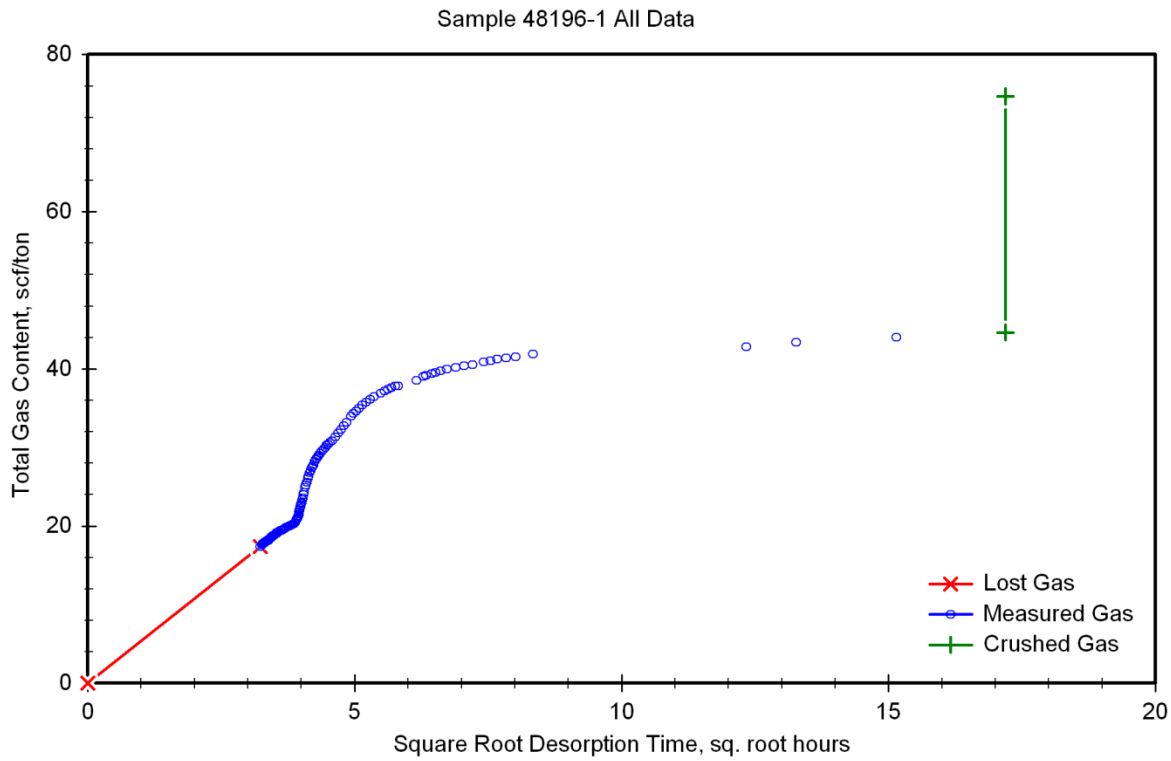
Sample 48196-1 Desorption History

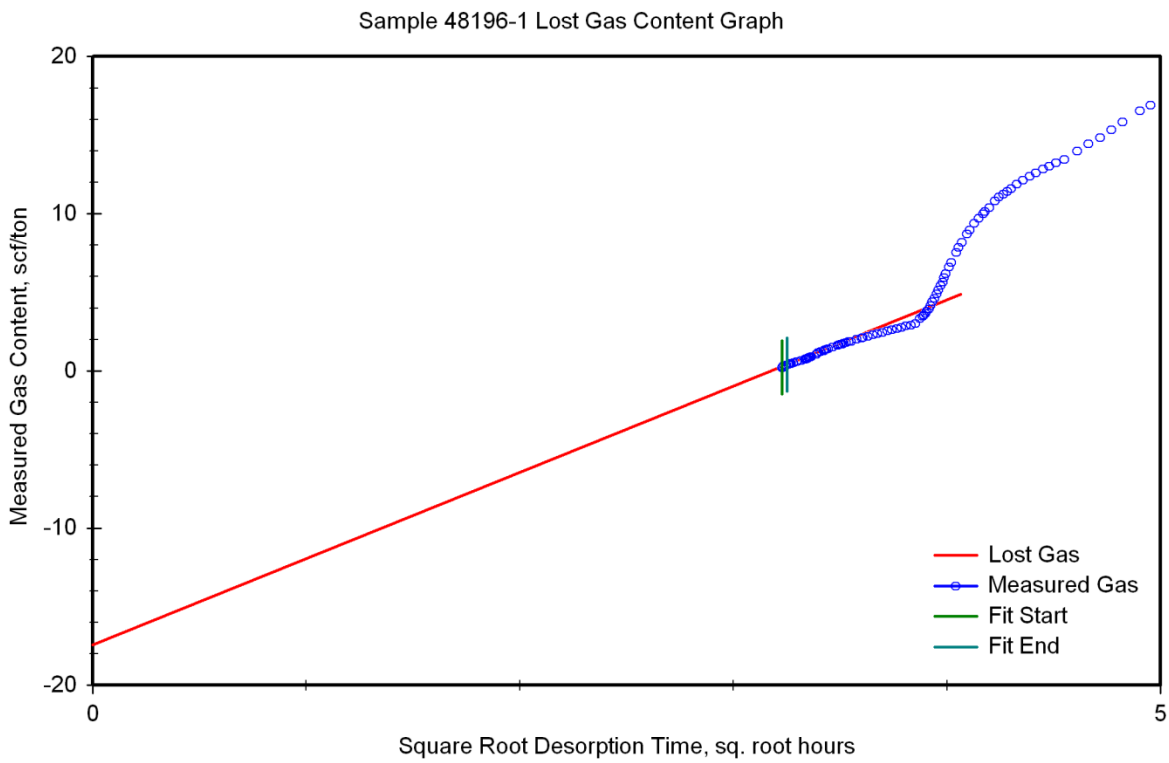
Date Time	Desorption Time	Sq. Root Desorption Time	Measured Gas Volume	Corrected Gas Volume	Canister Temp.	Ambient Temp.	Ambient Pressure	Cumulative Gas Content
mm/dd/yyyy hh:mm:ss	hours	$hours^{0.5}$	cm^3	cm^3	°F	°F	psia	scf/ton
08/04/2010 10:37:00	10.42	3.23	0.0	0.0	82.6	75.5	11.94	0.00
08/04/2010 10:50:00	10.42	3.23	45.0	35.5	82.6	75.5	11.94	0.19
08/04/2010 10:50:59	10.43	3.23	24.0	18.7	82.8	75.9	11.94	0.29
08/04/2010 10:53:00	10.47	3.24	10.0	7.6	83.1	76.8	11.94	0.33
08/04/2010 10:56:00	10.52	3.24	9.0	6.3	84.0	76.4	11.94	0.37
08/04/2010 10:57:59	10.55	3.25	8.0	5.2	85.3	77.1	11.94	0.39
08/04/2010 11:01:00	10.60	3.26	10.0	6.1	87.3	77.1	11.94	0.43
08/04/2010 11:03:00	10.63	3.26	7.0	4.3	88.7	77.7	11.94	0.45
08/04/2010 11:04:59	10.67	3.27	8.0	5.1	90.1	78.0	11.94	0.48
08/04/2010 11:06:59	10.70	3.27	10.0	5.6	92.8	77.9	11.94	0.51
08/04/2010 11:10:00	10.75	3.28	7.0	4.1	94.5	77.9	11.94	0.53
08/04/2010 11:16:59	10.87	3.30	24.0	14.5	99.5	78.9	11.94	0.61
08/04/2010 11:25:00	11.00	3.32	23.0	14.1	104.5	79.7	11.94	0.68
08/04/2010 11:32:00	11.12	3.33	22.0	14.0	108.3	80.2	11.94	0.76
08/04/2010 11:34:00	11.15	3.34	5.0	3.5	109.0	80.7	11.94	0.78
08/04/2010 11:35:00	11.17	3.34	7.0	4.8	109.6	80.2	11.94	0.80
08/04/2010 11:37:00	11.20	3.35	6.0	4.3	110.3	80.7	11.94	0.82
08/04/2010 11:39:00	11.23	3.35	8.0	5.2	111.2	80.7	11.93	0.85
08/04/2010 11:41:00	11.27	3.36	5.0	3.7	111.7	80.7	11.94	0.87
08/04/2010 11:42:00	11.28	3.36	6.0	4.2	112.3	80.7	11.94	0.89
08/04/2010 11:44:00	11.32	3.36	5.0	3.5	112.8	81.3	11.94	0.91
08/04/2010 11:53:00	11.47	3.39	37.0	26.7	115.3	81.6	11.93	1.06
08/04/2010 11:57:00	11.53	3.40	30.0	22.3	116.6	82.4	11.93	1.18
08/04/2010 12:01:59	11.62	3.41	16.0	11.8	117.5	81.6	11.93	1.24
08/04/2010 12:07:00	11.70	3.42	15.0	11.4	117.9	81.6	11.93	1.30
08/04/2010 12:10:00	11.75	3.43	9.0	6.9	118.0	81.6	11.93	1.34
08/04/2010 12:13:00	11.80	3.44	8.0	5.8	118.6	81.6	11.93	1.37
08/04/2010 12:16:00	11.85	3.44	10.0	7.2	119.1	82.0	11.93	1.41
08/04/2010 12:25:00	12.00	3.46	26.0	19.2	120.7	81.3	11.93	1.51
08/04/2010 12:34:00	12.15	3.49	28.0	21.5	120.9	80.2	11.93	1.63
08/04/2010 12:36:59	12.20	3.49	7.0	5.2	121.3	80.2	11.93	1.65
08/04/2010 12:40:00	12.25	3.50	8.0	6.1	121.5	80.0	11.93	1.69
08/04/2010 12:43:00	12.30	3.51	8.0	6.3	121.5	79.3	11.93	1.72
08/04/2010 12:46:59	12.37	3.52	10.0	7.8	121.5	79.7	11.93	1.76
08/04/2010 12:51:00	12.43	3.53	12.0	9.3	121.6	78.9	11.93	1.81
08/04/2010 12:57:00	12.53	3.54	13.0	10.2	121.6	78.9	11.93	1.87

08/04/2010 13:01:00	12.60	3.55	8.0	5.8	122.0	77.7	11.92	1.90
08/04/2010 13:12:00	12.78	3.58	29.0	22.6	122.2	77.3	11.92	2.02
08/04/2010 13:21:59	12.95	3.60	18.0	14.0	122.2	76.8	11.92	2.09
08/04/2010 13:25:00	13.00	3.61	6.0	4.9	122.2	76.4	11.92	2.12
08/04/2010 13:34:59	13.17	3.63	21.0	16.3	122.2	76.4	11.92	2.21
08/04/2010 13:45:00	13.33	3.65	22.0	17.3	122.2	76.1	11.92	2.30
08/04/2010 13:55:00	13.50	3.67	18.0	14.0	122.4	76.1	11.92	2.38
08/04/2010 14:04:59	13.67	3.70	20.0	15.7	122.2	75.9	11.91	2.46
08/04/2010 14:15:00	13.83	3.72	19.0	14.8	122.4	75.9	11.91	2.54
08/04/2010 14:25:00	14.00	3.74	19.0	14.9	122.5	75.9	11.91	2.62
08/04/2010 14:35:00	14.17	3.76	20.0	15.9	122.5	75.3	11.92	2.71
08/04/2010 14:45:00	14.33	3.79	18.0	14.2	122.5	75.0	11.92	2.78
08/04/2010 14:55:00	14.50	3.81	19.0	15.1	122.4	74.8	11.92	2.86
08/04/2010 15:04:59	14.67	3.83	15.0	12.1	122.5	74.3	11.93	2.93
08/04/2010 15:15:00	14.83	3.85	20.0	16.0	122.5	74.7	11.93	3.01
08/04/2010 15:25:00	15.00	3.87	78.0	62.7	121.1	74.3	11.93	3.35
08/04/2010 15:30:00	15.08	3.88	30.0	21.6	123.8	74.6	11.93	3.47
08/04/2010 15:33:00	15.13	3.89	25.0	17.2	127.2	73.7	11.93	3.56
08/04/2010 15:36:59	15.20	3.90	27.0	18.6	130.9	73.7	11.93	3.66
08/04/2010 15:40:00	15.25	3.91	35.0	25.1	134.4	73.7	11.93	3.79
08/04/2010 15:44:00	15.32	3.91	41.0	29.7	138.3	73.5	11.93	3.95
08/04/2010 15:48:00	15.38	3.92	50.0	37.2	141.5	73.5	11.93	4.15
08/04/2010 15:52:00	15.45	3.93	59.0	44.6	144.4	74.1	11.93	4.39
08/04/2010 15:56:00	15.52	3.94	57.0	43.2	146.7	74.1	11.93	4.62
08/04/2010 16:01:00	15.60	3.95	66.0	50.9	148.8	73.9	11.93	4.90
08/04/2010 16:05:59	15.68	3.96	68.0	52.2	150.5	73.9	11.92	5.18
08/04/2010 16:10:00	15.75	3.97	63.0	48.6	152.1	74.6	11.92	5.44
08/04/2010 16:15:00	15.83	3.98	53.0	41.2	153.0	74.6	11.92	5.66
08/04/2010 16:18:00	15.88	3.99	67.0	52.1	154.1	75.0	11.92	5.94
08/04/2010 16:21:59	15.95	3.99	58.0	45.2	154.8	75.3	11.92	6.18
08/04/2010 16:29:00	16.07	4.01	102.0	79.3	155.9	75.9	11.92	6.61
08/04/2010 16:34:00	16.15	4.02	70.0	54.4	156.6	77.7	11.92	6.90
08/04/2010 16:46:00	16.35	4.04	157.0	122.5	157.3	78.3	11.92	7.56
08/04/2010 16:50:59	16.43	4.05	72.0	56.1	157.7	78.2	11.92	7.86
08/04/2010 16:57:59	16.55	4.07	76.0	59.2	157.8	79.1	11.91	8.17
08/04/2010 17:10:00	16.75	4.09	126.0	98.5	157.7	79.3	11.91	8.70
08/04/2010 17:16:00	16.85	4.10	65.0	50.8	157.7	78.9	11.91	8.98
08/04/2010 17:27:00	17.03	4.13	99.0	78.0	157.1	77.7	11.91	9.39
08/04/2010 17:37:00	17.20	4.15	76.0	60.0	156.4	76.5	11.91	9.72
08/04/2010 17:47:00	17.37	4.17	71.0	55.6	156.4	75.9	11.90	10.01
08/04/2010 17:51:59	17.45	4.18	30.0	23.7	156.2	75.5	11.90	10.14
08/04/2010 18:01:59	17.62	4.20	64.0	50.7	155.7	74.8	11.90	10.41

08/04/2010 18:15:00	17.83	4.22	102.0	80.2	156.0	74.3	11.90	10.84
08/04/2010 18:25:00	18.00	4.24	58.0	44.9	157.3	73.5	11.90	11.09
08/04/2010 18:34:59	18.17	4.26	41.0	32.3	157.5	72.8	11.90	11.26
08/04/2010 18:45:00	18.33	4.28	44.0	35.4	156.9	71.9	11.91	11.45
08/04/2010 18:55:00	18.50	4.30	38.0	30.7	156.0	71.7	11.91	11.61
08/04/2010 19:08:00	18.72	4.33	60.0	51.5	150.3	71.0	11.91	11.89
08/04/2010 19:23:00	18.97	4.36	57.0	47.5	147.0	70.7	11.91	12.14
08/04/2010 19:40:00	19.25	4.39	58.0	47.4	145.0	70.7	11.91	12.40
08/04/2010 19:55:00	19.50	4.42	50.0	41.0	143.4	70.3	11.91	12.62
08/04/2010 20:13:00	19.80	4.45	52.0	42.6	141.8	71.0	11.92	12.85
08/04/2010 20:28:00	20.05	4.48	45.0	36.1	141.3	70.5	11.92	13.04
08/04/2010 20:45:00	20.33	4.51	46.0	36.5	141.4	70.1	11.92	13.24
08/04/2010 21:07:00	20.70	4.55	53.0	43.1	140.7	69.6	11.93	13.47
08/04/2010 21:39:00	21.23	4.61	121.0	95.4	142.5	69.2	11.93	13.98
08/04/2010 22:09:00	21.73	4.66	116.0	87.3	150.1	68.7	11.93	14.45
08/04/2010 22:38:59	22.23	4.72	106.0	78.0	159.4	69.0	11.93	14.87
08/04/2010 23:09:00	22.73	4.77	111.0	87.2	161.2	68.7	11.92	15.34
08/04/2010 23:39:00	23.23	4.82	120.0	92.7	165.9	68.1	11.92	15.83
08/05/2010 00:27:00	24.03	4.90	170.0	135.8	165.9	66.3	11.91	16.56
08/05/2010 00:57:00	24.53	4.95	86.0	68.2	166.6	67.8	11.91	16.93
08/05/2010 01:27:00	25.03	5.00	80.0	63.6	166.1	69.8	11.90	17.27
08/05/2010 01:57:00	25.53	5.05	77.0	61.0	166.1	71.2	11.90	17.60
08/05/2010 02:40:00	26.25	5.12	96.0	76.4	165.4	72.3	11.90	18.01
08/05/2010 03:25:00	27.00	5.20	91.0	72.1	165.4	71.7	11.90	18.39
08/05/2010 04:10:00	27.75	5.27	80.0	63.5	165.7	67.2	11.90	18.73
08/05/2010 04:55:00	28.50	5.34	74.0	60.6	163.9	66.2	11.90	19.06
08/05/2010 06:14:00	29.82	5.46	110.0	86.6	165.6	68.3	11.90	19.52
08/05/2010 07:05:00	30.67	5.54	69.0	53.4	167.0	78.4	11.91	19.81
08/05/2010 07:50:00	31.42	5.61	50.0	39.4	167.4	74.3	11.92	20.02
08/05/2010 08:30:00	32.08	5.66	47.0	37.3	167.2	73.7	11.92	20.22
08/05/2010 09:17:00	32.87	5.73	48.0	37.7	167.4	75.0	11.92	20.42
08/05/2010 10:01:00	33.60	5.80	3.0	2.9	166.5	76.8	11.92	20.44
08/05/2010 14:06:00	37.68	6.14	175.0	138.6	163.5	76.6	11.90	21.18
08/05/2010 15:36:00	39.18	6.26	106.0	79.2	167.9	82.2	11.89	21.61
08/05/2010 16:19:59	39.92	6.32	35.0	26.2	169.2	77.3	11.88	21.75
08/05/2010 17:40:00	41.25	6.42	52.0	40.3	169.5	77.0	11.88	21.97
08/05/2010 18:40:00	42.25	6.50	42.0	33.0	169.4	78.4	11.88	22.14
08/05/2010 19:50:00	43.42	6.59	48.0	40.3	166.1	74.4	11.89	22.36
08/05/2010 21:20:00	44.92	6.70	52.0	40.8	166.1	71.4	11.88	22.58
08/05/2010 23:41:00	47.27	6.88	60.0	47.0	168.0	64.9	11.89	22.83
08/06/2010 01:56:00	49.52	7.04	43.0	34.0	167.9	70.7	11.88	23.01
08/06/2010 04:08:00	51.72	7.19	34.0	30.1	163.2	65.4	11.88	23.17

08/06/2010 07:08:00	54.72	7.40	90.0	66.6	170.2	69.9	11.87	23.53
08/06/2010 09:03:00	56.63	7.53	34.0	26.3	171.0	75.2	11.88	23.67
08/06/2010 11:03:00	58.63	7.66	40.0	31.2	171.2	76.8	11.88	23.84
08/06/2010 13:31:59	61.12	7.82	32.0	24.7	170.4	77.0	11.85	23.97
08/06/2010 16:26:00	64.02	8.00	47.0	37.6	170.1	75.0	11.87	24.17
08/06/2010 21:46:00	69.35	8.33	70.0	58.3	166.1	67.2	11.87	24.49
08/10/2010 08:15:00	151.83	12.32	213.0	173.7	168.1	76.4	12.04	25.42
08/11/2010 08:04:59	175.67	13.25	132.0	103.9	169.2	78.4	12.04	25.98
08/13/2010 13:30:00	229.08	15.14	165.0	126.4	169.3	81.6	11.97	26.66
08/16/2010 07:43:00	295.30	17.18	129.0	109.1	164.5	74.8	12.06	27.24


Sample 48196-1 All Data
Total Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
0
20
40
60
80
0
5
10
15
20
Lost Gas
Measured Gas
Crushed Gas


Sample 48196-1 Lost Gas Content Graph
Measured Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
20
10
0
-10
-20
0
5
Lost Gas
Measured Gas
Fit Start
Fit End

Sample 48196-2 Desorption Parameters

Parameter	Unit	Value
Sample Top Depth	ft	8,583.00
Sample Bottom Depth	ft	8,584.00
Reservoir Pressure	psia	3,963.11
Reservoir Pressure Gradient	psi/ft	0.460
Mud Hydrostatic Pressure	psia	3,849.40
Mud Density	lbm/gal	8.60
Sample Mass	g	5,970.0
Sample Headspace Volume	cm^3	730.0
Date Time Sample Cored	mm/dd/yyyy hh:mm:ss	08/04/2010 00:48:00
Date Time Sample Start Out of Well	mm/dd/yyyy hh:mm:ss	08/04/2010 03:56:12
Date Time Desorption Time Zero	mm/dd/yyyy hh:mm:ss	08/04/2010 00:48:00
Date Time Sample at Surface	mm/dd/yyyy hh:mm:ss	08/04/2010 08:06:59
Date Time Sample Canister Sealed	mm/dd/yyyy hh:mm:ss	08/04/2010 10:47:59
Lost Gas Time	hours	10.00
Desorption Time Correction	hours	0.03
Fit Start Time	hours	10.02
Fit End Time	hours	10.17
Fit Start Time	$hours^{0.5}$	3.17
Fit End Time	$hours^{0.5}$	3.19
Lost Gas Content	scf/ton	31.6
Measured Gas Content	scf/ton	18.9
Crushed Gas Content	scf/ton	35.1
Total Gas Content	scf/ton	85.6
Lost Gas Fraction	vol frac	0.3686
Measured Gas Fraction	vol frac	0.2210
Crushed Gas Fraction	vol frac	0.4103
Diffusivity	1/us	0.337
Sorption Time	hours	55.0

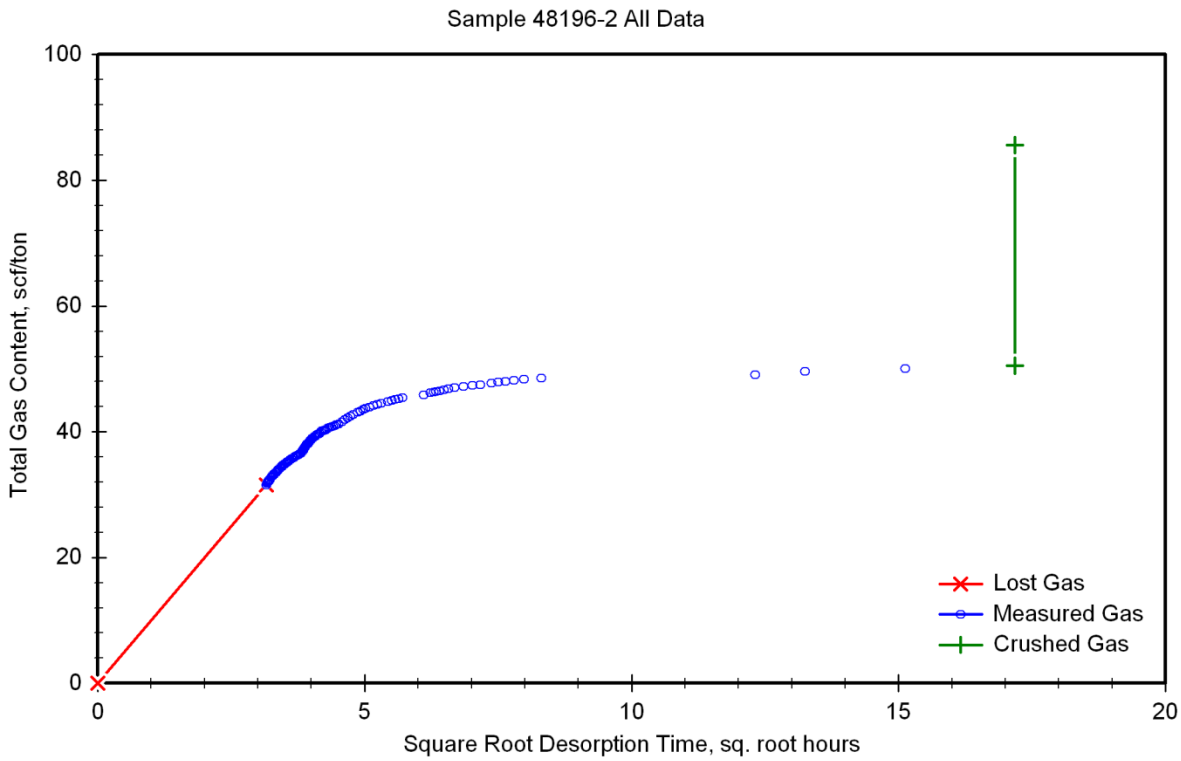
Sample 48196-2 Desorption History

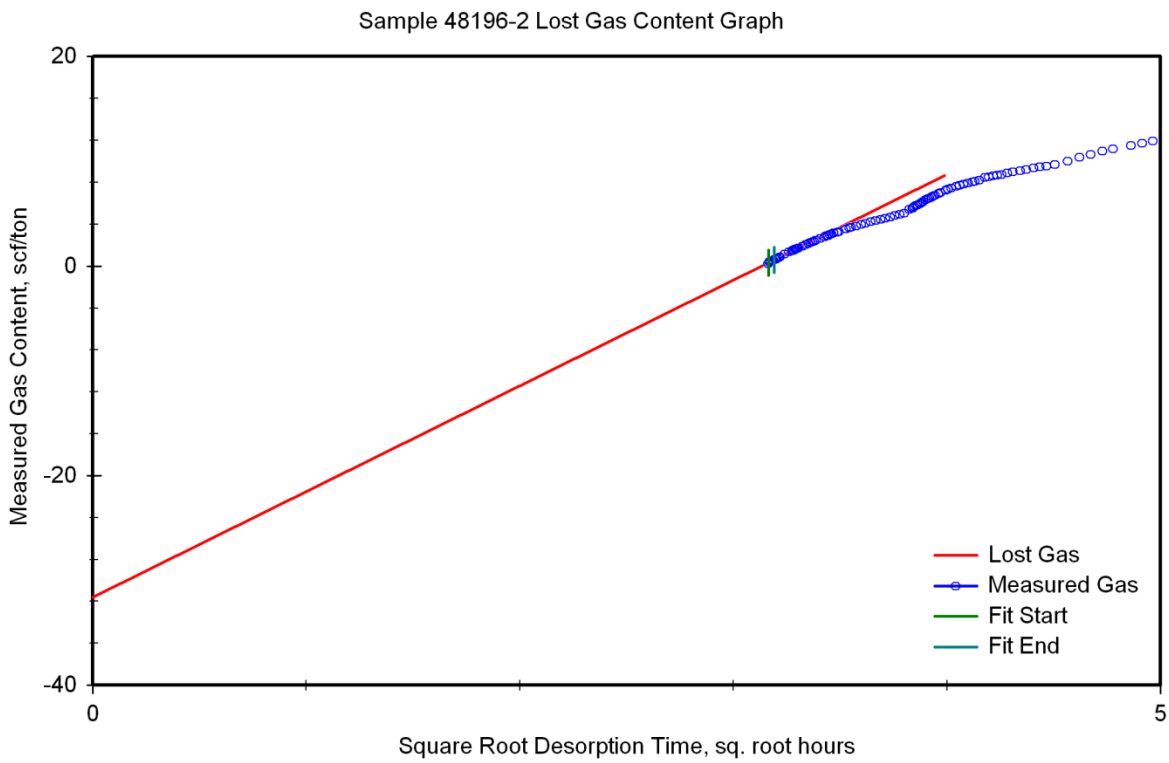
Date Time	Desorption Time	Sq. Root Desorption Time	Measured Gas Volume	Corrected Gas Volume	Canister Temp.	Ambient Temp.	Ambient Pressure	Cumulative Gas Content
mm/dd/yyyy hh:mm:ss	hours	$hours^{0.5}$	cm^3	cm^3	°F	°F	psia	scf/ton
08/04/2010 10:47:59	10.00	3.16	0.0	0.0	82.8	75.5	11.94	0.00
08/04/2010 10:50:00	10.00	3.16	62.0	48.9	82.8	75.5	11.94	0.26
08/04/2010 10:52:00	10.03	3.17	30.0	23.5	82.9	76.1	11.94	0.39
08/04/2010 10:54:00	10.07	3.17	19.0	14.1	83.7	76.4	11.94	0.46
08/04/2010 10:57:00	10.12	3.18	16.0	11.6	84.7	76.6	11.94	0.53
08/04/2010 10:59:00	10.15	3.19	15.0	10.2	86.2	77.3	11.94	0.58
08/04/2010 11:02:00	10.20	3.19	18.0	12.3	88.0	77.3	11.94	0.65
08/04/2010 11:04:00	10.23	3.20	14.0	9.6	89.4	77.3	11.94	0.70
08/04/2010 11:06:00	10.27	3.20	19.0	12.4	91.6	78.0	11.94	0.77
08/04/2010 11:09:00	10.32	3.21	20.0	13.7	93.6	77.9	11.94	0.84
08/04/2010 11:11:00	10.35	3.22	14.0	9.8	95.0	78.2	11.94	0.89
08/04/2010 11:19:00	10.48	3.24	66.0	45.3	101.3	78.9	11.94	1.13
08/04/2010 11:27:00	10.62	3.26	62.0	44.1	105.8	80.2	11.94	1.37
08/04/2010 11:32:59	10.72	3.27	28.0	19.3	108.7	80.2	11.94	1.48
08/04/2010 11:35:00	10.75	3.28	10.0	6.9	109.4	80.8	11.94	1.51
08/04/2010 11:35:59	10.77	3.28	9.0	6.6	109.9	80.8	11.94	1.55
08/04/2010 11:38:00	10.80	3.29	12.0	17.5	101.5	80.8	11.94	1.64
08/04/2010 11:40:00	10.83	3.29	11.0	0.0	111.4	80.9	11.94	1.64
08/04/2010 11:41:00	10.85	3.29	9.0	6.6	111.9	80.7	11.94	1.68
08/04/2010 11:42:59	10.88	3.30	10.0	7.2	112.5	80.9	11.94	1.72
08/04/2010 11:45:00	10.92	3.30	8.0	5.5	113.0	81.3	11.93	1.74
08/04/2010 11:51:59	11.03	3.32	45.0	32.9	115.3	81.3	11.93	1.92
08/04/2010 11:58:00	11.13	3.34	41.0	30.7	116.6	82.0	11.93	2.09
08/04/2010 12:03:00	11.22	3.35	26.0	18.5	118.5	81.6	11.93	2.19
08/04/2010 12:08:00	11.30	3.36	23.0	18.5	117.9	81.6	11.93	2.29
08/04/2010 12:11:00	11.35	3.37	15.0	11.6	118.0	81.6	11.93	2.35
08/04/2010 12:14:00	11.40	3.38	15.0	11.1	118.6	81.6	11.93	2.41
08/04/2010 12:17:00	11.45	3.38	20.0	15.1	119.1	82.4	11.93	2.49
08/04/2010 12:26:00	11.60	3.41	42.0	31.3	120.7	81.6	11.93	2.66
08/04/2010 12:34:59	11.75	3.43	46.0	35.1	121.3	80.7	11.93	2.84
08/04/2010 12:38:00	11.80	3.44	14.0	10.9	121.3	80.2	11.93	2.90
08/04/2010 12:41:00	11.85	3.44	13.0	10.2	121.3	79.3	11.93	2.96
08/04/2010 12:44:00	11.90	3.45	13.0	10.2	121.3	79.3	11.93	3.01
08/04/2010 12:48:00	11.97	3.46	19.0	14.5	121.5	79.1	11.92	3.09
08/04/2010 12:52:00	12.03	3.47	17.0	13.2	121.6	78.4	11.92	3.16
08/04/2010 12:58:00	12.13	3.48	21.0	16.7	121.6	78.2	11.93	3.25

08/04/2010 13:02:00	12.20	3.49	17.0	12.8	122.0	77.7	11.92	3.32
08/04/2010 13:16:00	12.43	3.53	63.0	49.1	122.2	76.6	11.92	3.58
08/04/2010 13:23:00	12.55	3.54	15.0	12.2	122.0	76.6	11.92	3.65
08/04/2010 13:26:00	12.60	3.55	11.0	8.4	122.0	76.8	11.92	3.69
08/04/2010 13:36:00	12.77	3.57	32.0	25.0	122.2	76.1	11.92	3.83
08/04/2010 13:46:00	12.93	3.60	35.0	27.5	122.2	76.1	11.92	3.97
08/04/2010 13:56:00	13.10	3.62	33.0	25.8	122.4	75.9	11.92	4.11
08/04/2010 14:06:00	13.27	3.64	32.0	25.2	122.4	76.1	11.92	4.25
08/04/2010 14:16:00	13.43	3.67	28.0	21.7	122.5	75.5	11.91	4.36
08/04/2010 14:26:00	13.60	3.69	28.0	22.3	122.5	75.7	11.92	4.48
08/04/2010 14:35:59	13.77	3.71	29.0	22.8	122.5	75.3	11.92	4.61
08/04/2010 14:46:00	13.93	3.73	26.0	20.5	122.5	74.6	11.92	4.72
08/04/2010 14:56:00	14.10	3.75	27.0	21.6	122.4	74.8	11.92	4.83
08/04/2010 15:06:00	14.27	3.78	24.0	19.3	122.5	74.3	11.93	4.94
08/04/2010 15:16:00	14.43	3.80	26.0	20.5	122.5	74.6	11.93	5.05
08/04/2010 15:27:00	14.62	3.82	87.0	70.0	121.1	74.3	11.93	5.42
08/04/2010 15:34:00	14.73	3.84	31.0	21.0	124.9	74.6	11.93	5.53
08/04/2010 15:34:59	14.75	3.84	24.0	15.9	128.3	73.7	11.93	5.62
08/04/2010 15:38:00	14.80	3.85	22.0	14.4	131.7	73.7	11.93	5.70
08/04/2010 15:41:00	14.85	3.85	25.0	16.3	135.7	73.7	11.93	5.79
08/04/2010 15:45:00	14.92	3.86	25.0	16.7	139.2	74.1	11.93	5.87
08/04/2010 15:49:00	14.98	3.87	29.0	20.1	142.5	73.7	11.93	5.98
08/04/2010 15:53:00	15.05	3.88	27.0	18.9	145.1	73.7	11.93	6.08
08/04/2010 15:57:00	15.12	3.89	24.0	17.2	147.4	74.1	11.93	6.18
08/04/2010 16:02:00	15.20	3.90	35.0	25.6	149.6	74.3	11.93	6.31
08/04/2010 16:07:00	15.28	3.91	29.0	21.5	151.0	74.3	11.92	6.43
08/04/2010 16:11:00	15.35	3.92	23.0	17.0	152.4	74.8	11.92	6.52
08/04/2010 16:16:00	15.43	3.93	22.0	16.6	153.3	74.8	11.92	6.61
08/04/2010 16:19:00	15.48	3.93	23.0	17.2	154.4	75.0	11.92	6.70
08/04/2010 16:23:00	15.55	3.94	20.0	15.3	155.0	75.9	11.92	6.78
08/04/2010 16:30:00	15.67	3.96	34.0	25.7	156.2	76.8	11.92	6.92
08/04/2010 16:34:59	15.75	3.97	24.0	18.2	156.8	76.6	11.92	7.02
08/04/2010 16:47:00	15.95	3.99	51.0	39.4	157.5	78.2	11.92	7.23
08/04/2010 16:52:00	16.03	4.00	24.0	18.4	157.7	78.4	11.91	7.33
08/04/2010 16:59:00	16.15	4.02	27.0	21.0	157.8	79.1	11.91	7.44
08/04/2010 17:11:00	16.35	4.04	40.0	31.2	157.8	79.7	11.91	7.61
08/04/2010 17:19:00	16.48	4.06	33.0	25.9	157.7	78.4	11.91	7.75
08/04/2010 17:28:00	16.63	4.08	17.0	13.8	157.1	77.3	11.91	7.82
08/04/2010 17:38:00	16.80	4.10	29.0	23.1	156.4	76.1	11.91	7.95
08/04/2010 17:48:00	16.97	4.12	27.0	21.0	156.4	75.9	11.90	8.06
08/04/2010 17:53:00	17.05	4.13	13.0	10.3	156.5	75.7	11.91	8.12
08/04/2010 18:03:00	17.22	4.15	25.0	20.2	155.7	74.6	11.90	8.22

08/04/2010 18:16:00	17.43	4.18	55.0	43.1	156.0	73.9	11.90	8.46
08/04/2010 18:26:00	17.60	4.20	26.0	19.5	157.3	73.7	11.90	8.56
08/04/2010 18:36:00	17.77	4.22	14.0	11.1	157.5	72.6	11.91	8.62
08/04/2010 18:46:00	17.93	4.23	14.0	11.6	156.9	72.3	11.91	8.68
08/04/2010 18:56:00	18.10	4.25	12.0	10.3	155.9	71.4	11.91	8.74
08/04/2010 19:09:00	18.32	4.28	29.0	26.1	152.1	71.0	11.91	8.88
08/04/2010 19:24:00	18.57	4.31	27.0	23.7	149.4	70.5	11.91	9.00
08/04/2010 19:41:00	18.85	4.34	27.0	24.3	145.9	70.7	11.91	9.14
08/04/2010 19:56:00	19.10	4.37	23.0	19.2	145.0	70.5	11.91	9.24
08/04/2010 20:14:00	19.40	4.40	27.0	23.6	142.7	71.4	11.92	9.37
08/04/2010 20:29:00	19.65	4.43	23.0	19.2	141.8	71.0	11.92	9.47
08/04/2010 20:46:00	19.93	4.46	23.0	18.1	141.8	71.0	11.92	9.57
08/04/2010 21:08:00	20.30	4.51	30.0	24.7	141.4	69.4	11.93	9.70
08/04/2010 21:40:00	20.83	4.56	85.0	65.4	144.5	69.2	11.93	10.05
08/04/2010 22:10:00	21.33	4.62	87.0	61.2	154.4	68.9	11.93	10.38
08/04/2010 22:40:00	21.83	4.67	80.0	58.4	160.5	69.0	11.92	10.69
08/04/2010 23:10:00	22.33	4.73	71.0	53.8	163.8	68.7	11.92	10.98
08/04/2010 23:40:00	22.83	4.78	58.0	44.7	165.9	68.0	11.92	11.22
08/05/2010 00:27:59	23.63	4.86	80.0	63.9	165.9	66.3	11.91	11.56
08/05/2010 00:58:00	24.13	4.91	47.0	37.0	166.6	68.0	11.91	11.76
08/05/2010 01:28:00	24.63	4.96	46.0	36.5	166.1	69.8	11.90	11.96
08/05/2010 01:57:59	25.13	5.01	42.0	33.3	166.1	71.2	11.90	12.13
08/05/2010 02:41:00	25.85	5.08	55.0	44.1	165.4	72.1	11.90	12.37
08/05/2010 03:26:00	26.60	5.16	54.0	42.8	165.4	71.7	11.90	12.60
08/05/2010 04:11:00	27.35	5.23	46.0	36.5	165.7	67.2	11.90	12.80
08/05/2010 04:56:00	28.10	5.30	46.0	38.2	163.9	66.2	11.90	13.00
08/05/2010 06:15:00	29.42	5.42	62.0	48.3	165.6	68.5	11.91	13.26
08/05/2010 07:05:59	30.27	5.50	41.0	31.1	167.2	77.7	11.91	13.43
08/05/2010 07:50:59	31.02	5.57	36.0	28.4	167.4	74.4	11.92	13.58
08/05/2010 08:31:00	31.68	5.63	31.0	24.6	167.2	73.7	11.92	13.71
08/05/2010 09:17:59	32.47	5.70	33.0	25.8	167.4	75.2	11.92	13.85
08/05/2010 14:06:59	37.28	6.11	101.0	81.5	163.5	76.8	11.90	14.29
08/05/2010 15:36:59	38.78	6.23	90.0	65.9	167.9	82.2	11.89	14.64
08/05/2010 16:21:59	39.53	6.29	33.0	24.5	169.3	77.3	11.88	14.77
08/05/2010 16:55:00	40.08	6.33	25.0	19.8	168.8	80.2	11.88	14.88
08/05/2010 17:41:00	40.85	6.39	22.0	16.5	169.5	77.0	11.88	14.97
08/05/2010 18:43:00	41.88	6.47	31.0	24.4	169.5	77.7	11.88	15.10
08/05/2010 19:50:59	43.02	6.56	42.0	36.3	166.1	74.4	11.90	15.29
08/05/2010 21:20:59	44.52	6.67	46.0	36.0	166.1	71.4	11.89	15.49
08/05/2010 23:42:00	46.87	6.85	43.0	32.8	168.0	64.9	11.88	15.66
08/06/2010 01:57:59	49.13	7.01	37.0	28.9	168.6	70.5	11.88	15.82
08/06/2010 04:09:00	51.32	7.16	25.0	23.3	164.1	65.4	11.88	15.94

08/06/2010 07:09:00	54.32	7.37	76.0	55.1	170.4	69.9	11.87	16.24
08/06/2010 09:04:00	56.23	7.50	41.0	31.8	171.1	75.3	11.88	16.41
08/06/2010 11:04:00	58.23	7.63	10.0	7.4	171.7	77.1	11.88	16.45
08/06/2010 13:33:00	60.72	7.79	37.0	28.9	170.4	77.0	11.85	16.61
08/06/2010 16:27:00	63.62	7.98	43.0	34.4	170.1	75.0	11.86	16.79
08/06/2010 21:49:59	69.00	8.31	53.0	42.7	169.7	67.2	11.87	17.02
08/10/2010 08:19:00	151.48	12.31	112.0	96.3	169.2	77.0	12.04	17.54
08/11/2010 08:10:00	175.33	13.24	113.0	89.1	169.9	78.4	12.04	18.01
08/13/2010 13:31:59	228.70	15.12	125.0	95.1	169.5	81.5	11.97	18.52
08/16/2010 07:47:59	294.97	17.17	88.0	75.7	167.4	73.4	12.06	18.93


Sample 48196-2 All Data
Total Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
100
80
60
40
20
0
0
5
10
15
20
Lost Gas
Measured Gas
Crushed Gas


Sample 48196-2 Lost Gas Content Graph
Measured Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
20
0
-20
-40
0
5
Lost Gas
Measured Gas
Fit Start
Fit End

Sample 48196-3 Desorption Parameters

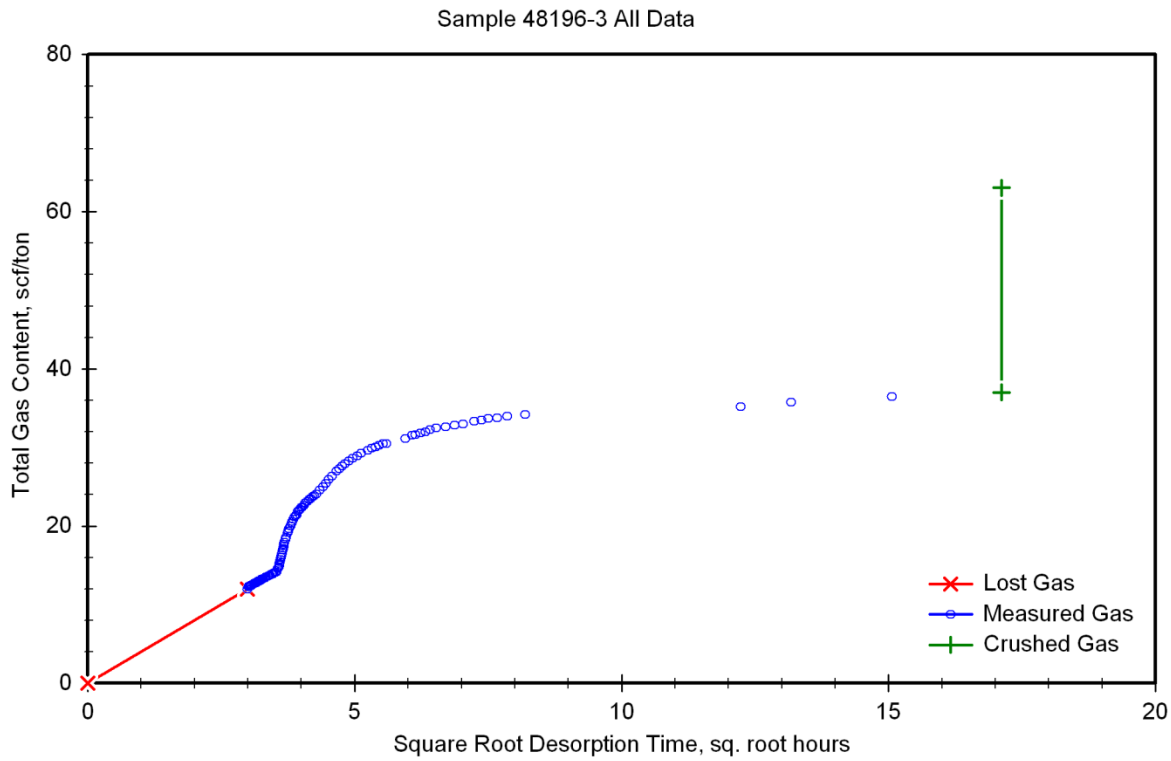
Parameter	Unit	Value
Sample Top Depth	ft	8,616.00
Sample Bottom Depth	ft	8,617.00
Reservoir Pressure	psia	3,978.29
Reservoir Pressure Gradient	psi/ft	0.460
Mud Hydrostatic Pressure	psia	3,864.14
Mud Density	lbm/gal	8.60
Sample Mass	g	6,132.0
Sample Headspace Volume	cm^3	704.0
Date Time Sample Cored	mm/dd/yyyy hh:mm:ss	08/04/2010 02:49:00
Date Time Sample Start Out of Well	mm/dd/yyyy hh:mm:ss	08/04/2010 03:56:12
Date Time Desorption Time Zero	mm/dd/yyyy hh:mm:ss	08/04/2010 02:49:00
Date Time Sample at Surface	mm/dd/yyyy hh:mm:ss	08/04/2010 08:06:59
Date Time Sample Canister Sealed	mm/dd/yyyy hh:mm:ss	08/04/2010 11:45:00
Lost Gas Time	hours	8.93
Desorption Time Correction	hours	0.10
Fit Start Time	hours	8.97
Fit End Time	hours	9.17
Fit Start Time	$hours^{0.5}$	2.99
Fit End Time	$hours^{0.5}$	3.03
Lost Gas Content	scf/ton	12.0
Measured Gas Content	scf/ton	25.1
Crushed Gas Content	scf/ton	26.0
Total Gas Content	scf/ton	63.1
Lost Gas Fraction	vol frac	0.1897
Measured Gas Fraction	vol frac	0.3976
Crushed Gas Fraction	vol frac	0.4127
Diffusivity	1/us	0.103
Sorption Time	hours	180.2

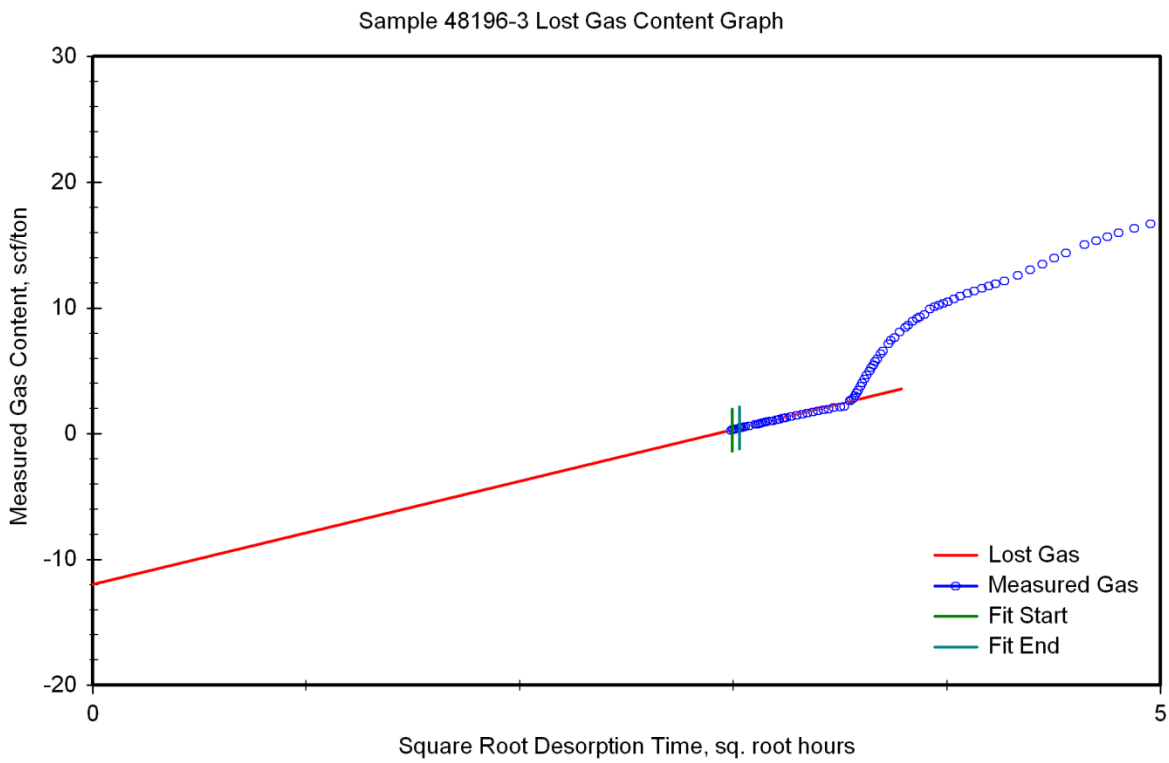
Sample 48196-3 Desorption History

Date Time	Desorption Time	Sq. Root Desorption Time	Measured Gas Volume	Corrected Gas Volume	Canister Temp.	Ambient Temp.	Ambient Pressure	Cumulative Gas Content
mm/dd/yyyy hh:mm:ss	hours	$hours^{0.5}$	cm^3	cm^3	°F	°F	psia	scf/ton
08/04/2010 11:45:00	8.93	2.99	0.0	0.0	75.6	81.6	11.93	0.00
08/04/2010 11:51:00	8.93	2.99	63.0	49.1	75.6	81.6	11.93	0.26
08/04/2010 11:54:00	8.98	3.00	28.0	17.1	80.2	81.6	11.93	0.35
08/04/2010 11:56:00	9.02	3.00	6.0	3.2	81.7	81.6	11.93	0.36
08/04/2010 11:59:00	9.07	3.01	15.0	6.0	87.4	82.0	11.93	0.39
08/04/2010 12:01:00	9.10	3.02	6.0	4.1	88.0	81.6	11.93	0.41
08/04/2010 12:04:00	9.15	3.02	15.0	8.8	90.9	81.6	11.93	0.46
08/04/2010 12:06:00	9.18	3.03	5.0	2.7	92.1	81.6	11.93	0.48
08/04/2010 12:08:59	9.23	3.04	10.0	5.0	95.0	81.6	11.93	0.50
08/04/2010 12:12:00	9.28	3.05	12.0	7.4	97.0	82.0	11.93	0.54
08/04/2010 12:15:00	9.33	3.06	9.0	5.1	99.0	81.6	11.93	0.57
08/04/2010 12:22:00	9.45	3.07	27.0	15.6	104.5	82.0	11.93	0.65
08/04/2010 12:32:00	9.62	3.10	31.0	20.1	108.9	80.9	11.93	0.75
08/04/2010 12:36:00	9.68	3.11	9.0	5.1	111.0	80.7	11.93	0.78
08/04/2010 12:39:00	9.73	3.12	9.0	5.9	112.3	80.0	11.93	0.81
08/04/2010 12:42:00	9.78	3.13	8.0	5.6	113.0	79.3	11.93	0.84
08/04/2010 12:45:00	9.83	3.14	9.0	6.4	113.7	79.7	11.93	0.87
08/04/2010 12:49:59	9.92	3.15	17.0	12.1	114.8	78.9	11.92	0.94
08/04/2010 12:53:00	9.97	3.16	8.0	5.9	115.5	78.6	11.93	0.97
08/04/2010 12:59:00	10.07	3.17	13.0	8.8	116.8	77.9	11.92	1.01
08/04/2010 13:02:59	10.13	3.18	10.0	7.2	117.5	77.3	11.92	1.05
08/04/2010 13:10:00	10.25	3.20	18.0	12.9	118.6	77.3	11.92	1.12
08/04/2010 13:15:00	10.33	3.21	16.0	11.9	119.3	77.1	11.92	1.18
08/04/2010 13:21:00	10.43	3.23	14.0	10.8	119.5	76.6	11.92	1.24
08/04/2010 13:24:00	10.48	3.24	8.0	6.1	119.7	76.8	11.92	1.27
08/04/2010 13:27:00	10.53	3.25	6.0	4.3	120.2	76.4	11.92	1.29
08/04/2010 13:37:00	10.70	3.27	24.0	18.4	120.7	76.1	11.92	1.39
08/04/2010 13:47:00	10.87	3.30	25.0	19.2	121.3	75.4	11.92	1.49
08/04/2010 13:57:00	11.03	3.32	22.0	16.7	122.0	75.4	11.92	1.58
08/04/2010 14:06:59	11.20	3.35	23.0	18.3	121.8	75.4	11.92	1.67
08/04/2010 14:16:59	11.37	3.37	18.0	13.6	122.2	75.3	11.91	1.74
08/04/2010 14:27:00	11.53	3.40	22.0	17.3	122.2	75.5	11.91	1.83
08/04/2010 14:37:00	11.70	3.42	20.0	16.0	122.2	75.0	11.92	1.92
08/04/2010 14:47:00	11.87	3.44	18.0	13.9	122.5	75.2	11.92	1.99
08/04/2010 14:57:00	12.03	3.47	20.0	15.9	122.4	74.4	11.92	2.07
08/04/2010 15:10:00	12.25	3.50	20.0	16.1	122.5	74.6	11.93	2.16

08/04/2010 15:17:59	12.38	3.52	14.0	11.3	122.5	74.6	11.93	2.21
08/04/2010 15:29:00	12.57	3.54	98.0	78.2	121.6	74.3	11.93	2.62
08/04/2010 15:32:00	12.62	3.55	29.0	18.9	126.0	73.9	11.93	2.72
08/04/2010 15:36:00	12.68	3.56	40.0	28.6	129.8	73.9	11.93	2.87
08/04/2010 15:39:00	12.73	3.57	49.0	35.9	133.2	73.7	11.93	3.06
08/04/2010 15:42:00	12.78	3.58	55.0	40.2	137.1	73.7	11.93	3.27
08/04/2010 15:46:00	12.85	3.58	57.0	42.3	140.2	73.7	11.93	3.49
08/04/2010 15:49:59	12.92	3.59	75.0	56.7	143.4	73.7	11.93	3.79
08/04/2010 15:53:59	12.98	3.60	70.0	53.2	146.0	73.9	11.93	4.06
08/04/2010 15:58:00	13.05	3.61	73.0	56.0	148.1	73.9	11.93	4.36
08/04/2010 16:02:59	13.13	3.62	83.0	64.0	149.9	73.7	11.92	4.69
08/04/2010 16:08:00	13.22	3.64	72.0	55.6	151.5	73.9	11.92	4.98
08/04/2010 16:12:00	13.28	3.64	62.0	48.1	152.6	74.3	11.92	5.23
08/04/2010 16:17:00	13.37	3.66	63.0	48.9	153.6	75.0	11.92	5.49
08/04/2010 16:19:59	13.42	3.66	60.0	46.1	154.8	75.0	11.92	5.73
08/04/2010 16:24:00	13.48	3.67	62.0	48.8	155.1	75.5	11.92	5.98
08/04/2010 16:31:00	13.60	3.69	98.0	75.9	156.4	76.1	11.92	6.38
08/04/2010 16:36:00	13.68	3.70	57.0	44.4	156.9	77.1	11.92	6.61
08/04/2010 16:47:59	13.88	3.73	142.0	110.7	157.7	77.9	11.92	7.19
08/04/2010 16:53:00	13.97	3.74	58.0	45.1	157.8	78.6	11.91	7.43
08/04/2010 17:00:00	14.08	3.75	63.0	49.3	157.7	79.7	11.91	7.68
08/04/2010 17:12:00	14.28	3.78	101.0	78.7	157.8	80.0	11.91	8.09
08/04/2010 17:23:00	14.47	3.80	87.0	68.4	157.5	78.2	11.91	8.45
08/04/2010 17:29:00	14.57	3.82	52.0	41.2	156.9	77.7	11.91	8.67
08/04/2010 17:39:00	14.73	3.84	64.0	50.5	156.4	76.1	11.91	8.93
08/04/2010 17:49:00	14.90	3.86	60.0	47.1	156.2	75.5	11.90	9.18
08/04/2010 17:55:00	15.00	3.87	35.0	27.7	156.0	75.0	11.90	9.32
08/04/2010 18:04:59	15.17	3.89	46.0	36.6	155.5	74.6	11.90	9.51
08/04/2010 18:17:00	15.37	3.92	100.0	78.4	156.0	74.3	11.90	9.92
08/04/2010 18:27:00	15.53	3.94	45.0	34.5	157.3	73.2	11.90	10.10
08/04/2010 18:36:59	15.70	3.96	32.0	25.4	157.5	72.5	11.91	10.24
08/04/2010 18:46:59	15.87	3.98	37.0	29.7	156.9	72.3	11.91	10.39
08/04/2010 18:57:00	16.03	4.00	30.0	24.5	155.7	71.4	11.90	10.52
08/04/2010 19:10:00	16.25	4.03	53.0	45.1	152.4	70.7	11.91	10.75
08/04/2010 19:25:00	16.50	4.06	51.0	42.8	149.2	70.7	11.91	10.98
08/04/2010 19:42:00	16.78	4.10	50.0	41.8	146.8	70.7	11.91	11.20
08/04/2010 19:57:00	17.03	4.13	45.0	36.5	145.9	70.7	11.91	11.39
08/04/2010 20:15:00	17.33	4.16	46.0	38.7	143.4	71.2	11.92	11.59
08/04/2010 20:30:00	17.58	4.19	40.0	32.3	142.7	71.0	11.92	11.76
08/04/2010 20:47:00	17.87	4.23	42.0	33.5	142.5	70.7	11.92	11.93
08/04/2010 21:08:59	18.23	4.27	51.0	40.7	142.3	70.7	11.92	12.15
08/04/2010 21:41:00	18.77	4.33	119.0	92.9	145.6	68.9	11.93	12.63

08/04/2010 22:11:00	19.27	4.39	116.0	84.7	155.5	68.7	11.93	13.07
08/04/2010 22:41:00	19.77	4.45	111.0	83.4	161.6	69.0	11.92	13.51
08/04/2010 23:11:00	20.27	4.50	113.0	88.1	164.3	68.7	11.92	13.97
08/04/2010 23:41:00	20.77	4.56	105.0	82.6	165.9	68.1	11.92	14.40
08/05/2010 00:29:00	21.57	4.64	152.0	121.3	165.9	66.3	11.91	15.04
08/05/2010 00:59:00	22.07	4.70	81.0	64.1	166.6	68.0	11.91	15.37
08/05/2010 01:29:00	22.57	4.75	78.0	62.0	166.1	69.8	11.90	15.69
08/05/2010 01:59:00	23.07	4.80	67.0	53.3	166.1	71.2	11.91	15.97
08/05/2010 02:42:00	23.78	4.88	90.0	71.3	165.4	72.1	11.90	16.35
08/05/2010 03:27:00	24.53	4.95	83.0	65.9	165.4	71.7	11.90	16.69
08/05/2010 04:12:00	25.28	5.03	71.0	56.5	165.7	67.2	11.90	16.99
08/05/2010 04:57:00	26.03	5.10	70.0	57.4	163.9	66.0	11.90	17.29
08/05/2010 06:16:00	27.35	5.23	103.0	80.7	165.6	68.7	11.90	17.71
08/05/2010 07:07:00	28.20	5.31	58.0	44.7	167.2	77.3	11.91	17.94
08/05/2010 07:52:00	28.95	5.38	52.0	41.0	167.5	74.4	11.92	18.15
08/05/2010 08:32:00	29.62	5.44	44.0	35.0	167.2	73.9	11.92	18.34
08/05/2010 09:19:00	30.40	5.51	45.0	35.3	167.4	75.2	11.92	18.52
08/05/2010 10:02:59	31.13	5.58	2.0	2.1	166.5	76.6	11.91	18.53
08/05/2010 14:08:00	35.22	5.93	157.0	124.8	163.5	77.0	11.90	19.18
08/05/2010 15:38:00	36.72	6.06	104.0	77.1	167.9	82.4	11.89	19.59
08/05/2010 16:23:00	37.47	6.12	34.0	24.9	169.5	78.6	11.88	19.72
08/05/2010 17:42:00	38.78	6.23	51.0	39.7	169.5	77.1	11.88	19.93
08/05/2010 18:45:00	39.83	6.31	34.0	26.7	169.9	78.2	11.89	20.06
08/05/2010 19:52:00	40.95	6.40	52.0	44.0	166.1	74.4	11.89	20.29
08/05/2010 21:22:00	42.45	6.52	52.0	41.1	165.6	71.4	11.88	20.51
08/05/2010 23:42:59	44.80	6.69	49.0	36.7	169.0	64.9	11.88	20.70
08/06/2010 02:00:00	47.08	6.86	42.0	33.3	169.0	70.3	11.88	20.87
08/06/2010 04:10:00	49.25	7.02	32.0	28.6	164.8	65.4	11.88	21.02
08/06/2010 07:10:00	52.25	7.23	95.0	71.0	170.6	69.9	11.88	21.39
08/06/2010 09:04:59	54.17	7.36	37.0	28.4	171.5	75.5	11.88	21.54
08/06/2010 11:04:59	56.17	7.49	47.0	36.4	172.0	77.3	11.88	21.73
08/06/2010 13:34:00	58.65	7.66	29.0	22.9	170.4	77.3	11.85	21.85
08/06/2010 16:28:00	61.55	7.85	45.0	35.9	170.1	75.2	11.86	22.04
08/06/2010 21:53:00	66.97	8.18	57.0	45.1	170.4	67.4	11.86	22.28
08/10/2010 08:16:59	149.37	12.22	221.0	182.8	169.5	77.5	12.04	23.23
08/11/2010 08:19:59	173.42	13.17	137.0	107.4	171.0	78.9	12.04	23.79
08/13/2010 13:33:00	226.63	15.05	174.0	133.8	170.2	81.6	11.97	24.49
08/16/2010 07:50:00	292.92	17.11	134.0	111.6	169.0	73.2	12.06	25.07


Sample 48196-3 All Data
Total Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
0
20
40
60
80
0
5
10
15
20
Lost Gas
Measured Gas
Crushed Gas


Sample 48196-3 Lost Gas Content Graph
Measured Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
30
20
10
0
-10
-20
0
5
Lost Gas
Measured Gas
Fit Start
Fit End

Sample 48196-4 Desorption Parameters

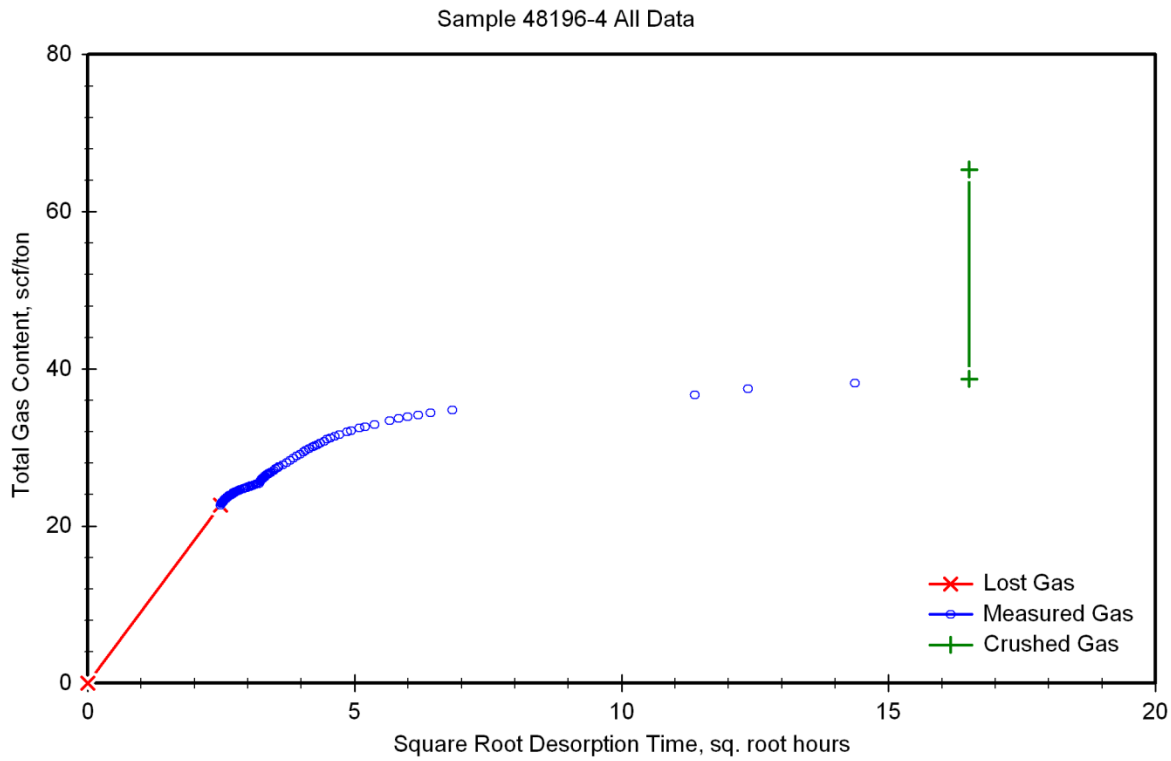
Parameter	Unit	Value
Sample Top Depth	ft	8,673.00
Sample Bottom Depth	ft	8,674.00
Reservoir Pressure	psia	4,004.51
Reservoir Pressure Gradient	psi/ft	0.460
Mud Hydrostatic Pressure	psia	4,024.78
Mud Density	lbm/gal	8.90
Sample Mass	g	5,946.0
Sample Headspace Volume	cm^3	364.9
Date Time Sample Cored	mm/dd/yyyy hh:mm:ss	08/04/2010 21:04:00
Date Time Sample Start Out of Well	mm/dd/yyyy hh:mm:ss	08/04/2010 23:14:00
Date Time Desorption Time Zero	mm/dd/yyyy hh:mm:ss	08/04/2010 23:15:35
Date Time Sample at Surface	mm/dd/yyyy hh:mm:ss	08/05/2010 04:29:00
Date Time Sample Canister Sealed	mm/dd/yyyy hh:mm:ss	08/05/2010 05:27:47
Lost Gas Time	hours	6.20
Desorption Time Correction	hours	0.04
Fit Start Time	hours	6.22
Fit End Time	hours	6.36
Fit Start Time	$hours^{0.5}$	2.49
Fit End Time	$hours^{0.5}$	2.52
Lost Gas Content	scf/ton	22.7
Measured Gas Content	scf/ton	16.0
Crushed Gas Content	scf/ton	26.7
Total Gas Content	scf/ton	65.4
Lost Gas Fraction	vol frac	0.3470
Measured Gas Fraction	vol frac	0.2454
Crushed Gas Fraction	vol frac	0.4076
Diffusivity	1/us	0.479
Sorption Time	hours	38.7

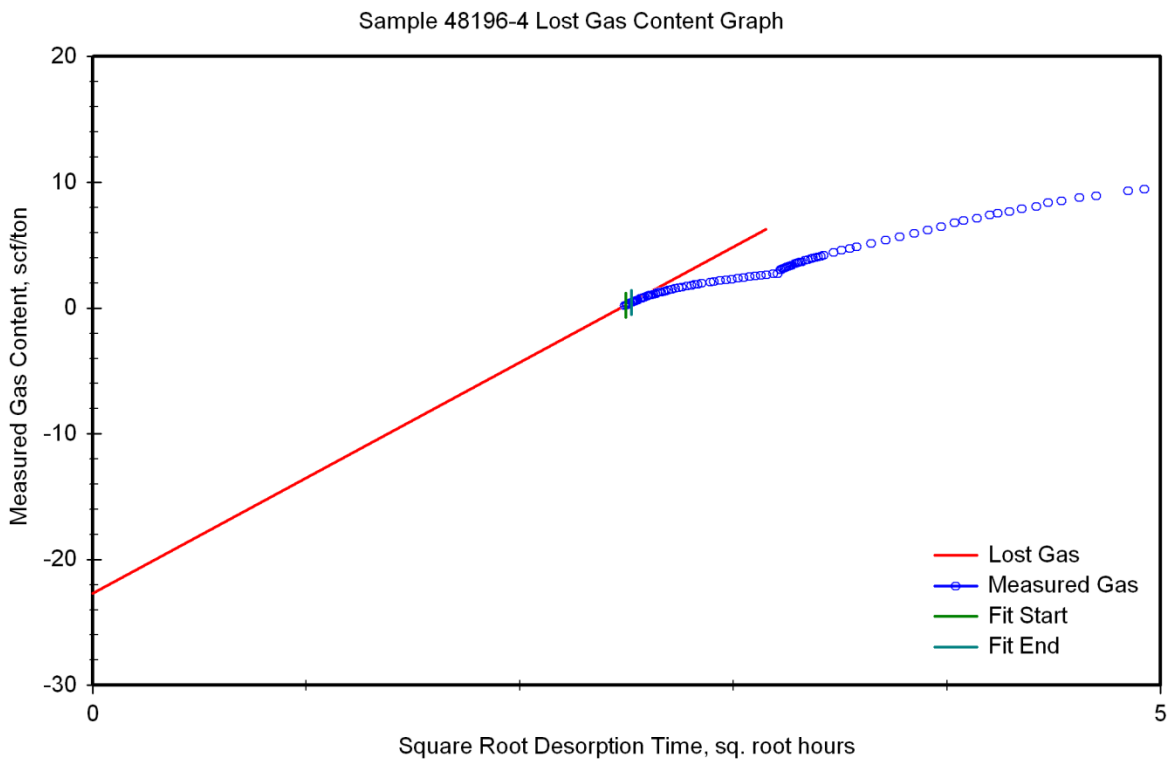
Sample 48196-4 Desorption History

Date Time	Desorption Time	Sq. Root Desorption Time	Measured Gas Volume	Corrected Gas Volume	Canister Temp.	Ambient Temp.	Ambient Pressure	Cumulative Gas Content
mm/dd/yyyy hh:mm:ss	hours	$hours^{0.5}$	cm^3	cm^3	°F	°F	psia	scf/ton
08/05/2010 05:27:47	6.20	2.49	0.0	0.0	113.7	65.3	11.91	0.00
08/05/2010 05:30:00	6.20	2.49	47.0	37.7	113.7	65.3	11.91	0.20
08/05/2010 05:32:00	6.24	2.50	10.0	8.8	112.1	65.1	11.91	0.25
08/05/2010 05:34:00	6.27	2.50	14.0	11.7	110.8	64.7	11.90	0.31
08/05/2010 05:35:59	6.30	2.51	15.0	12.3	110.3	64.4	11.90	0.38
08/05/2010 05:38:00	6.34	2.52	12.0	9.6	110.3	64.2	11.90	0.43
08/05/2010 05:40:00	6.37	2.52	12.0	9.5	110.8	64.0	11.91	0.48
08/05/2010 05:42:00	6.40	2.53	12.0	9.4	111.4	64.0	11.91	0.53
08/05/2010 05:44:00	6.44	2.54	11.0	8.3	112.3	64.0	11.90	0.58
08/05/2010 05:46:00	6.47	2.54	10.0	7.7	113.0	64.0	11.90	0.62
08/05/2010 05:48:00	6.50	2.55	10.0	7.6	113.9	64.2	11.90	0.66
08/05/2010 05:51:59	6.57	2.56	27.0	20.5	116.4	64.5	11.90	0.77
08/05/2010 05:54:00	6.60	2.57	6.0	4.9	116.4	64.9	11.91	0.80
08/05/2010 05:56:00	6.64	2.58	9.0	6.9	117.1	65.1	11.91	0.83
08/05/2010 05:58:00	6.67	2.58	8.0	6.0	117.9	65.1	11.91	0.87
08/05/2010 06:01:59	6.74	2.60	22.0	16.8	119.7	65.6	11.91	0.96
08/05/2010 06:04:00	6.77	2.60	7.0	5.4	120.0	65.8	11.90	0.99
08/05/2010 06:06:00	6.80	2.61	9.0	7.0	120.6	66.2	11.91	1.02
08/05/2010 06:08:00	6.84	2.61	9.0	3.3	129.3	66.9	11.91	1.04
08/05/2010 06:11:00	6.89	2.62	12.0	12.8	122.2	67.2	11.91	1.11
08/05/2010 06:14:00	6.94	2.63	10.0	7.8	122.7	68.0	11.91	1.15
08/05/2010 06:17:00	6.99	2.64	16.0	11.5	125.4	68.7	11.91	1.22
08/05/2010 06:20:00	7.04	2.65	9.0	7.3	125.2	69.4	11.91	1.25
08/05/2010 06:23:00	7.09	2.66	9.0	7.1	125.4	70.8	11.91	1.29
08/05/2010 06:26:00	7.14	2.67	8.0	6.2	125.8	71.6	11.91	1.33
08/05/2010 06:29:00	7.19	2.68	9.0	7.0	126.1	72.6	11.91	1.36
08/05/2010 06:34:00	7.27	2.70	17.0	13.1	126.7	73.9	11.91	1.43
08/05/2010 06:39:00	7.35	2.71	17.0	13.2	127.2	76.8	11.91	1.51
08/05/2010 06:44:00	7.44	2.73	15.0	11.6	127.6	78.8	11.91	1.57
08/05/2010 06:49:00	7.52	2.74	12.0	9.1	128.1	80.4	11.91	1.62
08/05/2010 06:53:59	7.60	2.76	11.0	8.4	128.6	79.8	11.91	1.66
08/05/2010 07:02:00	7.74	2.78	19.0	14.7	128.9	78.4	11.91	1.74
08/05/2010 07:09:00	7.85	2.80	18.0	13.8	129.7	76.6	11.91	1.82
08/05/2010 07:14:00	7.94	2.82	12.0	9.3	129.9	76.4	11.91	1.87
08/05/2010 07:19:00	8.02	2.83	11.0	8.7	129.7	75.9	11.91	1.91
08/05/2010 07:25:00	8.12	2.85	14.0	11.1	129.7	75.9	11.92	1.97

08/05/2010 07:40:00	8.37	2.89	24.0	18.7	130.1	74.8	11.92	2.07
08/05/2010 07:45:00	8.45	2.91	8.0	6.3	130.1	74.3	11.92	2.11
08/05/2010 07:55:00	8.62	2.94	18.0	13.9	130.8	74.8	11.92	2.18
08/05/2010 08:04:59	8.79	2.96	13.0	10.1	131.2	74.6	11.92	2.24
08/05/2010 08:15:00	8.95	2.99	18.0	14.2	131.2	74.1	11.92	2.31
08/05/2010 08:25:00	9.12	3.02	13.0	10.6	130.5	73.5	11.92	2.37
08/05/2010 08:35:00	9.29	3.05	19.0	15.0	130.5	74.3	11.92	2.45
08/05/2010 08:45:00	9.45	3.07	11.0	8.6	130.6	74.8	11.92	2.50
08/05/2010 08:55:00	9.62	3.10	12.0	9.4	130.8	74.8	11.92	2.55
08/05/2010 09:04:59	9.79	3.13	15.0	11.8	130.8	74.8	11.92	2.61
08/05/2010 09:15:00	9.95	3.15	12.0	9.4	131.0	74.8	11.92	2.66
08/05/2010 09:27:00	10.15	3.19	16.0	12.5	131.2	75.5	11.92	2.73
08/05/2010 09:34:59	10.29	3.21	7.0	5.6	131.0	76.1	11.92	2.76
08/05/2010 09:40:00	10.37	3.22	64.0	50.2	131.2	76.6	11.92	3.03
08/05/2010 09:41:00	10.39	3.22	9.0	7.1	131.2	77.1	11.92	3.07
08/05/2010 09:44:00	10.44	3.23	15.0	11.6	131.6	77.5	11.92	3.13
08/05/2010 09:46:59	10.49	3.24	17.0	12.8	132.8	77.7	11.92	3.20
08/05/2010 09:49:00	10.52	3.24	11.0	8.0	134.2	77.7	11.92	3.24
08/05/2010 09:51:00	10.55	3.25	8.0	5.6	135.7	77.7	11.92	3.27
08/05/2010 09:53:59	10.60	3.26	14.0	10.0	137.9	77.3	11.92	3.33
08/05/2010 09:57:00	10.65	3.26	13.0	9.2	140.2	77.1	11.92	3.38
08/05/2010 10:00:00	10.70	3.27	12.0	8.6	142.2	77.0	11.92	3.42
08/05/2010 10:07:00	10.82	3.29	28.0	20.1	146.5	76.6	11.91	3.53
08/05/2010 10:10:00	10.87	3.30	11.0	8.2	147.9	76.6	11.92	3.58
08/05/2010 10:12:59	10.92	3.30	12.0	8.8	149.2	76.6	11.91	3.62
08/05/2010 10:16:00	10.97	3.31	10.0	7.4	150.3	76.4	11.91	3.66
08/05/2010 10:19:00	11.02	3.32	10.0	7.6	151.2	76.2	11.92	3.70
08/05/2010 10:25:00	11.12	3.33	23.0	17.4	153.0	75.9	11.92	3.80
08/05/2010 10:30:00	11.20	3.35	15.0	11.3	154.1	76.1	11.92	3.86
08/05/2010 10:36:00	11.30	3.36	18.0	13.9	154.8	75.9	11.92	3.93
08/05/2010 10:40:00	11.37	3.37	12.0	9.2	155.3	75.9	11.92	3.98
08/05/2010 10:45:00	11.45	3.38	13.0	10.0	155.9	75.9	11.92	4.04
08/05/2010 10:50:00	11.54	3.40	12.0	9.4	156.0	75.9	11.92	4.09
08/05/2010 10:55:00	11.62	3.41	12.0	9.4	156.2	76.1	11.92	4.14
08/05/2010 11:00:00	11.70	3.42	11.0	8.5	156.2	75.9	11.91	4.18
08/05/2010 11:19:59	12.04	3.47	54.0	42.6	155.7	76.4	11.91	4.41
08/05/2010 11:35:00	12.29	3.51	46.0	36.2	155.3	75.9	11.91	4.61
08/05/2010 11:51:59	12.57	3.55	37.0	28.6	156.5	76.2	11.91	4.76
08/05/2010 12:04:59	12.79	3.58	29.0	22.5	156.9	75.9	11.90	4.88
08/05/2010 12:34:59	13.29	3.65	61.0	47.5	158.4	74.3	11.90	5.14
08/05/2010 13:05:00	13.79	3.71	64.0	50.1	158.7	74.8	11.90	5.41
08/05/2010 13:34:59	14.29	3.78	62.0	48.2	160.4	75.3	11.90	5.67

08/05/2010 14:04:59	14.79	3.85	68.0	52.5	162.3	76.4	11.90	5.95
08/05/2010 14:35:00	15.29	3.91	62.0	47.8	164.0	78.9	11.90	6.21
08/05/2010 15:04:59	15.79	3.97	68.0	52.2	165.6	80.7	11.89	6.49
08/05/2010 15:34:59	16.29	4.04	73.0	56.1	167.2	81.8	11.89	6.79
08/05/2010 15:55:00	16.62	4.08	41.0	31.5	167.8	82.0	11.89	6.96
08/05/2010 16:26:00	17.14	4.14	47.0	36.0	169.3	78.8	11.88	7.16
08/05/2010 16:56:00	17.64	4.20	58.0	45.4	168.5	80.7	11.88	7.40
08/05/2010 17:15:00	17.95	4.24	38.0	29.7	168.2	78.6	11.88	7.56
08/05/2010 17:42:59	18.42	4.29	34.0	26.1	169.5	77.1	11.88	7.70
08/05/2010 18:13:00	18.92	4.35	52.0	40.8	169.2	77.7	11.88	7.92
08/05/2010 18:49:00	19.52	4.42	41.0	32.0	169.7	79.3	11.89	8.09
08/05/2010 19:19:00	20.02	4.47	64.0	52.8	164.3	74.6	11.90	8.38
08/05/2010 19:53:00	20.59	4.54	34.0	26.0	166.1	74.4	11.90	8.52
08/05/2010 20:38:00	21.34	4.62	65.0	51.4	165.1	72.6	11.88	8.79
08/05/2010 21:23:00	22.09	4.70	39.0	30.8	165.6	71.4	11.89	8.96
08/05/2010 22:47:59	23.50	4.85	86.0	68.5	166.1	66.7	11.89	9.33
08/05/2010 23:32:00	24.24	4.92	38.0	30.5	165.9	65.1	11.89	9.49
08/06/2010 01:08:00	25.84	5.08	79.0	62.6	167.0	65.8	11.88	9.83
08/06/2010 02:13:00	26.92	5.19	19.0	15.4	166.3	69.0	11.88	9.91
08/06/2010 04:07:00	28.82	5.37	76.0	62.7	161.2	65.4	11.88	10.25
08/06/2010 07:11:00	31.89	5.65	125.0	95.2	171.1	70.1	11.88	10.77
08/06/2010 09:06:00	33.80	5.81	63.0	49.2	171.7	75.5	11.88	11.03
08/06/2010 11:06:00	35.80	5.98	49.0	37.8	172.4	78.8	11.87	11.23
08/06/2010 13:34:59	38.29	6.19	53.0	41.7	170.4	77.5	11.85	11.46
08/06/2010 16:29:00	41.19	6.42	69.0	54.5	170.1	75.2	11.87	11.75
08/06/2010 21:57:00	46.65	6.83	84.0	66.5	171.0	67.8	11.87	12.11
08/10/2010 08:27:00	129.15	11.36	440.0	352.8	169.2	77.7	12.04	14.01
08/11/2010 08:13:00	152.92	12.37	185.0	146.0	170.8	78.6	12.05	14.80
08/13/2010 13:34:00	206.27	14.36	178.0	137.7	170.4	81.6	11.97	15.54
08/16/2010 07:53:00	272.59	16.51	114.0	93.3	169.7	73.4	12.06	16.04


Sample 48196-4 All Data
Total Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
0
20
40
60
80
0
5
10
15
20
Lost Gas
Measured Gas
Crushed Gas


Sample 48196-4 Lost Gas Content Graph
Measured Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
20
10
0
-10
-20
-30
0
5
Lost Gas
Measured Gas
Fit Start
Fit End

Sample 48196-5 Desorption Parameters

Parameter	Unit	Value
Sample Top Depth	ft	8,728.00
Sample Bottom Depth	ft	8,729.00
Reservoir Pressure	psia	4,029.81
Reservoir Pressure Gradient	psi/ft	0.460
Mud Hydrostatic Pressure	psia	4,050.21
Mud Density	lbm/gal	8.90
Sample Mass	g	5,776.0
Sample Headspace Volume	cm^3	501.0
Date Time Sample Cored	mm/dd/yyyy hh:mm:ss	08/05/2010 12:32:00
Date Time Sample Start Out of Well	mm/dd/yyyy hh:mm:ss	08/05/2010 16:19:00
Date Time Desorption Time Zero	mm/dd/yyyy hh:mm:ss	08/05/2010 16:20:30
Date Time Sample at Surface	mm/dd/yyyy hh:mm:ss	08/05/2010 21:17:59
Date Time Sample Canister Sealed	mm/dd/yyyy hh:mm:ss	08/05/2010 22:41:32
Lost Gas Time	hours	6.35
Desorption Time Correction	hours	0.00
Fit Start Time	hours	6.25
Fit End Time	hours	6.34
Fit Start Time	$hours^{0.5}$	2.50
Fit End Time	$hours^{0.5}$	2.52
Lost Gas Content	scf/ton	26.8
Measured Gas Content	scf/ton	27.1
Crushed Gas Content	scf/ton	30.9
Total Gas Content	scf/ton	84.8
Lost Gas Fraction	vol frac	0.3162
Measured Gas Fraction	vol frac	0.3194
Crushed Gas Fraction	vol frac	0.3645
Diffusivity	1/us	0.394
Sorption Time	hours	47.0

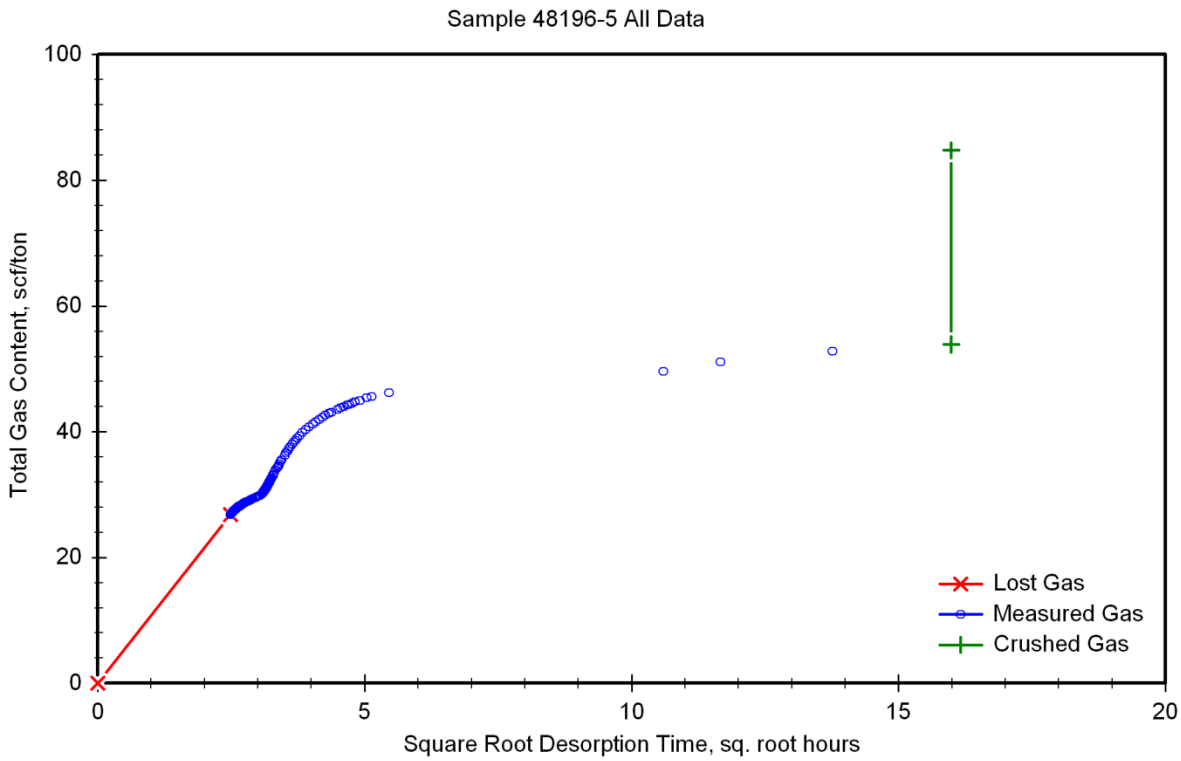
Sample 48196-5 Desorption History

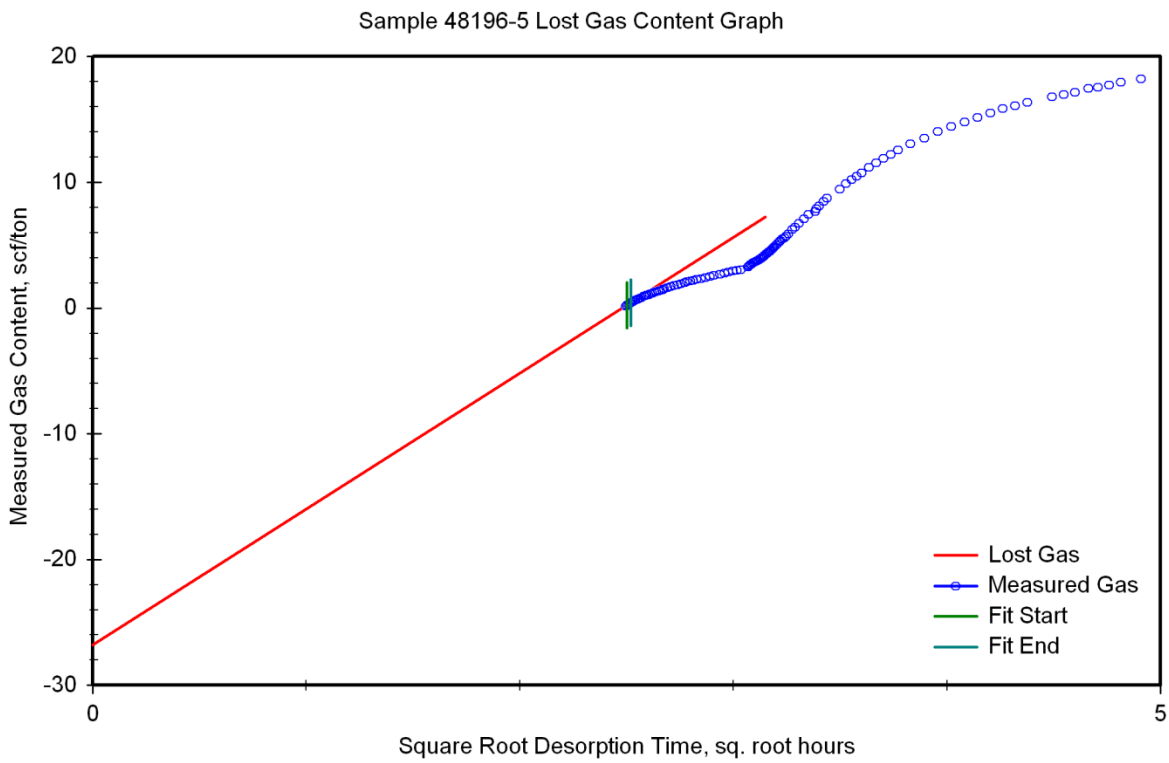
Date Time	Desorption Time	Sq. Root Desorption Time	Measured Gas Volume	Corrected Gas Volume	Canister Temp.	Ambient Temp.	Ambient Pressure	Cumulative Gas Content
mm/dd/yyyy hh:mm:ss	hours	$hours^{0.5}$	cm^3	cm^3	°F	°F	psia	scf/ton
08/05/2010 22:31:32	6.35	2.52	0.0	0.0	92.3	69.0	11.89	0.00
08/05/2010 22:34:00	6.22	2.49	37.0	29.4	92.3	69.0	11.89	0.16
08/05/2010 22:36:00	6.26	2.50	18.0	14.5	92.1	68.9	11.89	0.24
08/05/2010 22:38:00	6.29	2.51	16.0	12.8	91.9	65.5	11.89	0.31
08/05/2010 22:40:00	6.32	2.51	17.0	13.1	92.5	68.1	11.89	0.39
08/05/2010 22:42:00	6.36	2.52	16.0	11.6	94.1	67.8	11.89	0.45
08/05/2010 22:44:00	6.39	2.53	17.0	12.6	95.5	67.2	11.89	0.52
08/05/2010 22:46:00	6.42	2.53	15.0	10.9	97.3	66.9	11.89	0.58
08/05/2010 22:47:59	6.46	2.54	14.0	10.0	99.0	66.9	11.89	0.64
08/05/2010 22:50:00	6.49	2.55	15.0	11.2	100.2	66.9	11.89	0.70
08/05/2010 22:52:00	6.52	2.55	11.0	7.3	102.4	66.9	11.89	0.74
08/05/2010 22:56:00	6.59	2.57	28.0	19.9	106.2	66.3	11.89	0.85
08/05/2010 23:00:00	6.66	2.58	27.0	21.0	106.9	65.8	11.89	0.97
08/05/2010 23:02:00	6.69	2.59	8.0	4.2	110.3	65.8	11.89	0.99
08/05/2010 23:04:00	6.72	2.59	9.0	6.6	111.2	65.8	11.89	1.03
08/05/2010 23:06:00	6.76	2.60	9.0	6.4	112.5	65.8	11.89	1.06
08/05/2010 23:09:00	6.81	2.61	15.0	10.8	114.3	65.6	11.89	1.12
08/05/2010 23:12:00	6.86	2.62	15.0	11.1	115.7	65.4	11.89	1.18
08/05/2010 23:15:00	6.91	2.63	17.0	12.6	117.3	65.4	11.89	1.25
08/05/2010 23:18:00	6.96	2.64	13.0	9.7	118.4	65.8	11.89	1.31
08/05/2010 23:21:00	7.01	2.65	14.0	10.4	119.7	65.4	11.89	1.37
08/05/2010 23:23:59	7.06	2.66	13.0	9.8	120.6	65.3	11.89	1.42
08/05/2010 23:27:00	7.11	2.67	13.0	9.8	121.6	65.3	11.89	1.47
08/05/2010 23:30:00	7.16	2.68	12.0	9.0	122.4	65.1	11.88	1.52
08/05/2010 23:35:00	7.24	2.69	24.0	19.1	122.6	65.1	11.88	1.63
08/05/2010 23:40:00	7.32	2.71	20.0	14.8	124.9	64.9	11.89	1.71
08/05/2010 23:45:00	7.41	2.72	19.0	15.1	125.1	64.9	11.89	1.80
08/05/2010 23:49:59	7.49	2.74	16.0	11.7	126.7	64.7	11.88	1.86
08/05/2010 23:55:00	7.57	2.75	19.0	14.8	127.6	65.1	11.89	1.94
08/06/2010 00:01:00	7.67	2.77	23.0	18.1	128.1	65.1	11.89	2.04
08/06/2010 00:04:59	7.74	2.78	12.0	9.2	128.5	64.9	11.88	2.09
08/06/2010 00:10:00	7.82	2.80	13.0	10.4	128.7	65.1	11.89	2.15
08/06/2010 00:15:00	7.91	2.81	14.0	11.0	129.0	65.1	11.89	2.21
08/06/2010 00:20:00	7.99	2.83	14.0	11.0	129.4	65.3	11.89	2.27
08/06/2010 00:27:00	8.11	2.85	19.0	15.0	129.7	65.1	11.89	2.36
08/06/2010 00:34:00	8.22	2.87	18.0	14.3	129.9	65.3	11.89	2.44

08/06/2010 00:41:00	8.34	2.89	20.0	15.9	130.1	65.4	11.89	2.52
08/06/2010 00:48:00	8.46	2.91	16.0	12.5	130.3	65.8	11.88	2.59
08/06/2010 00:58:00	8.62	2.94	26.0	20.8	130.5	65.8	11.89	2.71
08/06/2010 01:05:00	8.74	2.96	18.0	14.3	130.6	65.6	11.89	2.79
08/06/2010 01:12:00	8.86	2.98	16.0	12.7	130.8	66.3	11.89	2.86
08/06/2010 01:19:00	8.97	3.00	22.0	17.4	130.8	67.2	11.88	2.96
08/06/2010 01:26:00	9.09	3.02	11.0	8.9	130.6	68.1	11.88	3.00
08/06/2010 01:33:00	9.21	3.03	16.0	12.9	130.6	68.9	11.89	3.08
08/06/2010 01:45:00	9.41	3.07	50.0	40.2	129.4	69.9	11.88	3.30
08/06/2010 01:47:00	9.44	3.07	20.0	15.7	129.6	70.1	11.88	3.39
08/06/2010 01:49:00	9.47	3.08	15.0	11.6	130.1	70.3	11.88	3.45
08/06/2010 01:50:59	9.51	3.08	14.0	10.3	131.4	70.8	11.88	3.51
08/06/2010 01:53:00	9.54	3.09	14.0	10.5	132.4	70.8	11.88	3.57
08/06/2010 01:55:00	9.57	3.09	17.0	13.1	133.0	70.8	11.88	3.64
08/06/2010 01:57:00	9.61	3.10	14.0	8.1	138.0	70.5	11.88	3.68
08/06/2010 01:59:00	9.64	3.11	10.0	6.7	140.0	70.5	11.88	3.72
08/06/2010 02:01:00	9.67	3.11	11.0	7.8	141.6	70.3	11.88	3.76
08/06/2010 02:03:00	9.71	3.12	13.0	10.1	141.8	69.6	11.88	3.82
08/06/2010 02:04:59	9.74	3.12	15.0	11.8	142.2	69.8	11.88	3.89
08/06/2010 02:06:59	9.77	3.13	16.0	12.0	143.4	69.6	11.88	3.95
08/06/2010 02:09:00	9.81	3.13	16.0	12.2	144.3	69.4	11.88	4.02
08/06/2010 02:11:00	9.84	3.14	18.0	13.8	145.2	69.4	11.88	4.10
08/06/2010 02:13:00	9.87	3.14	16.0	12.2	146.1	69.0	11.88	4.16
08/06/2010 02:15:00	9.91	3.15	16.0	10.9	149.2	69.0	11.88	4.23
08/06/2010 02:16:59	9.94	3.15	18.0	14.1	149.6	69.0	11.88	4.30
08/06/2010 02:19:00	9.97	3.16	19.0	14.9	149.9	68.9	11.88	4.39
08/06/2010 02:21:00	10.01	3.16	18.0	14.0	150.4	68.7	11.88	4.46
08/06/2010 02:23:00	10.04	3.17	19.0	14.9	150.8	68.5	11.88	4.55
08/06/2010 02:25:00	10.07	3.17	19.0	14.9	151.2	68.5	11.88	4.63
08/06/2010 02:27:00	10.11	3.18	20.0	15.3	152.1	68.5	11.88	4.71
08/06/2010 02:29:00	10.14	3.18	21.0	16.7	152.4	68.3	11.88	4.81
08/06/2010 02:31:00	10.17	3.19	21.0	16.1	153.5	68.1	11.88	4.90
08/06/2010 02:34:00	10.22	3.20	26.0	20.3	154.2	68.1	11.88	5.01
08/06/2010 02:37:00	10.27	3.21	30.0	23.9	154.2	68.0	11.88	5.14
08/06/2010 02:40:00	10.32	3.21	31.0	23.7	155.7	67.8	11.88	5.27
08/06/2010 02:42:59	10.37	3.22	25.0	19.6	156.2	67.4	11.88	5.38
08/06/2010 02:46:00	10.42	3.23	27.0	21.5	156.2	67.4	11.88	5.50
08/06/2010 02:49:00	10.47	3.24	25.0	19.7	156.6	67.2	11.88	5.61
08/06/2010 02:51:59	10.52	3.24	27.0	21.0	157.5	67.2	11.88	5.73
08/06/2010 02:57:00	10.61	3.26	46.0	36.4	158.0	67.1	11.88	5.93
08/06/2010 03:04:00	10.72	3.27	73.0	58.2	158.0	66.9	11.88	6.25
08/06/2010 03:08:59	10.81	3.29	47.0	37.4	158.2	66.7	11.88	6.46

08/06/2010 03:17:00	10.94	3.31	70.0	55.3	159.3	66.5	11.88	6.76
08/06/2010 03:26:00	11.09	3.33	77.0	62.5	157.8	66.2	11.88	7.11
08/06/2010 03:34:00	11.22	3.35	75.0	59.8	157.8	66.2	11.88	7.44
08/06/2010 03:46:59	11.44	3.38	62.0	47.6	161.4	66.0	11.88	7.71
08/06/2010 03:49:00	11.47	3.39	46.0	37.1	160.7	66.0	11.88	7.91
08/06/2010 03:53:59	11.56	3.40	53.0	42.4	160.7	65.8	11.88	8.15
08/06/2010 04:02:59	11.71	3.42	79.0	62.7	161.2	65.6	11.87	8.50
08/06/2010 04:10:00	11.82	3.44	58.0	44.3	165.2	65.6	11.88	8.74
08/06/2010 04:34:00	12.22	3.50	162.0	132.9	160.0	63.3	11.88	9.48
08/06/2010 04:47:00	12.44	3.53	93.0	74.9	160.0	61.8	11.88	9.89
08/06/2010 04:57:59	12.62	3.55	73.0	57.9	161.6	61.5	11.88	10.22
08/06/2010 05:08:00	12.79	3.58	63.0	50.3	162.5	61.5	11.88	10.49
08/06/2010 05:18:00	12.96	3.60	64.0	50.3	164.7	61.8	11.88	10.77
08/06/2010 05:32:59	13.21	3.63	97.0	78.2	164.3	62.7	11.88	11.21
08/06/2010 05:48:00	13.46	3.67	79.0	62.9	165.0	64.5	11.88	11.56
08/06/2010 06:03:00	13.71	3.70	81.0	64.5	165.4	66.2	11.88	11.91
08/06/2010 06:17:59	13.96	3.74	76.0	60.6	165.6	66.0	11.88	12.25
08/06/2010 06:33:00	14.21	3.77	73.0	58.6	164.8	67.6	11.88	12.57
08/06/2010 06:59:00	14.64	3.83	119.0	93.9	165.4	69.8	11.87	13.10
08/06/2010 07:30:00	15.16	3.89	103.0	78.8	170.1	73.2	11.88	13.53
08/06/2010 08:00:00	15.66	3.96	117.0	91.3	170.9	77.1	11.88	14.04
08/06/2010 08:30:00	16.16	4.02	95.0	74.3	170.7	78.4	11.88	14.45
08/06/2010 09:00:00	16.66	4.08	85.0	66.5	170.8	75.2	11.88	14.82
08/06/2010 09:30:00	17.16	4.14	81.0	63.8	170.6	74.8	11.88	15.17
08/06/2010 10:00:00	17.66	4.20	85.0	66.3	170.8	77.7	11.88	15.54
08/06/2010 10:30:00	18.16	4.26	74.0	58.2	170.4	76.6	11.88	15.86
08/06/2010 11:00:00	18.66	4.32	58.0	45.1	170.8	76.2	11.87	16.11
08/06/2010 11:30:00	19.16	4.38	56.0	43.8	170.2	79.1	11.87	16.36
08/06/2010 12:30:00	20.16	4.49	104.0	81.2	170.1	76.8	11.86	16.81
08/06/2010 13:00:00	20.66	4.55	44.0	34.4	169.7	77.0	11.86	17.00
08/06/2010 13:30:00	21.16	4.60	45.0	35.0	169.7	76.6	11.85	17.19
08/06/2010 14:04:59	21.74	4.66	62.0	48.6	169.2	79.5	11.86	17.46
08/06/2010 14:30:00	22.16	4.71	23.0	17.7	169.5	76.6	11.85	17.56
08/06/2010 15:00:00	22.66	4.76	45.0	35.3	169.5	74.3	11.85	17.76
08/06/2010 15:30:00	23.16	4.81	47.0	37.1	169.3	74.3	11.86	17.96
08/06/2010 16:25:00	24.07	4.91	65.0	50.8	169.9	74.8	11.86	18.24
08/06/2010 17:40:00	25.32	5.03	82.0	64.3	169.7	74.4	11.86	18.60
08/06/2010 18:40:00	26.32	5.13	51.0	39.4	170.2	73.2	11.84	18.82
08/06/2010 22:02:00	29.69	5.45	140.0	111.5	170.8	68.0	11.86	19.44
08/10/2010 08:30:00	112.16	10.59	762.0	609.2	169.3	77.9	12.04	22.82
08/11/2010 08:15:00	135.91	11.66	350.0	276.0	171.0	78.8	12.04	24.35
08/13/2010 13:34:59	189.24	13.76	378.0	293.7	170.6	81.6	11.97	25.98

08/16/2010 07:55:00	255.57	15.99	245.0	198.8	169.9	73.5	12.06	27.08


Sample 48196-5 All Data
Total Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
0
20
40
60
80
100
0
5
10
15
20
Lost Gas
Measured Gas
Crushed Gas


Sample 48196-5 Lost Gas Content Graph
Measured Gas Content, scf/ton
Square Root Desorption Time, sq. root hours
20
10
0
-10
-20
-30
0
5
Lost Gas
Measured Gas
Fit Start
Fit End

Appendix III

Noble Energy, Incorporated
Child VO 30-9
Niobrara Formation

Canister Gas Composition Results

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Sample 48196-1 Desorbed Gas Composition History

Date Time	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/04/2010 11:16:59	0.5407	0.0485	0.0329	0.0035	0.0104	0.0017	0.0017	0.0000	0.0000	0.0607	0.2565	0.0433	0.0000	1.0000
08/04/2010 13:12:00	0.7408	0.0725	0.0559	0.0045	0.0192	0.0033	0.0042	0.0003	0.0000	0.0051	0.0370	0.0571	0.0000	1.0000
08/04/2010 17:16:00	0.7298	0.0811	0.0726	0.0063	0.0269	0.0050	0.0065	0.0021	0.0000	0.0032	0.0215	0.0450	0.0000	1.0000
08/05/2010 16:19:59	0.4812	0.1328	0.1597	0.0136	0.0626	0.0108	0.0150	0.0039	0.0000	0.0169	0.0652	0.0385	0.0000	1.0000
08/06/2010 21:46:00	0.3473	0.1651	0.2538	0.0226	0.1022	0.0174	0.0233	0.0048	0.0000	0.0030	0.0138	0.0465	0.0000	1.0000
08/17/2010 11:35:59	0.0590	0.0328	0.1852	0.0016	0.1951	0.0656	0.0885	0.0689	0.0000	0.0475	0.1820	0.0738	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History														
O_2, N_2, and H_2 Removed														
08/04/2010 11:16:59	0.7919	0.0711	0.0482	0.0051	0.0152	0.0025	0.0025	0.0000	0.0000	0.0000	0.0000	0.0635	0.0000	1.0000
08/04/2010 13:12:00	0.7733	0.0757	0.0584	0.0047	0.0201	0.0035	0.0044	0.0003	0.0000	0.0000	0.0000	0.0597	0.0000	1.0000
08/04/2010 17:16:00	0.7483	0.0832	0.0744	0.0065	0.0276	0.0051	0.0066	0.0021	0.0000	0.0000	0.0000	0.0461	0.0000	1.0000
08/05/2010 16:19:59	0.5242	0.1447	0.1739	0.0148	0.0682	0.0118	0.0163	0.0042	0.0000	0.0000	0.0000	0.0419	0.0000	1.0000
08/06/2010 21:46:00	0.3532	0.1680	0.2582	0.0230	0.1040	0.0177	0.0237	0.0049	0.0000	0.0000	0.0000	0.0473	0.0000	1.0000
08/17/2010 11:35:59	0.0766	0.0426	0.2404	0.0021	0.2532	0.0851	0.1149	0.0894	0.0000	0.0000	0.0000	0.0957	0.0000	1.0000

Sample 48196-1 Corrected Gas Composition vs. Desorbed Fraction

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.8847	0.0107	0.0000	0.0084	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0962	0.0000	1.0000
0.2414	0.7919	0.0711	0.0482	0.0051	0.0152	0.0025	0.0025	0.0000	0.0000	0.0000	0.0000	0.0635	0.0000	1.0000
0.2603	0.7733	0.0757	0.0584	0.0047	0.0201	0.0035	0.0044	0.0003	0.0000	0.0000	0.0000	0.0597	0.0000	1.0000
0.3534	0.7483	0.0832	0.0744	0.0065	0.0276	0.0051	0.0066	0.0021	0.0000	0.0000	0.0000	0.0461	0.0000	1.0000
0.5245	0.5242	0.1447	0.1739	0.0148	0.0682	0.0118	0.0163	0.0042	0.0000	0.0000	0.0000	0.0419	0.0000	1.0000
0.5612	0.3532	0.1680	0.2582	0.0230	0.1040	0.0177	0.0237	0.0049	0.0000	0.0000	0.0000	0.0473	0.0000	1.0000
1.0000	0.0766	0.0426	0.2404	0.0021	0.2532	0.0851	0.1149	0.0894	0.0000	0.0000	0.0000	0.0957	0.0000	1.0000
Integrated Gas Composition														
-	0.4466	0.0625	0.1477	0.0057	0.1268	0.0401	0.0540	0.0400	0.0000	0.0000	0.0000	0.0765	0.0000	1.0000

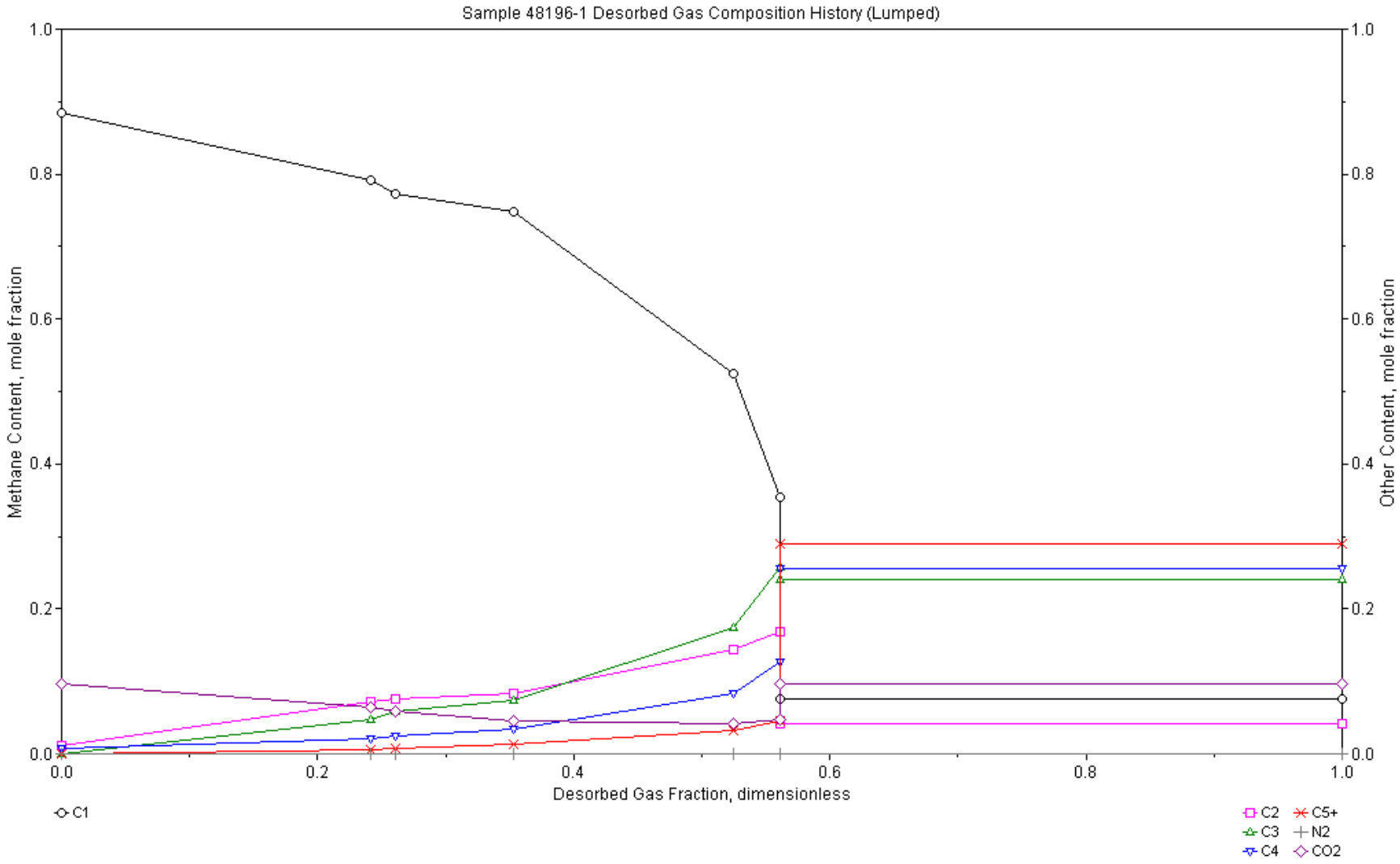
Sample 48196-1 Desorbed Gas Composition History (Lumped)

Date Time	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/04/2010 11:16:59	0.5407	0.0485	0.0329	0.0035	0.0104	0.0035	0.0607	0.2565	0.0433	0.0000	1.0000
08/04/2010 13:12:00	0.7408	0.0725	0.0559	0.0045	0.0192	0.0078	0.0051	0.0370	0.0571	0.0000	1.0000
08/04/2010 17:16:00	0.7298	0.0811	0.0726	0.0063	0.0269	0.0135	0.0032	0.0215	0.0450	0.0000	1.0000
08/05/2010 16:19:59	0.4812	0.1328	0.1597	0.0136	0.0626	0.0296	0.0169	0.0652	0.0385	0.0000	1.0000
08/06/2010 21:46:00	0.3473	0.1651	0.2538	0.0226	0.1022	0.0455	0.0030	0.0138	0.0465	0.0000	1.0000
08/17/2010 11:35:59	0.0590	0.0328	0.1852	0.0016	0.1951	0.2230	0.0475	0.1820	0.0738	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History											
O_2, N_2, and H_2 Removed											
08/04/2010 11:16:59	0.7919	0.0711	0.0482	0.0051	0.0152	0.0051	0.0000	0.0000	0.0635	0.0000	1.0000
08/04/2010 13:12:00	0.7733	0.0757	0.0584	0.0047	0.0201	0.0082	0.0000	0.0000	0.0597	0.0000	1.0000
08/04/2010 17:16:00	0.7483	0.0832	0.0744	0.0065	0.0276	0.0139	0.0000	0.0000	0.0461	0.0000	1.0000
08/05/2010 16:19:59	0.5242	0.1447	0.1739	0.0148	0.0682	0.0323	0.0000	0.0000	0.0419	0.0000	1.0000
08/06/2010 21:46:00	0.3532	0.1680	0.2582	0.0230	0.1040	0.0463	0.0000	0.0000	0.0473	0.0000	1.0000
08/17/2010 11:35:59	0.0766	0.0426	0.2404	0.0021	0.2532	0.2894	0.0000	0.0000	0.0957	0.0000	1.0000

Sample 48196-1 Corrected Gas Composition vs. Desorbed Fraction (Lumped)

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.8847	0.0107	0.0000	0.0084	0.0000	0.0000	0.0000	0.0000	0.0962	0.0000	1.0000
0.2414	0.7919	0.0711	0.0482	0.0051	0.0152	0.0051	0.0000	0.0000	0.0635	0.0000	1.0000
0.2603	0.7733	0.0757	0.0584	0.0047	0.0201	0.0082	0.0000	0.0000	0.0597	0.0000	1.0000
0.3534	0.7483	0.0832	0.0744	0.0065	0.0276	0.0139	0.0000	0.0000	0.0461	0.0000	1.0000
0.5245	0.5242	0.1447	0.1739	0.0148	0.0682	0.0323	0.0000	0.0000	0.0419	0.0000	1.0000
0.5612	0.3532	0.1680	0.2582	0.0230	0.1040	0.0463	0.0000	0.0000	0.0473	0.0000	1.0000
1.0000	0.0766	0.0426	0.2404	0.0021	0.2532	0.2894	0.0000	0.0000	0.0957	0.0000	1.0000
Integrated Gas Composition											
-	0.4466	0.0625	0.1477	0.0057	0.1268	0.1341	0.0000	0.0000	0.0765	0.0000	1.0000

Noble Energy, Incorporated, Child VO 30-9



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Sample 48196-2 Desorbed Gas Composition History

Date Time	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/04/2010 11:19:00	0.4618	0.1547	0.1697	0.0149	0.0579	0.0090	0.0108	0.0012	0.0000	0.0161	0.0675	0.0364	0.0000	1.0000
08/04/2010 13:16:00	0.4425	0.1685	0.2095	0.0187	0.0737	0.0118	0.0137	0.0025	0.0000	0.0029	0.0158	0.0402	0.0000	1.0000
08/04/2010 17:19:00	0.3493	0.1566	0.2555	0.0256	0.1084	0.0200	0.0251	0.0043	0.0000	0.0022	0.0115	0.0416	0.0000	1.0000
08/05/2010 16:55:00	0.1150	0.1099	0.3647	0.0488	0.2102	0.0428	0.0538	0.0075	0.0000	0.0024	0.0144	0.0306	0.0000	1.0000
08/06/2010 21:49:59	0.0575	0.0827	0.3762	0.0607	0.2561	0.0523	0.0615	0.0068	0.0000	0.0030	0.0121	0.0312	0.0000	1.0000
08/17/2010 11:23:59	0.0663	0.0117	0.0955	0.0448	0.2242	0.1170	0.1696	0.0000	0.0000	0.0409	0.1696	0.0604	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History														
O_2, N_2, and H_2 Removed														
08/04/2010 11:19:00	0.5039	0.1688	0.1851	0.0163	0.0632	0.0098	0.0117	0.0013	0.0000	0.0000	0.0000	0.0398	0.0000	1.0000
08/04/2010 13:16:00	0.4509	0.1718	0.2135	0.0191	0.0751	0.0121	0.0139	0.0026	0.0000	0.0000	0.0000	0.0410	0.0000	1.0000
08/04/2010 17:19:00	0.3541	0.1588	0.2590	0.0259	0.1099	0.0203	0.0255	0.0043	0.0000	0.0000	0.0000	0.0422	0.0000	1.0000
08/05/2010 16:55:00	0.1169	0.1117	0.3710	0.0497	0.2138	0.0435	0.0547	0.0076	0.0000	0.0000	0.0000	0.0311	0.0000	1.0000
08/06/2010 21:49:59	0.0584	0.0840	0.3820	0.0616	0.2600	0.0531	0.0624	0.0069	0.0000	0.0000	0.0000	0.0317	0.0000	1.0000
08/17/2010 11:23:59	0.0840	0.0148	0.1210	0.0568	0.2840	0.1481	0.2148	0.0000	0.0000	0.0000	0.0000	0.0765	0.0000	1.0000

Sample 48196-2 Corrected Gas Composition vs. Desorbed Fraction

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.8878	0.0950	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0171	0.0000	1.0000
0.3819	0.5039	0.1688	0.1851	0.0163	0.0632	0.0098	0.0117	0.0013	0.0000	0.0000	0.0000	0.0398	0.0000	1.0000
0.4105	0.4509	0.1718	0.2135	0.0191	0.0751	0.0121	0.0139	0.0026	0.0000	0.0000	0.0000	0.0410	0.0000	1.0000
0.4591	0.3541	0.1588	0.2590	0.0259	0.1099	0.0203	0.0255	0.0043	0.0000	0.0000	0.0000	0.0422	0.0000	1.0000
0.5424	0.1169	0.1117	0.3710	0.0497	0.2138	0.0435	0.0547	0.0076	0.0000	0.0000	0.0000	0.0311	0.0000	1.0000
0.5674	0.0584	0.0840	0.3820	0.0616	0.2600	0.0531	0.0624	0.0069	0.0000	0.0000	0.0000	0.0317	0.0000	1.0000
1.0000	0.0840	0.0148	0.1210	0.0568	0.2840	0.1481	0.2148	0.0000	0.0000	0.0000	0.0000	0.0765	0.0000	1.0000
Integrated Gas Composition														
-	0.3571	0.0834	0.1405	0.0338	0.1608	0.0709	0.1013	0.0012	0.0000	0.0000	0.0000	0.0510	0.0000	1.0000

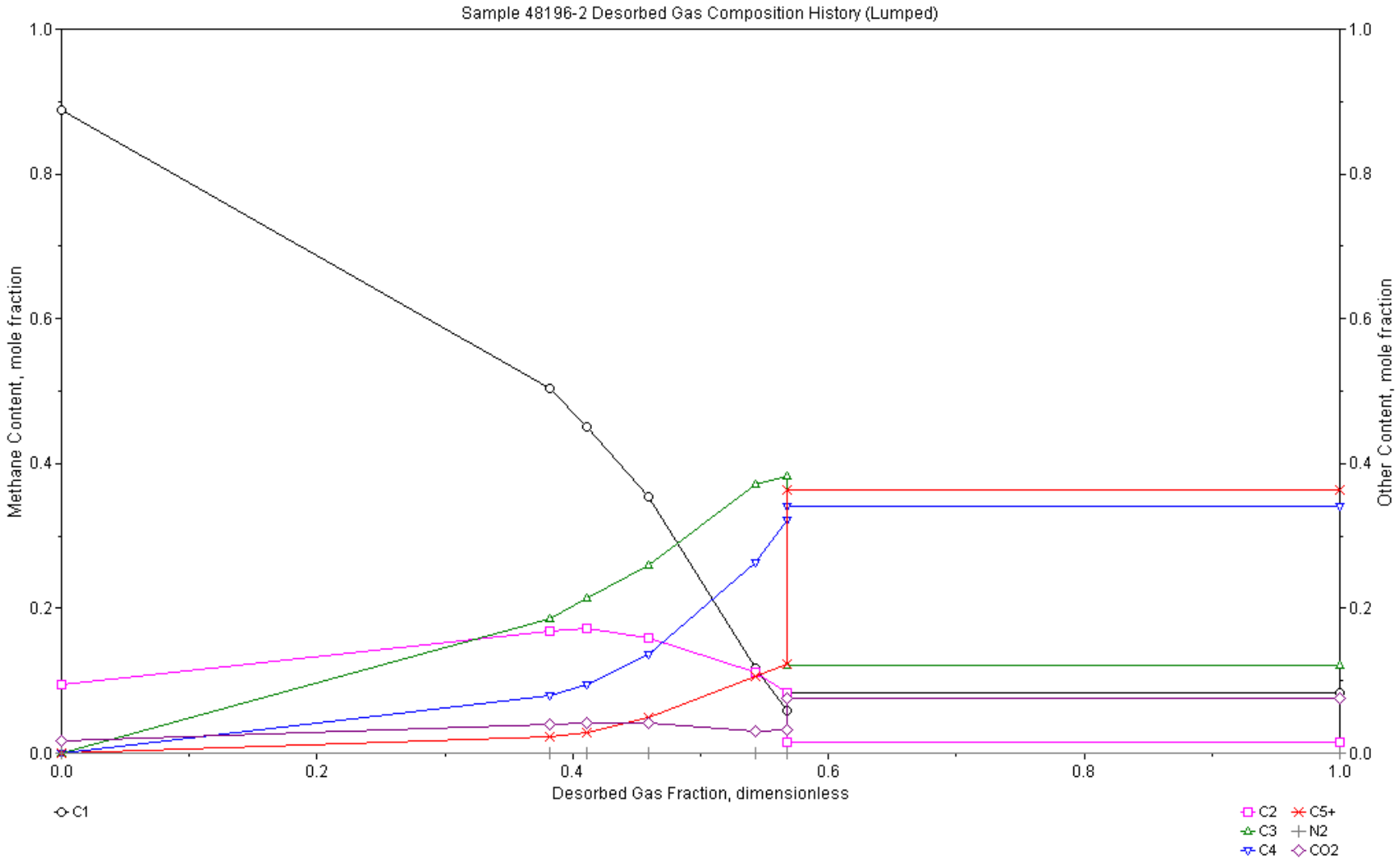
Sample 48196-2 Desorbed Gas Composition History (Lumped)

Date Time	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/04/2010 11:19:00	0.4618	0.1547	0.1697	0.0149	0.0579	0.0209	0.0161	0.0675	0.0364	0.0000	1.0000
08/04/2010 13:16:00	0.4425	0.1685	0.2095	0.0187	0.0737	0.0280	0.0029	0.0158	0.0402	0.0000	1.0000
08/04/2010 17:19:00	0.3493	0.1566	0.2555	0.0256	0.1084	0.0494	0.0022	0.0115	0.0416	0.0000	1.0000
08/05/2010 16:55:00	0.1150	0.1099	0.3647	0.0488	0.2102	0.1041	0.0024	0.0144	0.0306	0.0000	1.0000
08/06/2010 21:49:59	0.0575	0.0827	0.3762	0.0607	0.2561	0.1206	0.0030	0.0121	0.0312	0.0000	1.0000
08/17/2010 11:23:59	0.0663	0.0117	0.0955	0.0448	0.2242	0.2865	0.0409	0.1696	0.0604	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History											
O_2, N_2, and H_2 Removed											
08/04/2010 11:19:00	0.5039	0.1688	0.1851	0.0163	0.0632	0.0228	0.0000	0.0000	0.0398	0.0000	1.0000
08/04/2010 13:16:00	0.4509	0.1718	0.2135	0.0191	0.0751	0.0286	0.0000	0.0000	0.0410	0.0000	1.0000
08/04/2010 17:19:00	0.3541	0.1588	0.2590	0.0259	0.1099	0.0501	0.0000	0.0000	0.0422	0.0000	1.0000
08/05/2010 16:55:00	0.1169	0.1117	0.3710	0.0497	0.2138	0.1058	0.0000	0.0000	0.0311	0.0000	1.0000
08/06/2010 21:49:59	0.0584	0.0840	0.3820	0.0616	0.2600	0.1224	0.0000	0.0000	0.0317	0.0000	1.0000
08/17/2010 11:23:59	0.0840	0.0148	0.1210	0.0568	0.2840	0.3630	0.0000	0.0000	0.0765	0.0000	1.0000

Sample 48196-2 Corrected Gas Composition vs. Desorbed Fraction (Lumped)

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.8878	0.0950	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0171	0.0000	1.0000
0.3819	0.5039	0.1688	0.1851	0.0163	0.0632	0.0228	0.0000	0.0000	0.0398	0.0000	1.0000
0.4105	0.4509	0.1718	0.2135	0.0191	0.0751	0.0286	0.0000	0.0000	0.0410	0.0000	1.0000
0.4591	0.3541	0.1588	0.2590	0.0259	0.1099	0.0501	0.0000	0.0000	0.0422	0.0000	1.0000
0.5424	0.1169	0.1117	0.3710	0.0497	0.2138	0.1058	0.0000	0.0000	0.0311	0.0000	1.0000
0.5674	0.0584	0.0840	0.3820	0.0616	0.2600	0.1224	0.0000	0.0000	0.0317	0.0000	1.0000
1.0000	0.0840	0.0148	0.1210	0.0568	0.2840	0.3630	0.0000	0.0000	0.0765	0.0000	1.0000
Integrated Gas Composition											
-	0.3571	0.0834	0.1405	0.0338	0.1608	0.1734	0.0000	0.0000	0.0510	0.0000	1.0000

Noble Energy, Incorporated, Child VO 30-9



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Sample 48196-3 Desorbed Gas Composition History

Date Time	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/04/2010 15:10:00	0.6737	0.0763	0.0650	0.0057	0.0261	0.0052	0.0070	0.0015	0.0000	0.0155	0.0748	0.0493	0.0000	1.0000
08/04/2010 17:55:00	0.7166	0.0867	0.0778	0.0068	0.0299	0.0059	0.0079	0.0029	0.0000	0.0020	0.0163	0.0471	0.0000	1.0000
08/05/2010 16:23:00	0.5274	0.1392	0.1621	0.0138	0.0636	0.0114	0.0156	0.0039	0.0000	0.0039	0.0191	0.0398	0.0000	1.0000
08/06/2010 21:53:00	0.3717	0.1638	0.2419	0.0218	0.0993	0.0182	0.0245	0.0053	0.0000	0.0015	0.0092	0.0427	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History														
O_2, N_2, and H_2 Removed														
08/04/2010 15:10:00	0.7406	0.0839	0.0714	0.0062	0.0286	0.0057	0.0077	0.0017	0.0000	0.0000	0.0000	0.0542	0.0000	1.0000
08/04/2010 17:55:00	0.7300	0.0883	0.0793	0.0070	0.0304	0.0060	0.0081	0.0030	0.0000	0.0000	0.0000	0.0480	0.0000	1.0000
08/05/2010 16:23:00	0.5398	0.1425	0.1660	0.0141	0.0651	0.0117	0.0160	0.0040	0.0000	0.0000	0.0000	0.0408	0.0000	1.0000
08/06/2010 21:53:00	0.3758	0.1656	0.2446	0.0220	0.1004	0.0184	0.0248	0.0053	0.0000	0.0000	0.0000	0.0432	0.0000	1.0000

Sample 48196-3 Corrected Gas Composition vs. Desorbed Fraction

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.7608	0.0753	0.0560	0.0048	0.0251	0.0050	0.0069	0.0000	0.0000	0.0000	0.0000	0.0662	0.0000	1.0000
0.2235	0.7406	0.0839	0.0714	0.0062	0.0286	0.0057	0.0077	0.0017	0.0000	0.0000	0.0000	0.0542	0.0000	1.0000
0.3368	0.7300	0.0883	0.0793	0.0070	0.0304	0.0060	0.0081	0.0030	0.0000	0.0000	0.0000	0.0480	0.0000	1.0000
0.5034	0.5398	0.1425	0.1660	0.0141	0.0651	0.0117	0.0160	0.0040	0.0000	0.0000	0.0000	0.0408	0.0000	1.0000
1.0000	0.3758	0.1656	0.2446	0.0220	0.1004	0.0184	0.0248	0.0053	0.0000	0.0000	0.0000	0.0432	0.0000	1.0000
Integrated Gas Composition														
-	0.5468	0.1285	0.1631	0.0145	0.0664	0.0123	0.0166	0.0037	0.0000	0.0000	0.0000	0.0480	0.0000	1.0000

Sample 48196-3 Desorbed Gas Composition History (Lumped)

Date Time	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/04/2010 15:10:00	0.6737	0.0763	0.0650	0.0057	0.0261	0.0137	0.0155	0.0748	0.0493	0.0000	1.0000
08/04/2010 17:55:00	0.7166	0.0867	0.0778	0.0068	0.0299	0.0167	0.0020	0.0163	0.0471	0.0000	1.0000
08/05/2010 16:23:00	0.5274	0.1392	0.1621	0.0138	0.0636	0.0310	0.0039	0.0191	0.0398	0.0000	1.0000
08/06/2010 21:53:00	0.3717	0.1638	0.2419	0.0218	0.0993	0.0480	0.0015	0.0092	0.0427	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History											
O_2, N_2, and H_2 Removed											
08/04/2010 15:10:00	0.7406	0.0839	0.0714	0.0062	0.0286	0.0150	0.0000	0.0000	0.0542	0.0000	1.0000
08/04/2010 17:55:00	0.7300	0.0883	0.0793	0.0070	0.0304	0.0171	0.0000	0.0000	0.0480	0.0000	1.0000
08/05/2010 16:23:00	0.5398	0.1425	0.1660	0.0141	0.0651	0.0317	0.0000	0.0000	0.0408	0.0000	1.0000
08/06/2010 21:53:00	0.3758	0.1656	0.2446	0.0220	0.1004	0.0485	0.0000	0.0000	0.0432	0.0000	1.0000

Sample 48196-3 Corrected Gas Composition vs. Desorbed Fraction (Lumped)

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.7608	0.0753	0.0560	0.0048	0.0251	0.0119	0.0000	0.0000	0.0662	0.0000	1.0000
0.2235	0.7406	0.0839	0.0714	0.0062	0.0286	0.0150	0.0000	0.0000	0.0542	0.0000	1.0000
0.3368	0.7300	0.0883	0.0793	0.0070	0.0304	0.0171	0.0000	0.0000	0.0480	0.0000	1.0000
0.5034	0.5398	0.1425	0.1660	0.0141	0.0651	0.0317	0.0000	0.0000	0.0408	0.0000	1.0000
1.0000	0.3758	0.1656	0.2446	0.0220	0.1004	0.0485	0.0000	0.0000	0.0432	0.0000	1.0000
Integrated Gas Composition											
-	0.5468	0.1285	0.1631	0.0145	0.0664	0.0326	0.0000	0.0000	0.0480	0.0000	1.0000

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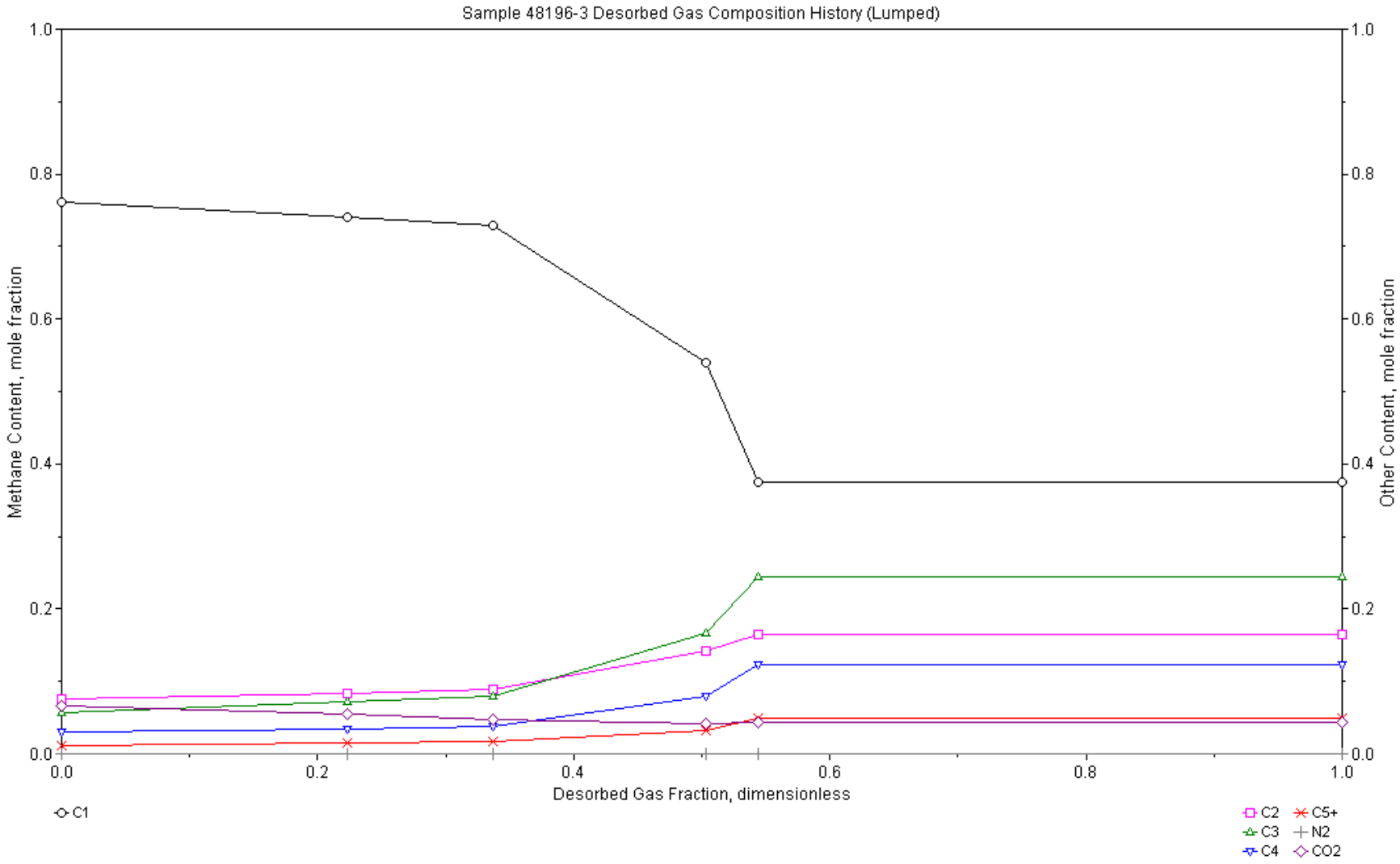

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Sample 48196-4 Desorbed Gas Composition History

Date Time	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/05/2010 07:40:00	0.7076	0.0669	0.0486	0.0041	0.0163	0.0030	0.0036	0.0003	0.0000	0.0088	0.0500	0.0907	0.0000	1.0000
08/05/2010 12:34:59	0.7221	0.0760	0.0564	0.0045	0.0196	0.0039	0.0051	0.0016	0.0000	0.0043	0.0272	0.0792	0.0000	1.0000
08/05/2010 21:57:00	0.6277	0.1087	0.1042	0.0083	0.0376	0.0068	0.0092	0.0029	0.0000	0.0033	0.0189	0.0724	0.0000	1.0000
08/05/2010 23:32:00	0.6196	0.0815	0.0658	0.0050	0.0228	0.0042	0.0057	0.0015	0.0000	0.0229	0.0910	0.0799	0.0000	1.0000
08/17/2010 15:17:59	0.0491	0.0358	0.1101	0.0212	0.0889	0.0305	0.0424	0.0398	0.0000	0.0981	0.3568	0.1273	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History														
O_2, N_2, and H_2 Removed														
08/05/2010 07:40:00	0.7518	0.0711	0.0517	0.0044	0.0173	0.0032	0.0038	0.0003	0.0000	0.0000	0.0000	0.0963	0.0000	1.0000
08/05/2010 12:34:59	0.7456	0.0785	0.0582	0.0046	0.0202	0.0040	0.0053	0.0017	0.0000	0.0000	0.0000	0.0818	0.0000	1.0000
08/05/2010 21:57:00	0.6419	0.1112	0.1066	0.0085	0.0384	0.0070	0.0094	0.0030	0.0000	0.0000	0.0000	0.0741	0.0000	1.0000
08/05/2010 23:32:00	0.6993	0.0920	0.0743	0.0057	0.0257	0.0047	0.0064	0.0017	0.0000	0.0000	0.0000	0.0902	0.0000	1.0000
08/17/2010 15:17:59	0.0900	0.0657	0.2019	0.0389	0.1630	0.0560	0.0779	0.0730	0.0000	0.0000	0.0000	0.2336	0.0000	1.0000

Sample 48196-4 Corrected Gas Composition vs. Desorbed Fraction

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.7793	0.0108	0.0000	0.0024	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2075	0.0000	1.0000
0.3787	0.7518	0.0711	0.0517	0.0044	0.0173	0.0032	0.0038	0.0003	0.0000	0.0000	0.0000	0.0963	0.0000	1.0000
0.4256	0.7456	0.0785	0.0582	0.0046	0.0202	0.0040	0.0053	0.0017	0.0000	0.0000	0.0000	0.0818	0.0000	1.0000
0.4863	0.6419	0.1112	0.1066	0.0085	0.0384	0.0070	0.0094	0.0030	0.0000	0.0000	0.0000	0.0741	0.0000	1.0000
0.4922	0.6993	0.0920	0.0743	0.0057	0.0257	0.0047	0.0064	0.0017	0.0000	0.0000	0.0000	0.0902	0.0000	1.0000
1.0000	0.0900	0.0657	0.2019	0.0389	0.1630	0.0560	0.0779	0.0730	0.0000	0.0000	0.0000	0.2336	0.0000	1.0000
Integrated Gas Composition														
-	0.4168	0.0587	0.1204	0.0217	0.0889	0.0296	0.0410	0.0373	0.0000	0.0000	0.0000	0.1855	0.0000	1.0000

Sample 48196-4 Desorbed Gas Composition History (Lumped)

Date Time	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/05/2010 07:40:00	0.7076	0.0669	0.0486	0.0041	0.0163	0.0069	0.0088	0.0500	0.0907	0.0000	1.0000
08/05/2010 12:34:59	0.7221	0.0760	0.0564	0.0045	0.0196	0.0106	0.0043	0.0272	0.0792	0.0000	1.0000
08/05/2010 21:57:00	0.6277	0.1087	0.1042	0.0083	0.0376	0.0189	0.0033	0.0189	0.0724	0.0000	1.0000
08/05/2010 23:32:00	0.6196	0.0815	0.0658	0.0050	0.0228	0.0114	0.0229	0.0910	0.0799	0.0000	1.0000
08/17/2010 15:17:59	0.0491	0.0358	0.1101	0.0212	0.0889	0.1127	0.0981	0.3568	0.1273	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History											
O_2, N_2, and H_2 Removed											
08/05/2010 07:40:00	0.7518	0.0711	0.0517	0.0044	0.0173	0.0073	0.0000	0.0000	0.0963	0.0000	1.0000
08/05/2010 12:34:59	0.7456	0.0785	0.0582	0.0046	0.0202	0.0110	0.0000	0.0000	0.0818	0.0000	1.0000
08/05/2010 21:57:00	0.6419	0.1112	0.1066	0.0085	0.0384	0.0194	0.0000	0.0000	0.0741	0.0000	1.0000
08/05/2010 23:32:00	0.6993	0.0920	0.0743	0.0057	0.0257	0.0128	0.0000	0.0000	0.0902	0.0000	1.0000
08/17/2010 15:17:59	0.0900	0.0657	0.2019	0.0389	0.1630	0.2068	0.0000	0.0000	0.2336	0.0000	1.0000

Sample 48196-4 Corrected Gas Composition vs. Desorbed Fraction (Lumped)

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.7793	0.0108	0.0000	0.0024	0.0000	0.0000	0.0000	0.0000	0.2075	0.0000	1.0000
0.3787	0.7518	0.0711	0.0517	0.0044	0.0173	0.0073	0.0000	0.0000	0.0963	0.0000	1.0000
0.4256	0.7456	0.0785	0.0582	0.0046	0.0202	0.0110	0.0000	0.0000	0.0818	0.0000	1.0000
0.4863	0.6419	0.1112	0.1066	0.0085	0.0384	0.0194	0.0000	0.0000	0.0741	0.0000	1.0000
0.4922	0.6993	0.0920	0.0743	0.0057	0.0257	0.0128	0.0000	0.0000	0.0902	0.0000	1.0000
1.0000	0.0900	0.0657	0.2019	0.0389	0.1630	0.2068	0.0000	0.0000	0.2336	0.0000	1.0000
Integrated Gas Composition											
-	0.4168	0.0587	0.1204	0.0217	0.0889	0.1079	0.0000	0.0000	0.1855	0.0000	1.0000

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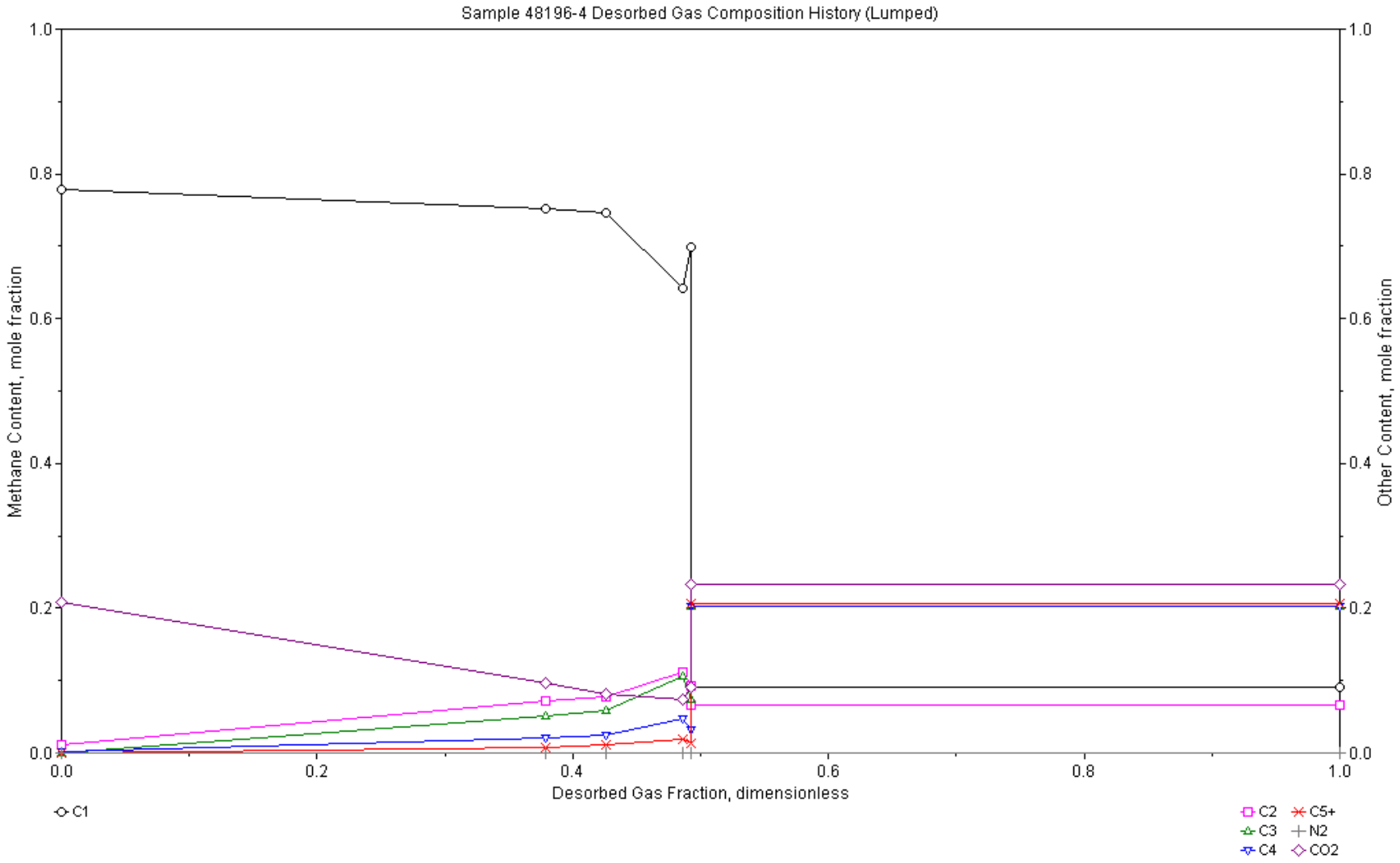

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Sample 48196-5 Desorbed Gas Composition History

Date Time	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/06/2010 03:49:00	0.7118	0.0905	0.0787	0.0068	0.0299	0.0058	0.0080	0.0026	0.0000	0.0020	0.0164	0.0473	0.0000	1.0000
08/06/2010 10:00:00	0.6632	0.1097	0.1057	0.0092	0.0434	0.0088	0.0127	0.0044	0.0000	0.0025	0.0175	0.0229	0.0000	1.0000
08/06/2010 22:02:00	0.5850	0.1246	0.1317	0.0114	0.0538	0.0107	0.0150	0.0044	0.0000	0.0032	0.0191	0.0411	0.0000	1.0000
08/17/2010 15:56:00	0.0838	0.0559	0.1688	0.0338	0.1467	0.0524	0.0710	0.0559	0.0000	0.0559	0.1991	0.0768	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History														
O_2, N_2, and H_2 Removed														
08/06/2010 03:49:00	0.7252	0.0922	0.0802	0.0069	0.0305	0.0060	0.0082	0.0026	0.0000	0.0000	0.0000	0.0482	0.0000	1.0000
08/06/2010 10:00:00	0.6767	0.1119	0.1078	0.0094	0.0443	0.0090	0.0129	0.0045	0.0000	0.0000	0.0000	0.0234	0.0000	1.0000
08/06/2010 22:02:00	0.5983	0.1274	0.1347	0.0117	0.0550	0.0109	0.0153	0.0045	0.0000	0.0000	0.0000	0.0420	0.0000	1.0000
08/17/2010 15:56:00	0.1125	0.0750	0.2266	0.0453	0.1969	0.0703	0.0953	0.0750	0.0000	0.0000	0.0000	0.1031	0.0000	1.0000

Sample 48196-5 Corrected Gas Composition vs. Desorbed Fraction

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	iC_5	nC_5	C_6	C_7	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.8525	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1451	0.0000	1.0000
0.4095	0.7252	0.0922	0.0802	0.0069	0.0305	0.0060	0.0082	0.0026	0.0000	0.0000	0.0000	0.0482	0.0000	1.0000
0.4995	0.6767	0.1119	0.1078	0.0094	0.0443	0.0090	0.0129	0.0045	0.0000	0.0000	0.0000	0.0234	0.0000	1.0000
0.5454	0.5983	0.1274	0.1347	0.0117	0.0550	0.0109	0.0153	0.0045	0.0000	0.0000	0.0000	0.0420	0.0000	1.0000
1.0000	0.1125	0.0750	0.2266	0.0453	0.1969	0.0703	0.0953	0.0750	0.0000	0.0000	0.0000	0.1031	0.0000	1.0000
Integrated Gas Composition														
-	0.4665	0.0681	0.1334	0.0232	0.1014	0.0343	0.0466	0.0352	0.0000	0.0000	0.0000	0.0912	0.0000	1.0000

Sample 48196-5 Desorbed Gas Composition History (Lumped)

Date Time	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
mm/dd/yyyy hh:mm:ss	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
08/06/2010 03:49:00	0.7118	0.0905	0.0787	0.0068	0.0299	0.0164	0.0020	0.0164	0.0473	0.0000	1.0000
08/06/2010 10:00:00	0.6632	0.1097	0.1057	0.0092	0.0434	0.0259	0.0025	0.0175	0.0229	0.0000	1.0000
08/06/2010 22:02:00	0.5850	0.1246	0.1317	0.0114	0.0538	0.0301	0.0032	0.0191	0.0411	0.0000	1.0000
08/17/2010 15:56:00	0.0838	0.0559	0.1688	0.0338	0.1467	0.1793	0.0559	0.1991	0.0768	0.0000	1.0000
Contamination Corrected Desorption Gas Composition History											
O_2, N_2, and H_2 Removed											
08/06/2010 03:49:00	0.7252	0.0922	0.0802	0.0069	0.0305	0.0168	0.0000	0.0000	0.0482	0.0000	1.0000
08/06/2010 10:00:00	0.6767	0.1119	0.1078	0.0094	0.0443	0.0264	0.0000	0.0000	0.0234	0.0000	1.0000
08/06/2010 22:02:00	0.5983	0.1274	0.1347	0.0117	0.0550	0.0307	0.0000	0.0000	0.0420	0.0000	1.0000
08/17/2010 15:56:00	0.1125	0.0750	0.2266	0.0453	0.1969	0.2406	0.0000	0.0000	0.1031	0.0000	1.0000

Sample 48196-5 Corrected Gas Composition vs. Desorbed Fraction (Lumped)

Desorbed Fraction	C_1	C_2	C_3	iC_4	nC_4	C_5+	O_2	N_2	CO_2	H_2	Total
vol. fraction	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac	mol frac
0.0000	0.8525	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1451	0.0000	1.0000
0.4095	0.7252	0.0922	0.0802	0.0069	0.0305	0.0168	0.0000	0.0000	0.0482	0.0000	1.0000
0.4995	0.6767	0.1119	0.1078	0.0094	0.0443	0.0264	0.0000	0.0000	0.0234	0.0000	1.0000
0.5454	0.5983	0.1274	0.1347	0.0117	0.0550	0.0307	0.0000	0.0000	0.0420	0.0000	1.0000
1.0000	0.1125	0.0750	0.2266	0.0453	0.1969	0.2406	0.0000	0.0000	0.1031	0.0000	1.0000
Integrated Gas Composition											
-	0.4665	0.0681	0.1334	0.0232	0.1014	0.1161	0.0000	0.0000	0.0912	0.0000	1.0000

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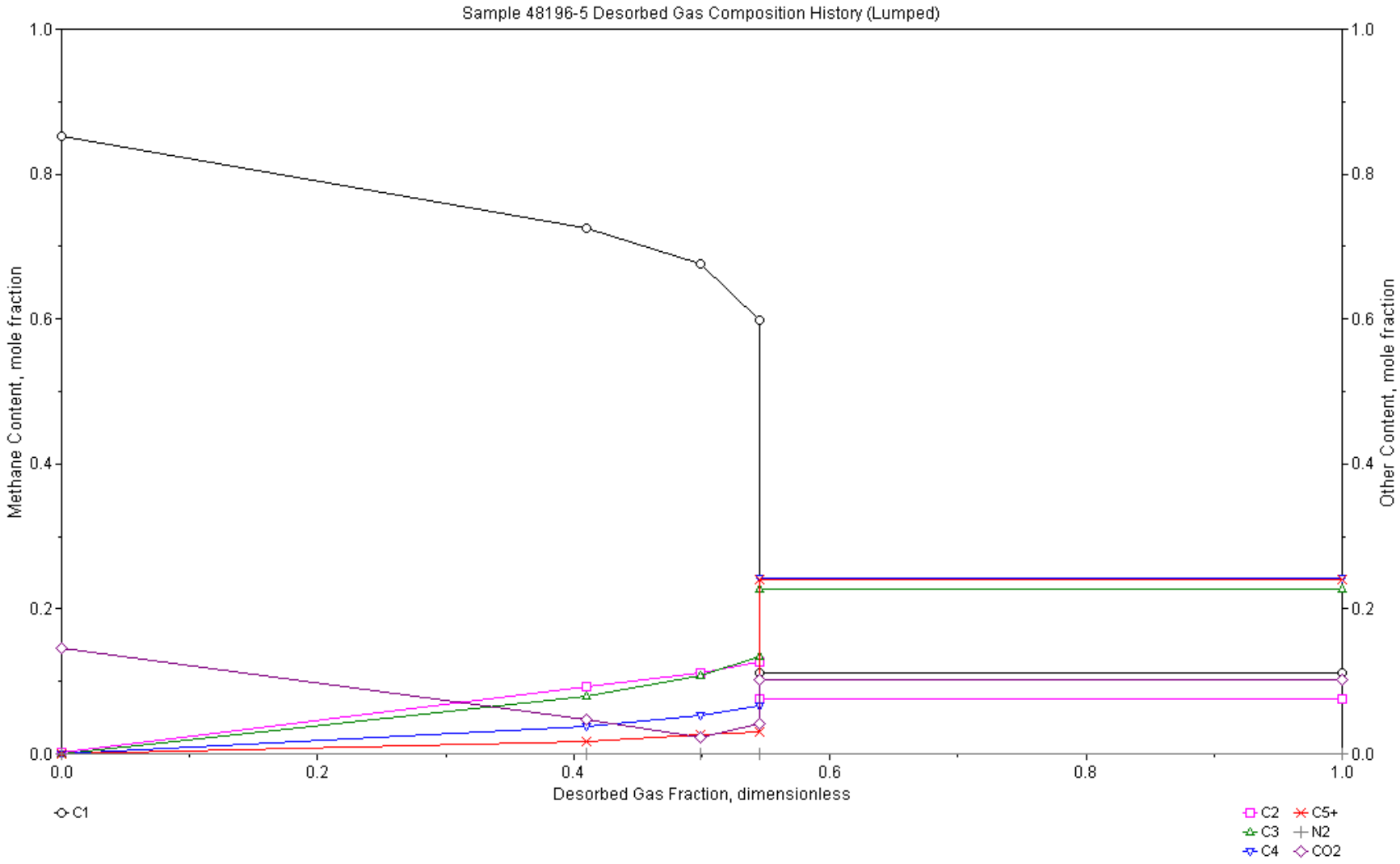

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Appendix IV

Noble Energy, Incorporated
Child VO 30-9
Niobrara Formation

Geochemical Report

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TOTAL ORGANIC CARBON, PROGRAMMED PYROLYSIS DATA

NOBLE

Well Name : Child VO 30-9	Operator :	State : WY	Project No. :
	API # :	County : Laramie	CO-48196 / CO-48196

Client ID	Depth (ft) Top	Formation	Sample Type	Sample Prep	*	Leco TOC	RE S1	RE S2	RE S3	Tmax (°C)	**	Ro,%	HI	OI	S2/S3	S1/TOC	PI	Notes Checks	Notes Pyrogram	Lab ID
1-3G	8419.4	Niobrara	Core Chip	NOPR		2.65	1.16	10.68	0.63	433			403	24	17.0	44	0.10	TOC RE	n:lts2sh	3401857321
1-9G	8425.3	Niobrara	Core Chip	NOPR		2.84	1.18	7.29	0.57	434			257	20	12.8	42	0.14	TOC	n:lts2sh	3401857323
1-19G	8435.8	Niobrara	Core Chip	NOPR		2.31	1.72	9.05	0.79	432			391	34	11.5	74	0.16	TOC	n:lts2sh	3401857325
2-9G	8445.6	Niobrara	Core Chip	NOPR		3.23	2.09	12.17	1.13	431			377	35	10.8	65	0.15	TOC	n:lts2sh	3401857327
2-15G	8451.2	Niobrara	Core Chip	NOPR		4.86	5.06	23.91	1.17	429		0.83	492	24	20.4	104	0.17	TOC RE	n:lts2sh	3401857329
2-22G	8458.2	Niobrara	Core Chip	NOPR		4.48	3.47	21.16	0.85	430			472	19	24.9	77	0.14	TOC	n:lts2sh	3401857331
2-27G	8463.7	Niobrara	Core Chip	NOPR		4.79	4.79	25.94	1.23	433			542	26	21.1	100	0.16	TOC RE	n:lts2sh	3401857333
2-33G	8469.3	Niobrara	Core Chip	NOPR		2.99	3.51	15.96	1.17	435			535	39	13.6	118	0.18	TOC	n:lts2sh	3401857335
2-39G	8475.3	Niobrara	Core Chip	NOPR		2.24	2.33	13.97	1.25	435			623	56	11.2	104	0.14	TOC	n:lts2sh	3401857337
2-42G	8478.5	Niobrara	Core Chip	NOPR		2.02	2.58	9.68	1.30	431			480	64	7.4	128	0.21	TOC	n:lts2sh	3401857339
2-48G	8484.4	Niobrara	Core Chip	NOPR		1.49	3.40	6.34	1.13	424			425	76	5.6	228	0.35	TOC	n:lts2sh	3401857341
2-57G	8493.4	Niobrara	Core Chip	NOPR		2.06	3.38	9.61	1.08	429			466	52	8.9	164	0.26	TOC	n:lts2sh	3401857343
2-69G	8505.3	Niobrara	Core Chip	NOPR		4.68	5.52	27.87	1.49	431		0.86	595	32	18.7	118	0.17	TOC RE	n:lts2sh	3401857345
2-78G	8514.4	Niobrara	Core Chip	NOPR		3.16	2.64	11.34	1.28	433			359	41	8.9	84	0.19	TOC	n:lts2sh:hts2sh	3401857347
2-87G	8523.6	Niobrara	Core Chip	NOPR		3.20	3.81	15.76	1.10	432			492	34	14.3	119	0.19	TOC	n:lts2sh	3401857349
2-93G	8529.4	Niobrara	Core Chip	NOPR		1.81	1.85	6.83	1.10	430			377	61	6.2	102	0.21	TOC	n:lts2sh	3401857351
3-4G	8533.4	Niobrara	Core Chip	NOPR		3.16	3.34	17.63	1.20	431		0.83	557	38	14.7	105	0.16	TOC	n:lts2sh	3401857353
3-9G	8538.4	Niobrara	Core Chip	NOPR		2.86	2.48	16.94	0.81	431			593	28	20.9	87	0.13	TOC RE	n:lts2sh	3401857355
3-27G	8556.4	Niobrara	Core Chip	NOPR		2.21	5.03	12.22	0.82	430			553	37	14.9	227	0.29	TOC	n:lts2sh	3401857357
3-35G	8567.5	Niobrara	Core Chip	NOPR		2.93	6.45	17.55	1.09	433			598	37	16.1	220	0.27	TOC	n:lts2sh	3401857359
3-39G	8571.2	Niobrara	Core Chip	NOPR		2.86	4.65	15.20	1.00	434			532	35	15.2	163	0.23	TOC	n:lts2sh	3401857361
3-42G	8574.8	Niobrara	Core Chip	NOPR		1.98	5.59	8.74	1.04	432		0.86	441	52	8.4	282	0.39	TOC	n:lts2sh	3401857363
3-55G	8586.4	Niobrara	Core Chip	NOPR		4.57	3.20	26.63	1.59	430		0.92	583	35	16.7	70	0.11	TOC	n:lts2sh	3401857365
3-59G	8589.8	Niobrara	Core Chip	NOPR		1.77	4.09	8.62	1.00	432			488	57	8.6	231	0.32	TOC	n:lts2sh	3401857367
3-65G	8595.3	Niobrara	Core Chip	NOPR		3.30	3.56	22.26	1.28	436			675	39	17.4	108	0.14	TOC	n	3401857369
3-68G	8598.8	Niobrara	Core Chip	NOPR		1.37	1.01	3.09	0.75	437			225	55	4.1	73	0.25	TOC	n:lts2sh:hts2sh	3401857371
3-74G	8604.3	Niobrara	Core Chip	NOPR		0.95	0.88	2.09	2.22	434			219	233	0.9	93	0.30	TOC	n	3401857373
3-83G	8613.5	Niobrara	Core Chip	NOPR		1.59	0.71	4.11	0.63	433			259	40	6.5	45	0.15	TOC	n:lts2sh	3401857375
4-3G	8625.9	Niobrara	Core Chip	NOPR		2.36	1.35	11.09	0.76	433			471	32	14.6	57	0.11	TOC RE	n:lts2sh	3401857377
4-24G	8646.6	Niobrara	Core Chip	NOPR		2.83	1.97	14.68	0.78	434		0.84	519	28	18.8	70	0.12	TOC	n:lts2sh	3401857379
4-48G	8670.7	Niobrara	Core Chip	NOPR		4.57	4.39	24.39	1.28	434			534	28	19.1	96	0.15	TOC	n	3401857381
4-75G	8697.9	Niobrara	Core Chip	NOPR		2.24	1.55	6.60	0.79	434			294	35	8.4	69	0.19	TOC	n:lts2sh	3401857383
4-84G	8706.3	Niobrara	Core Chip	NOPR		4.64	4.55	25.20	0.81	436			543	17	31.1	98	0.15	TOC	n	3401857385
4-92G	8715.4	Niobrara	Core Chip	NOPR		3.52	3.76	19.41	0.81	434			551	23	24.0	107	0.16	TOC	n	3401857387

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TOTAL ORGANIC CARBON, PROGRAMMED PYROLYSIS DATA

NOBLE

Well Name : Child VO 30-9	Operator :	State : WY	Project No. :
	API # :	County : Laramie	CO-48196 / CO-48196

Client ID	Depth (ft) Top	Formation	Sample Type	Sample Prep	*	Leco TOC	RE S1	RE S2	RE S3	Tmax (°C)	**	Ro,%	HI	OI	S2/S3	S1/TOC	PI	Notes Checks	Notes Pyrogram	Lab ID
5-11G	8725.9	Niobrara	Core Chip	NOPR		3.63	3.88	19.88	0.85	433			548	23	23.4	107	0.16	TOC	n	3401857389
5-17G	8731.8	Niobrara	Core Chip	NOPR		4.79	6.73	26.13	0.76	434			546	16	34.4	141	0.20	TOC	n:lts2sh	3401857391
5-21G	8735.3	Niobrara	Core Chip	NOPR		7.35	8.08	37.65	0.70	433		0.80	512	10	53.8	110	0.18	TOC	n:lts2sh	3401857393
5-26G	8740.2	Niobrara	Core Chip	NOPR		4.98	6.21	27.05	0.86	435			543	17	31.5	125	0.19	TOC	n:lts2sh	3401857395
6-9G	8759.9	Niobrara	Core Chip	NOPR		0.12	0.17	0.09	0.76	421	**		76	644	0.1	146	0.66	TOC	n:lts2sh	3401857397
6-12G	8762.2	Niobrara	Core Chip	NOPR		0.43	0.88	0.87	1.71	420			202	397	0.5	204	0.50	TOC	n	3401857399
6-27G	8777.9	Niobrara	Core Chip	NOPR		0.54	0.64	0.83	1.00	434			153	185	0.8	117	0.43	TOC	n	3401857401
6-30G	8780.5	Niobrara	Core Chip	NOPR		0.61	0.95	1.53	0.88	432			249	143	1.7	155	0.38	TOC	n:lts2sh	3401857403
6-35G	8785.9	Niobrara	Core Chip	NOPR		0.65	0.60	0.91	0.67	438			140	103	1.4	92	0.40	TOC	n:lts2sh	3401857405
6-39G	8789.9	Niobrara	Core Chip	NOPR		0.56	1.05	1.14	0.78	431			205	140	1.5	189	0.48	TOC	n:lts2sh	3401857407
6-42G	8792.2	Niobrara	Core Chip	NOPR		0.66	1.22	1.66	2.59	436			251	392	0.6	184	0.42	TOC	n:lts2sh	3401857409

Notes:

"-1" – not measured or invalid value for Tmax
TOC - Total Organic Carbon, wt. %
S1 - volatile hydrocarbon (HC) content, mg HC/ g rock
S2 - remaining HC generative potential, mg HC/ g rock
S3 - carbon dioxide content, mg CO2 / g rock

* - comments regarding contamination
** - low S2, Tmax is unreliable
Meas. %Ro - measured vitrinite reflectance
HI - Hydrogen index = S2 x 100 / TOC, mg HC/ g TOC
OI - Oxygen Index = S3 x 100 / TOC, mg CO2/ g TOC
PI - Production Index = S1 / (S1+S2)

Pyrogram:

f - flat S2 peak
n - normal
ltS2sh - low temperature S2 shoulder
htS2sh - high temperature S2 shoulder
ltS2p - low temperature S2 peak
htS2p - high temperature S2 peak

LECO – TOC on Leco Instrument
RE - Programmed pyrolysis or TOC on Rock-Eval instrument
SRA – Programmed pyrolysis by SRA Instrument
EXT - Extracted Rock
NOPR - Normal Preparation

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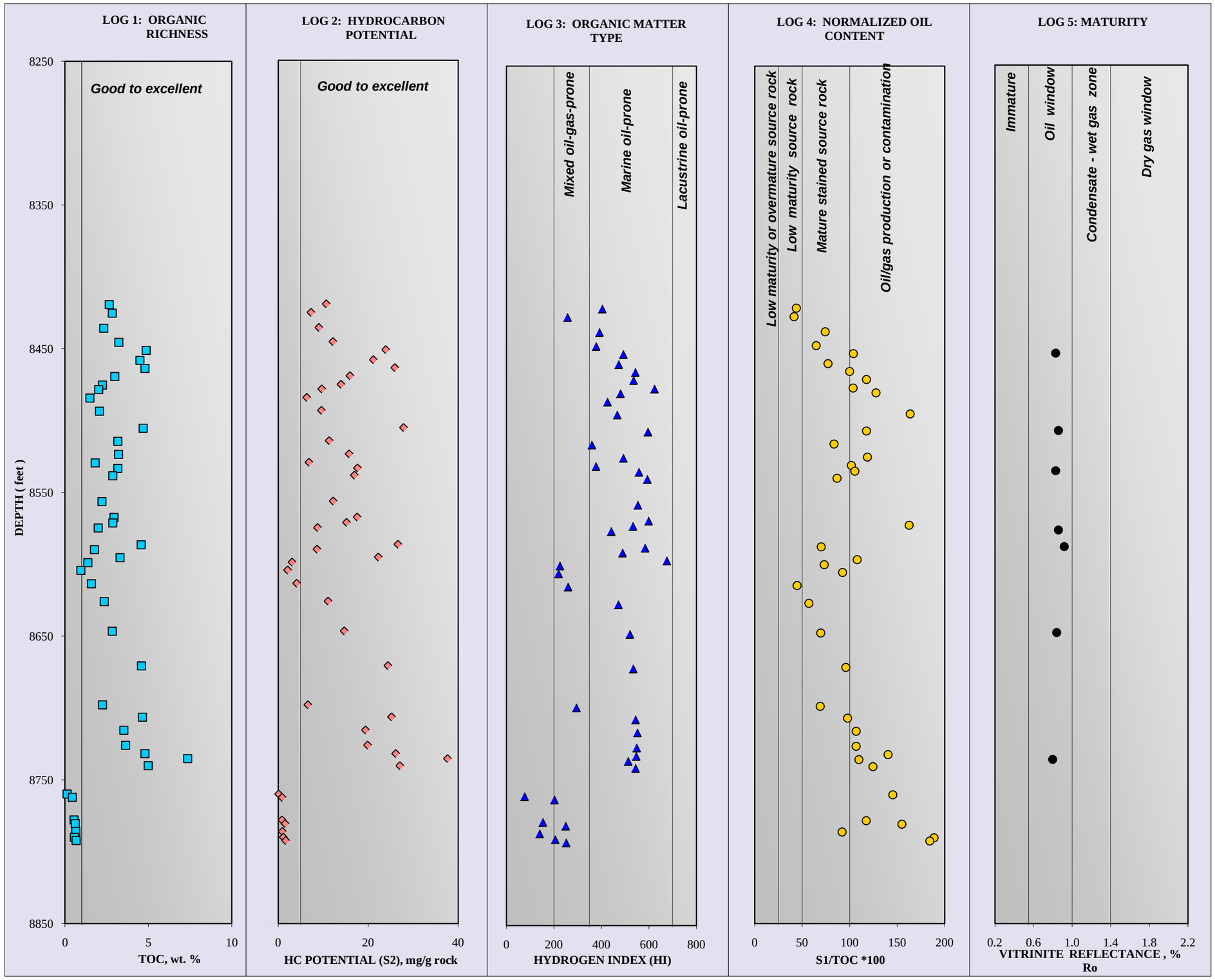
GEOCHEMICAL LOGS - Child VO 30-9

Company: NOBLE | **Project #: CO-48196 / CO-48196**



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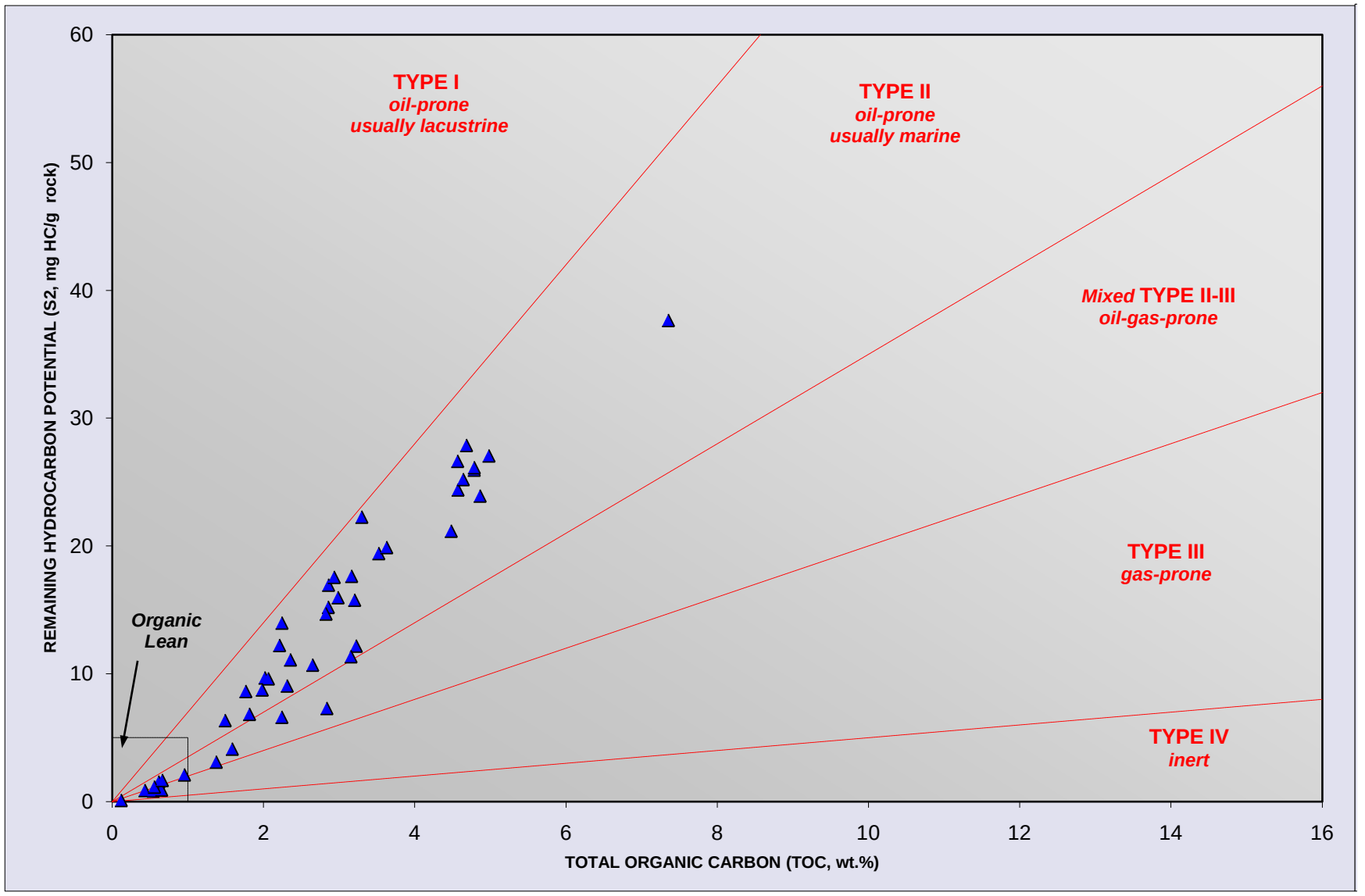
KEROGEN QUALITY PLOT - Child VO 30-9

Company: NOBLE **Project #: CO-48196 / CO-48196**



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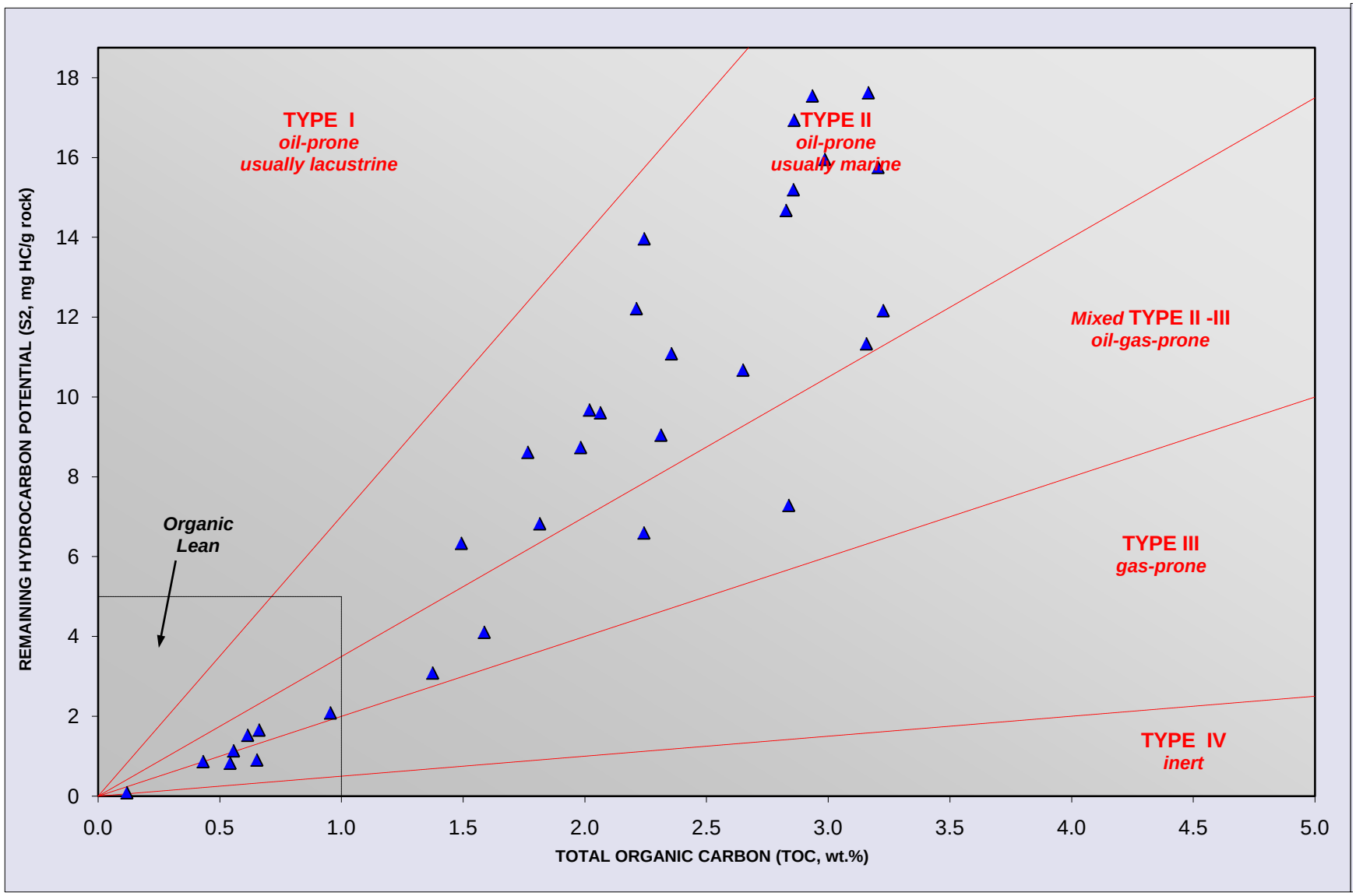
KEROGEN QUALITY PLOT - Child VO 30-9

Company: NOBLE **Project #: CO-48196 / CO-48196**



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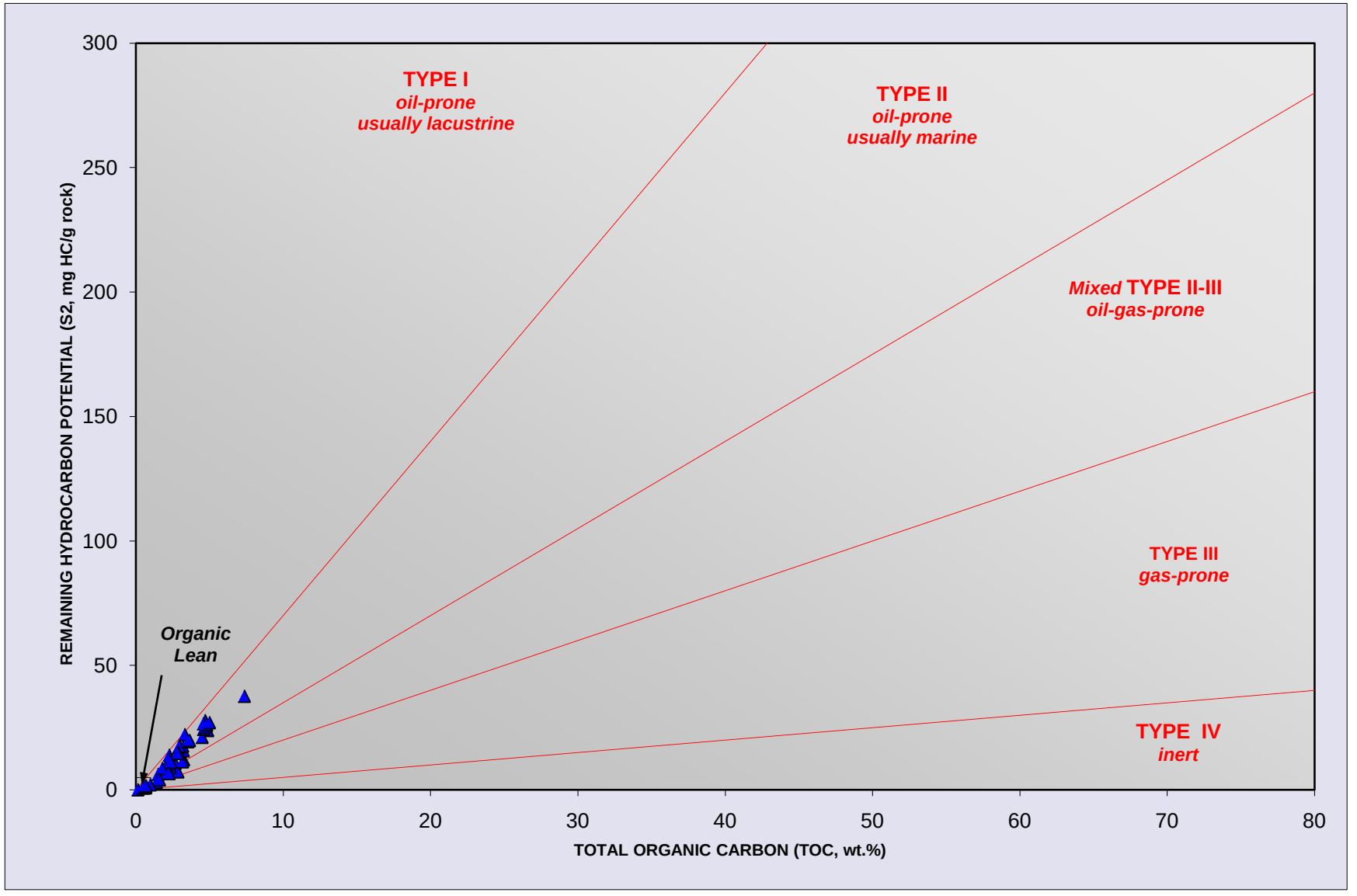
KEROGEN QUALITY PLOT - Child VO 30-9

Company: NOBLE **Project #: CO-48196 / CO-48196**



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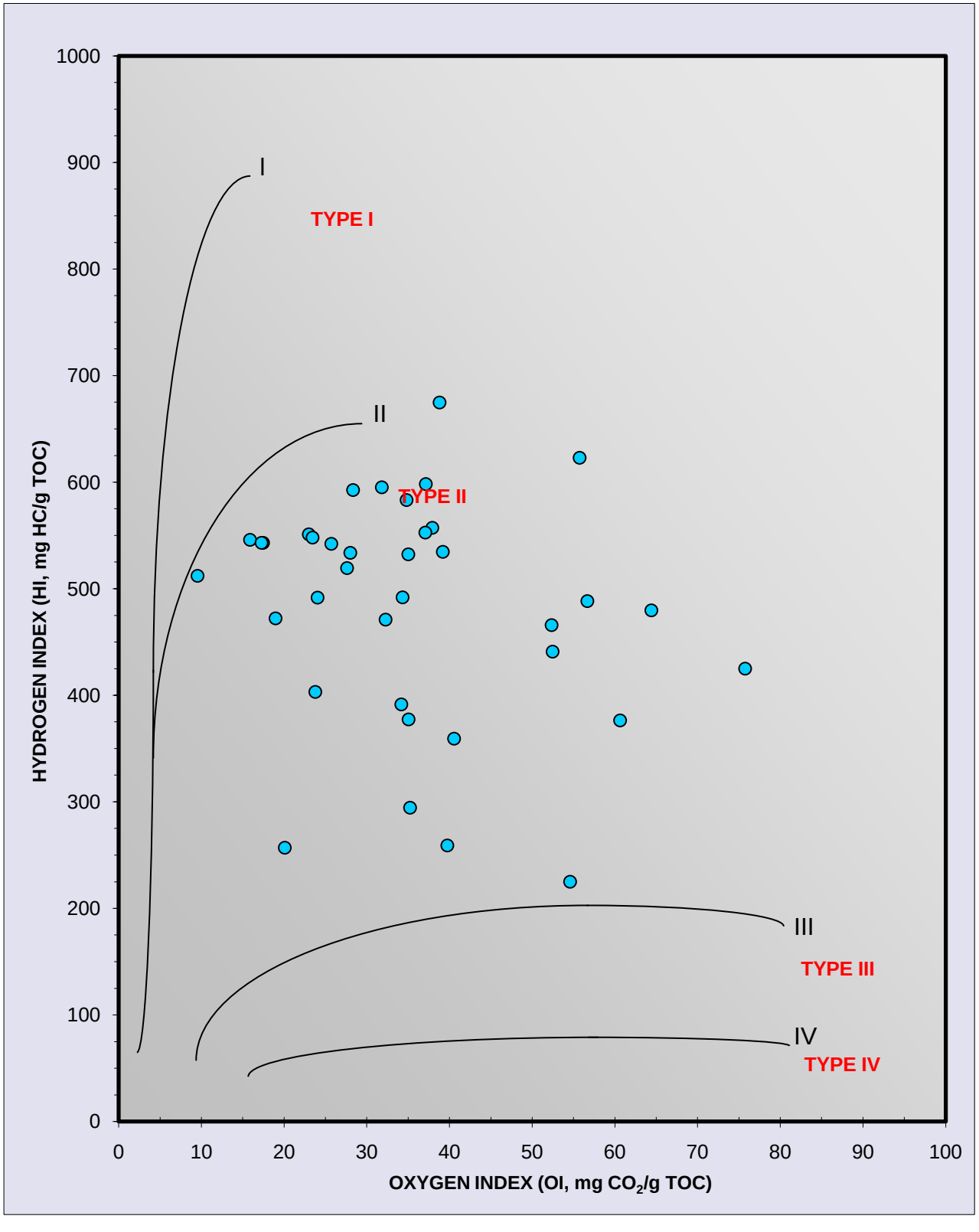
KEROGEN TYPE - Child VO 30-9

Company: NOBLE **Project #: CO-48196 / CO-48196**



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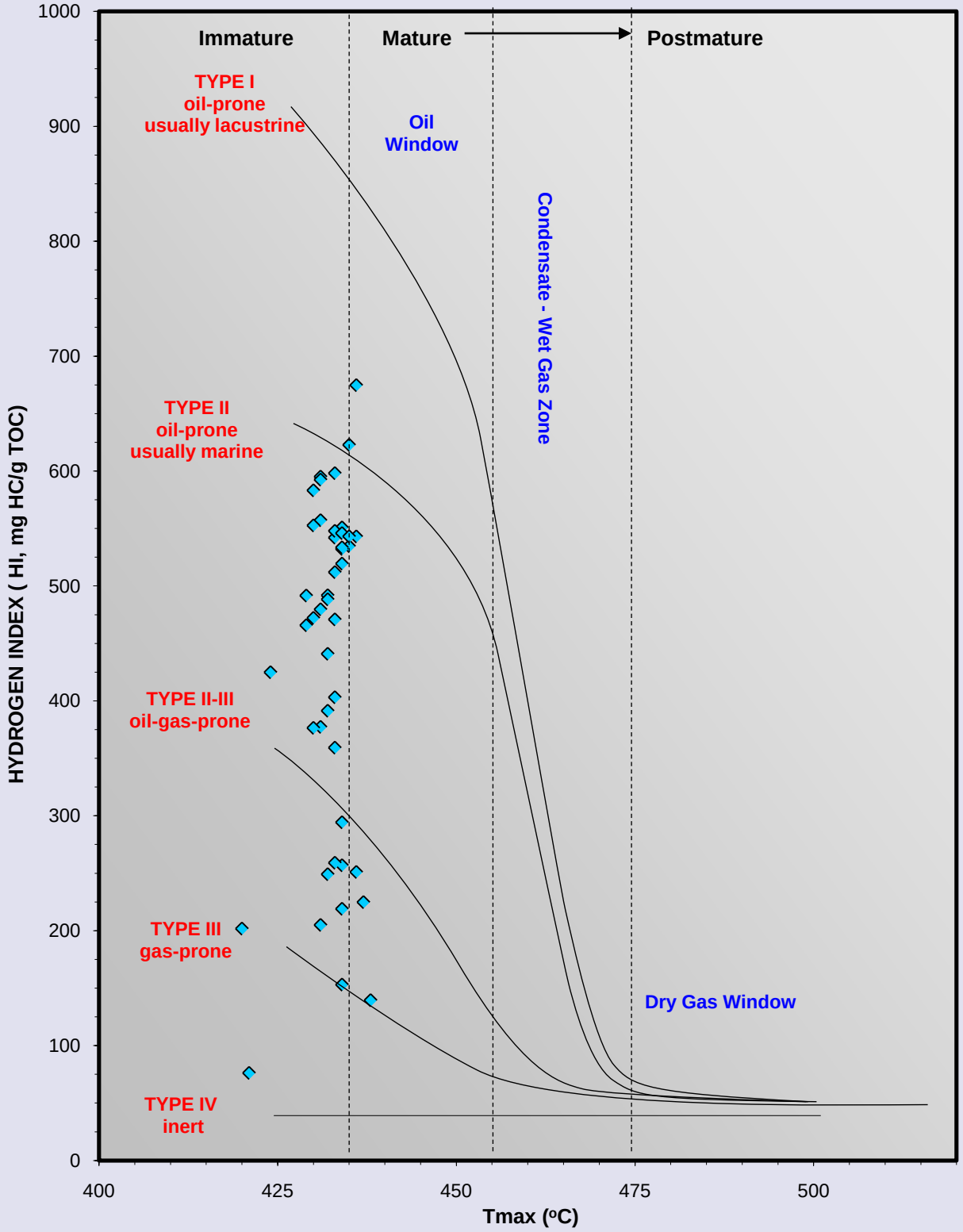
KEROGEN TYPE AND MATURITY (Tmax) - Child VO 30-9

Company: NOBLE **Project #: CO-48196 / CO-48196**



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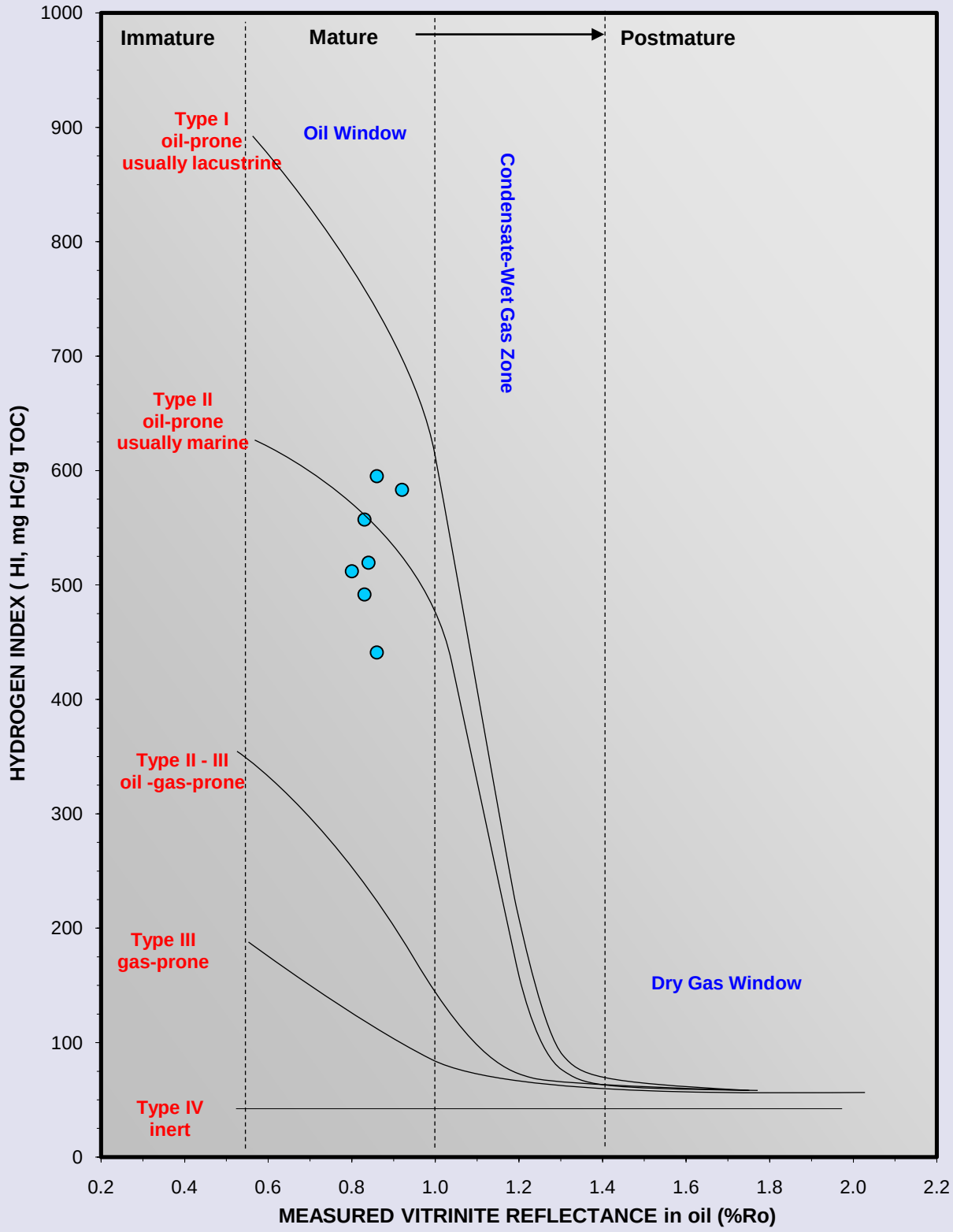
KEROGEN TYPE AND MATURITY (%Ro) - Child VO 30-9

Company: NOBLE **Project# : CO-48196 / CO-48196**



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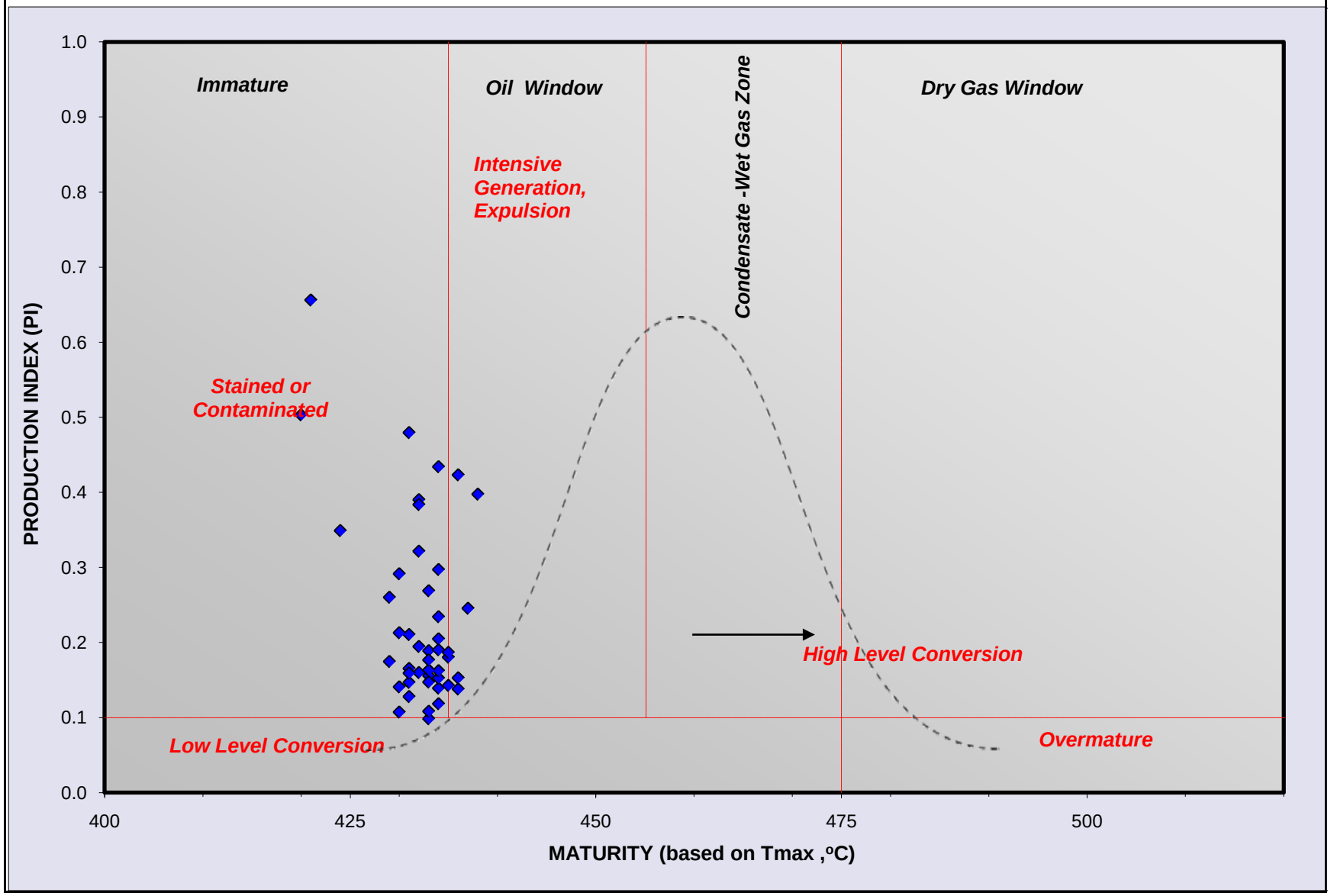
KEROGEN CONVERSION AND MATURITY (Tmax) - Child VO 30-9

Company: NOBLE | **Project #: CO-48196 / CO-48196**



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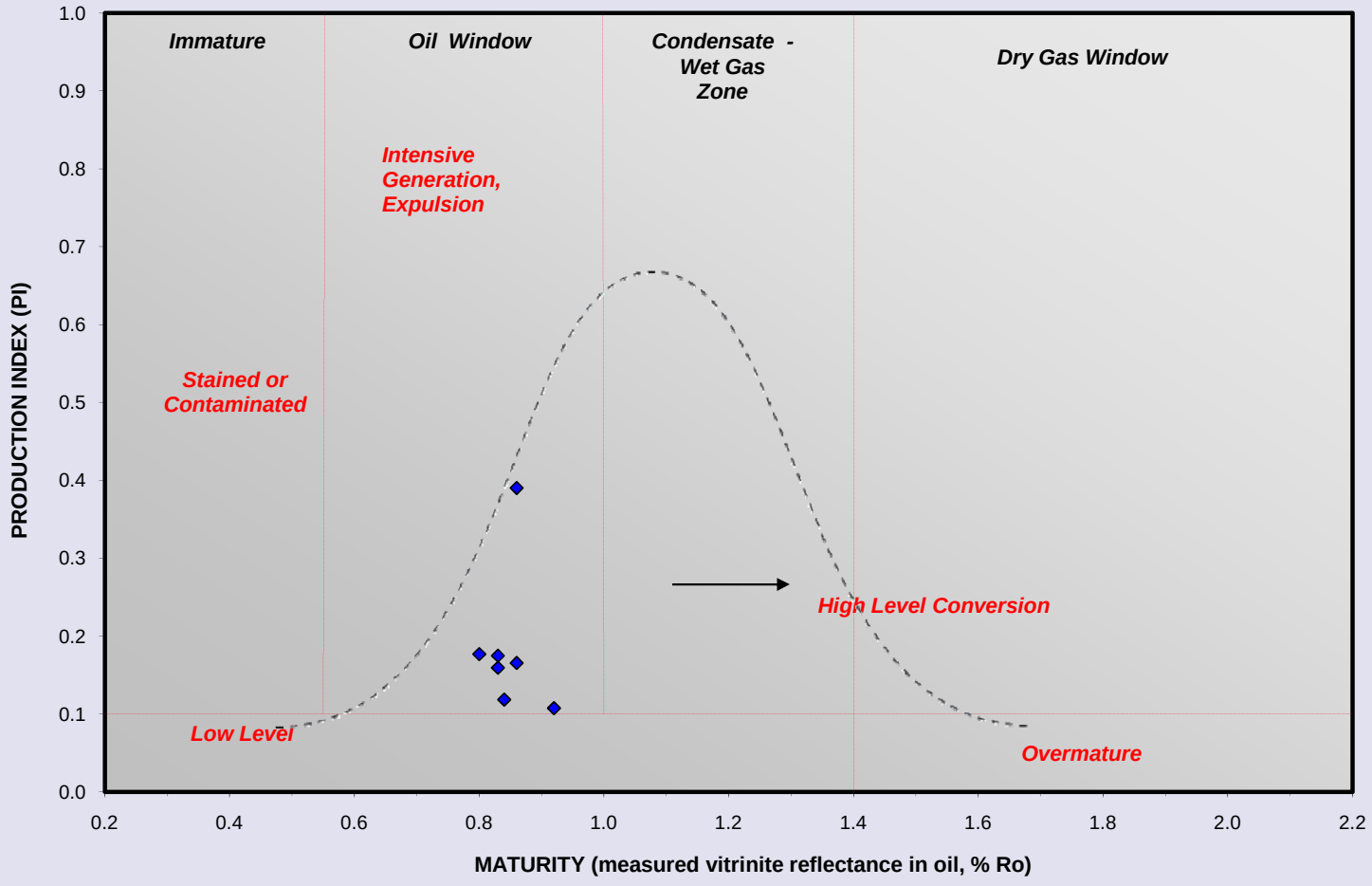
KEROGEN CONVERSION AND MATURITY (%Ro) - Child VO 30-9

Company: NOBLE **Project #: CO-48196 / CO-48196**



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Appendix V

Noble Energy, Incorporated
Child VO 30-9
Niobrara Formation

Adsorption Isotherm Results

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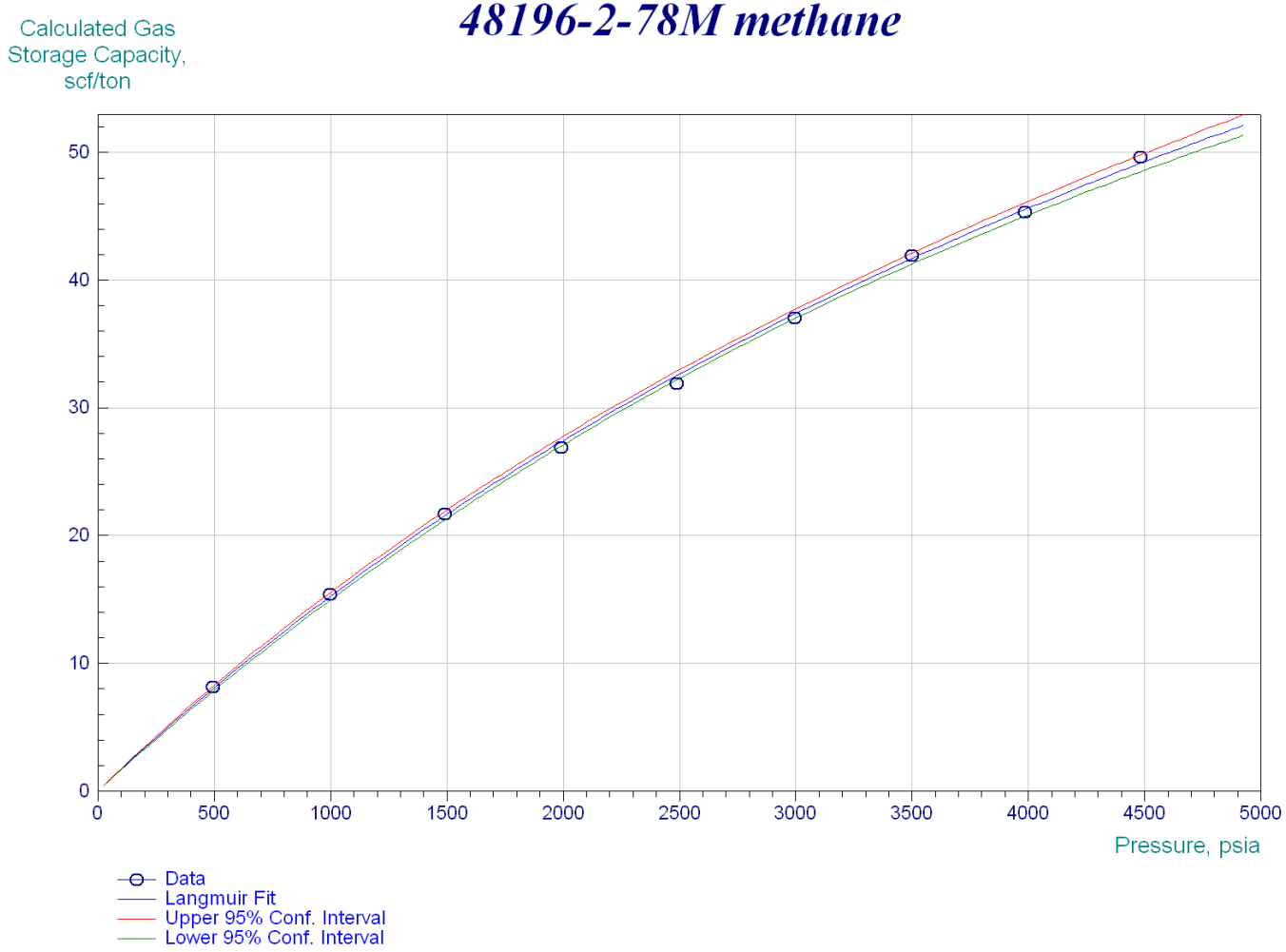
Sample 48196-2-78M Methane Adsorption Isotherm Parameters

Parameter	Unit	Value
Top Depth	ft	8,514.00
Bottom Depth	ft	8,514.10
Sample Parameters		
Measurement Gas	-	methane
Measurement Temperature	°F	199.9
Total Organic Carbon	wt frac	0.0372
Crushed Density	g/cm^3	2.476
Porosity	vol frac	0.0750
Gas Saturation	vol frac	0.2090
Quartz Content	wt frac	0.080
Clay Content	wt frac	0.160
Other Content	wt frac	0.760
Langmuir Parameters		
Number of Points	-	11
Regression Coefficient	-	0.9968
Langmuir Storage Capacity, Organic Fraction	scf/ton	3,645.35
Langmuir Storage Capacity, In-Situ	scf/ton	135.61
Langmuir Storage Capacity Range, In-Situ	scf/ton	1.59
Langmuir Pressure	psia	7,885.95
Langmuir Pressure Range	psia	271.09

Sample 48196-2-78M Methane Adsorption Isotherm Data

Pressure	Storage Capacity, in-situ
psia	scf/ton
496.11	8.14
998.54	15.41
1,493.33	21.68
1,992.81	26.92
2,487.38	31.94
2,996.16	37.02
3,499.85	41.89
3,983.77	45.32
4,480.96	49.61
3,983.77	45.32
4,480.96	49.61

48196-2-78M methane



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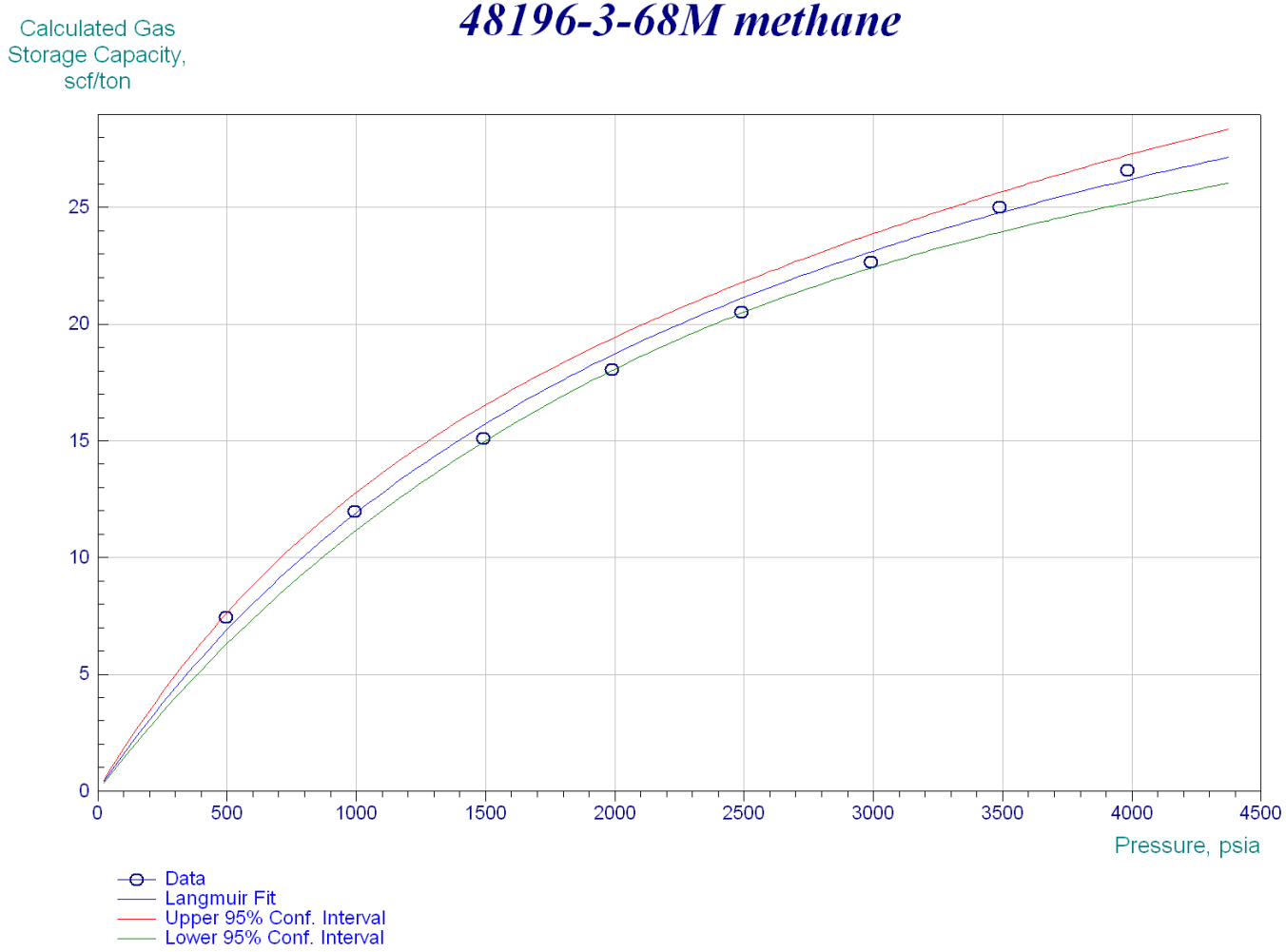
Sample 48196-3-68M Methane Adsorption Isotherm Parameters

Parameter	Unit	Value
Top Depth	ft	8,598.60
Bottom Depth	ft	8,598.65
Sample Parameters		
Measurement Gas	-	methane
Measurement Temperature	°F	199.9
Total Organic Carbon	wt frac	0.0169
Crushed Density	g/cm^3	2.483
Porosity	vol frac	0.0950
Gas Saturation	vol frac	0.4160
Quartz Content	wt frac	0.020
Clay Content	wt frac	0.040
Other Content	wt frac	0.940
Langmuir Parameters		
Number of Points	-	9
Regression Coefficient	-	0.9933
Langmuir Storage Capacity, Organic Fraction	scf/ton	2,583.93
Langmuir Storage Capacity, In-Situ	scf/ton	43.67
Langmuir Storage Capacity Range, In-Situ	scf/ton	0.69
Langmuir Pressure	psia	2,663.15
Langmuir Pressure Range	psia	303.19

Sample 48196-3-68M Methane Adsorption Isotherm Data

Pressure	Storage Capacity, in-situ
psia	scf/ton
494.01	7.45
992.88	11.96
1,489.40	15.10
1,987.93	18.05
2,489.33	20.51
2,988.95	22.65
3,486.39	25.03
3,982.22	26.59
3,982.22	26.59

48196-3-68M methane



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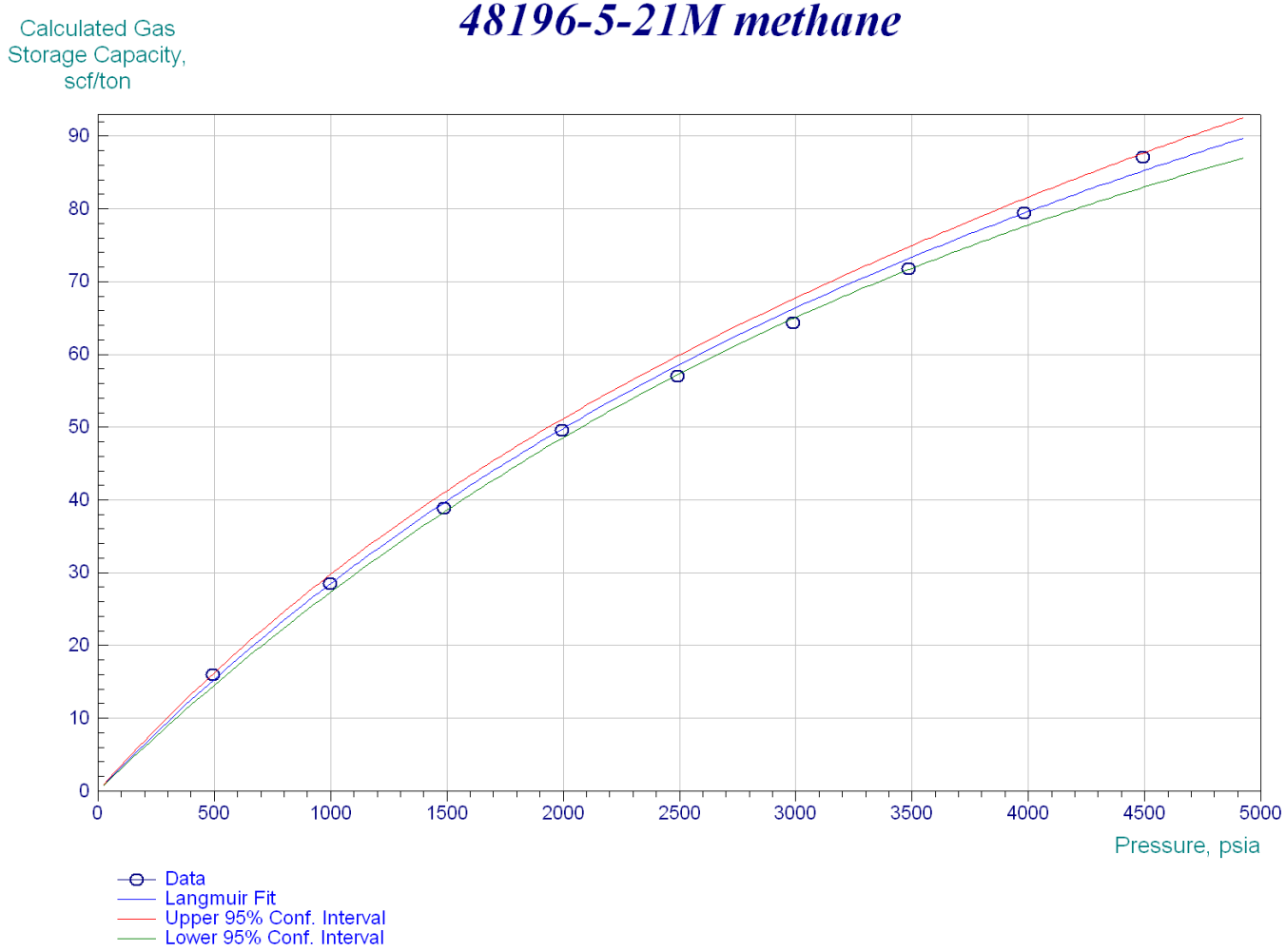
Sample 48196-5-21M Methane Adsorption Isotherm Parameters

Parameter	Unit	Value
Top Depth	ft	8,735.10
Bottom Depth	ft	8,735.20
Sample Parameters		
Measurement Gas	-	methane
Measurement Temperature	°F	199.9
Total Organic Carbon	wt frac	0.0767
Crushed Density	g/cm^3	2.429
Porosity	vol frac	0.0500
Gas Saturation	vol frac	0.0840
Quartz Content	wt frac	0.130
Clay Content	wt frac	0.210
Other Content	wt frac	0.660
Langmuir Parameters		
Number of Points	-	11
Regression Coefficient	-	0.9905
Langmuir Storage Capacity, Organic Fraction	scf/ton	2,581.38
Langmuir Storage Capacity, In-Situ	scf/ton	197.99
Langmuir Storage Capacity Range, In-Situ	scf/ton	3.93
Langmuir Pressure	psia	5,947.27
Langmuir Pressure Range	psia	423.94

Sample 48196-5-21M Methane Adsorption Isotherm Data

Pressure	Storage Capacity, in-situ
psia	scf/ton
493.01	16.00
996.69	28.57
1,489.07	38.88
1,993.55	49.54
2,489.89	57.07
2,987.38	64.30
3,484.01	71.73
3,980.96	79.38
4,489.36	87.03
3,980.96	79.38
4,489.36	87.03

48196-5-21M methane



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