ERCB/AGS Open File Report 2010-05

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Rock Eval™, Total Organic Carbon and Adsorption Isotherms of the Montney Formation in Alberta: Shale Gas Data Release

Energy Resources Conservation Board

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Alberta Geological Survey

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Abstract

This report is a data release of Rock Eval™, total organic carbon and adsorption isotherms for selected samples of the Montney Formation generated for the Energy Resources Conservation Board/Alberta Geological Survey project on shale gas resources in Alberta. A few samples were also taken in adjoining formations, such as the Nordegg, Belloy and Doig. This data release complements other reports and data from the same project, as listed.

1 Introduction

The Energy Resources Conservation Board/Alberta Geological Survey (ERCB/AGS) initiated a project in 2007 to evaluate shale gas resources in Alberta and to determine the quantity and spatial extent of these resources. Alberta Geological Survey is releasing a series of reports to disseminate data and knowledge from the project. The first formations chosen for evaluation were the Colorado Group (Beaton et al., 2009a; Pawlowicz et al., 2009b) and the Banff and Exshaw formations (Beaton et al., 2009b; Pawlowicz et al., 2009a). Readers can download these publications from the AGS website (http://www.ags.gov.ab.ca/publications).

This report disseminates results from adsorption isotherms, Rock Eval™ and total organic carbon (TOC) analysis associated with the Montney Formation. In addition to the analyses listed above, AGS ran a series of analyses on core samples (Table 1). The data generated from the project will be combined with additional data to map and estimate shale gas resources in Alberta.

Table 1. Analyses performed on core samples and the organization that performed the analyses as part of the shale gas resource evaluation project.

Analysis Type	Company/Analyst	References
Adsorption isotherms	Schlumberger/TerraTek	Beaton et al. (2010c), this report
Mercury porosimetry, and helium pycnometry	Department of Physics, University of Alberta (D. Schmitt)	Anderson et al. (2010a, b)
Permeametry	Department of Earth and Atmospheric Sciences, University of Alberta (M. Gingras)	Anderson et al. (2010a, b)
Rock Eval™/TOC	Geological Survey of Canada; Schlumberger/TerraTek	Beaton et al. (2010c), this report
Organic petrography	Geological Survey of Canada (J. Reyes)	Beaton et al. (2010a, b)
Petrographic analysis (thin section)	Vancouver Petrographics	Work in progress
Scanning electron microscope (SEM) with energy-dispersive X-ray (EDX)	Department of Earth and Atmospheric Sciences, University of Alberta (D-A. Rollings, G. Braybrook)	Anderson et al. (2010a, b)
X-Ray diffraction (bulk and clay mineral)	SGS Minerals Services Ltd. (H. Zhou)	Anderson et al. (2010a, b)

2 Sample Location and Description

Figure 1 displays all core sample sites associated with the Montney Formation. Table 2 and Appendix 1 list the precise locations of the sample sites.

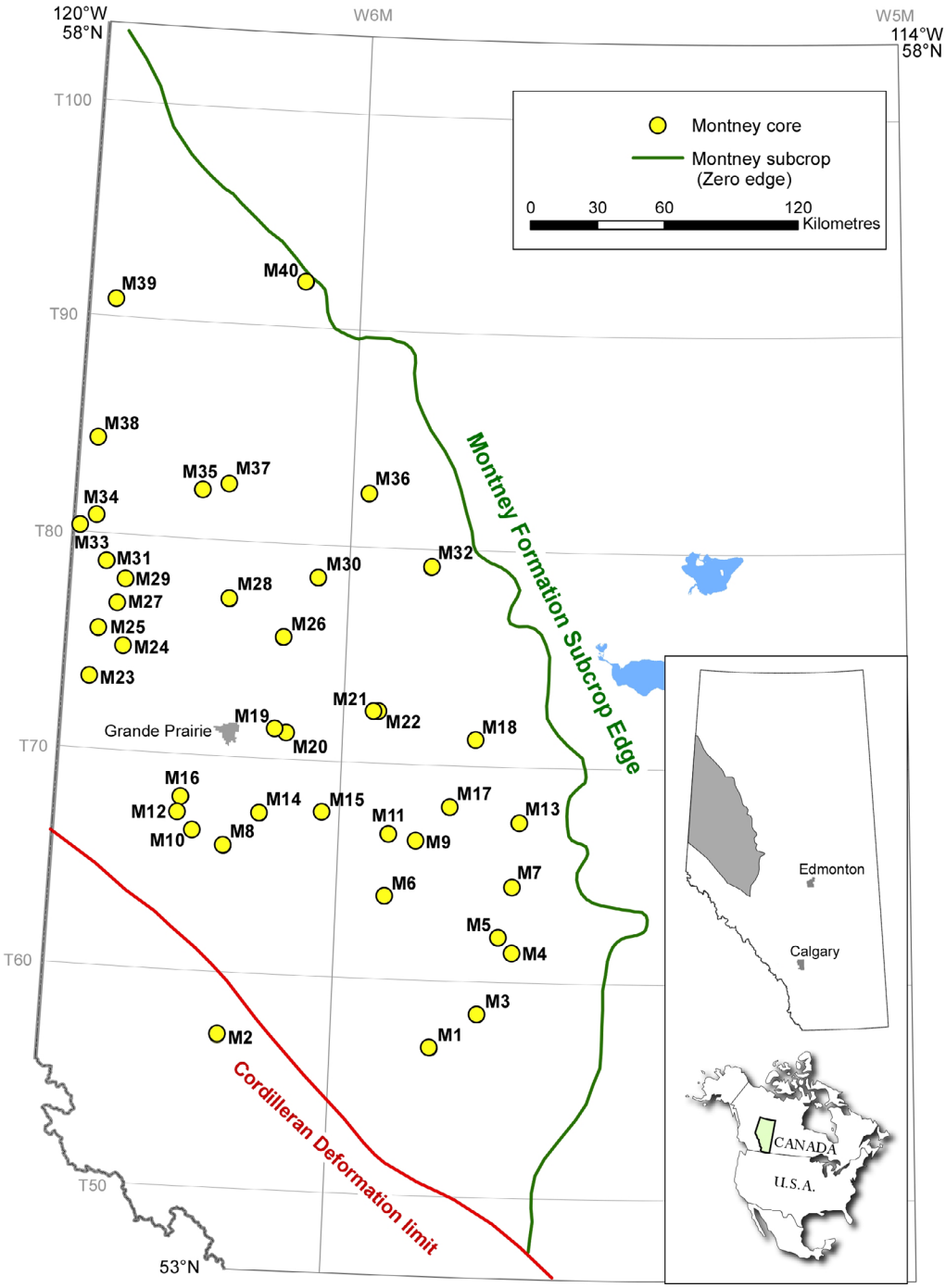

Figure 1. Core sites sampled for the Montney Formation. See Table 2 and Appendix 1 for a list of all sites and Appendix 2 for the type of analyses run on the samples.

Table 2. Core sample sites in the Montney Formation. Figure 1 shows the site numbers.

Site No.	Location UWI	Well Name	Latitude NAD 83	Longitude NAD 83	Year Drilled	No. of Samples
M1	100/11-14-057-23W5/00	TALISMAN WILDR 11-14-57-23	53.928046	-117.314072	1995	6
M2	100/16-23-057-06W6/00	ANDERSON FINDLEY 16-23-57-6	53.945460	-118.771591	1976	25
M3	100/04-06-059-20W5/00	MOBIL ET AL FIR 4-6-59-20	54.068135	-116.995887	1997	8
M4	102/11-34-061-19W5/00	BRLINGTON ETAL 102 FOXCK 11-34-61-19	54.320254	-116.767810	1996	7
M5	100/11-24-062-20W5/00	PENN WEST KAYBOBS 11-24-62-20	54.379782	-116.867662	1970	8
M6	100/07-14-064-25W5/00	DELPHI SIMONN 7-14-64-25	54.535464	-117.664978	1984	8
M7	103/10-34-064-19W5/00	TRILOGY ET AL 03 KAYBOB 10-34-64-19	54.584938	-116.780560	1996	7
M8	100/06-14-066-06W6/00	ANDERSON ET AL BILBO 6-14-66-6	54.710226	-118.798055	1979	6
M9	100/16-31-066-23W5/00	NCE ENER ANTE 16-31-66-23	54.759431	-117.460327	1980	7
M10	100/07-05-067-07W6/00	AMOCO ET AL BIG MOUNTAIN 7-5-67-7	54.768110	-119.025448	1977	7
M11	100/12-07-067-24W5/00	ARC ANTE CREEK 12-7-67-24	54.788150	-117.658255	1996	9
M12	100/14-27-067-08W6/00	DEVON WAPITI 14-27-67-8	54.835461	-119.131850	1998	7
M13	100/13-31-067-18W5/00	PARA ET AL GOOSE RIVER 13-31-67-18	54.847060	-116.741498	1998	5
M14	100/13-33-067-04W6/00	CEQUEL GOLDCK 13-33-67-4	54.847494	-118.556477	1995	4
M15	100/13-05-068-01W6/00	IMP ECONOMY 13-5-68-1	54.863502	-118.124671	1992	9
M16	100/06-23-068-08W6/00	NORTHROCK ET AL WAPITI 6-23-68-8	54.898674	-119.111277	1980	5
M17	100/05-24-068-22W5/00	CHARIOT STURLS 5-24-68-22	54.899835	-117.227282	1958	8
M18	100/02-30-071-20W5/00	BARR STUMP 2-30-71-20	55.174071	-117.059408	1996	6
M19	100/11-28-071-03W6/00	BIRCHCLIFF BEZAN 11-28-71-3	55.178479	-118.397982	1993	15
M20	100/06-36-071-04W6/00	BIRCHCLIFF GRANPR 6-36-71-4	55.191378	-118.475701	1993	14
M21	100/06-33-072-25W5/00	PCP DEBOLT 6-33-72-25	55.278609	-117.787914	1997	6
M22	100/06-34-072-25W5/00	PCP DEBOLT 6-34-72-25	55.279487	-117.763567	1997	6
M23	100/05-32-073-12W6/00	NORTHROCK ET AL SINCLAIR 5-32-73-12	55.363395	-119.815440	1999	7
M24	100/01-14-075-11W6/00	RIGEL ET AL VALHALLA 1-14-75-11	55.493733	-119.583341	1995	7
M25	100/06-03-076-12W6/00	DOME SULPETRO GLACIER 6-3-76-12	55.554749	-119.772543	1981	6
M26	100/15-06-076-03W6/00	PPCL KAKUT 15-6-76-3	55.560441	-118.451191	1992	8
M27	100/14-09-077-11W6/00	NORCEN POUCE COUPES 14-9-77-11	55.661617	-119.647542	1982	4
M28	100/11-27-077-06W6/00	CNRL RYCROFT 11-27-77-6	55.704273	-118.845833	2001	4
M29	100/05-14-078-11W6/00	AECOG (W) PCOUPES 5-14-78-11	55.760386	-119.594242	1993	7
M30	102/11-34-078-02W6/00	TALISMAN 102 ET AL BELLOY 11-34-78-2	55.805873	-118.221355	1997	8
M31	100/06-12-079-12W6/00	AECOG (W) GRDONDLE 6-12-79-12	55.831641	-119.737689	1993	7
M32	102/14-20-079-22W5/00	ANDERSON NORMANDVILLE 14-20-79-22	55.867389	-117.411478	1999	5
M33	100/12-27-080-13W6/00	STAR POUCE COUPE 12-27-80-13	55.966743	-119.952010	1997	4
M34	100/15-08-081-12W6/00	TALISMAN POUCE COUPE 15-8-81-12	56.011155	-119.835654	1994	6
M35	100/14-30-082-07W6/00	STRATAGEM BLUEB 14-30-82-7	56.141571	-119.090112	1998	9
M36	100/11-32-082-25W5/00	ADAMANT BERWYN 11-32-82-25	56.154459	-117.882771	1996	7
M37	102/13-04-083-06W6/00	TRICENT ET AL OAK 13-4-83-6	56.171475	-118.895792	1984	2
M38	100/04-32-084-12W6/00	INVERNESS SCEPTRE BDLKS 4-32-84-12	56.322217	-119.866817	1991	6
M39	102/01-14-091-12W6/00	JAVELIN CLEAR PR 1-14-91-12	56.889041	-119.804180	1999	5
M40	100/10-21-092-03W6/00	EXCEL ET AL CUB 10-21-92-3	56.998193	-118.411471	1972	8
					Total samples	293

Legend

Column Label	Label Description
Site No.	AGS site location number
Location UWI	Well location - unique well identifier
Well Name	Name assigned to well when drilling began
Latitude NAD 83	Well location - degrees latitude, North American Datum 1983
Longitude NAD 83	Well location - degrees longitude, North American Datum 1983
Year Drilled	Year the well was drilled
No. of Samples	Number of samples taken from the core

3 Analytical Methods and Results

A total of 293 core samples was selected for analysis. The analyses itemized in Table 1 were performed on selected samples, as indicated in Appendix 2.

Schlumberger/TerraTek performed the adsorption isotherm analysis along with Rock Eval 6 and total organic carbon (TOC) analyses on selected samples. The Geological Survey of Canada carried out Rock Eval 6 and TOC analysis on the majority of samples. References for the methodology are Bustin and Nassichuk (2002) and Mavor and Nelson (1997) for isotherms, and Lafargue et al. (1996) for Rock Eval and TOC.

Appendices 3 and 4 display the tabulated data. Adsorption isotherms indicate the gas storage capacity of the organic matter within a sample. Rock Eval and TOC indicate the current amount of hydrocarbon in a sample and the potential for in situ kerogen to generate hydrocarbon. Total organic carbon indicates total organic matter (suggestive of hydrocarbon potential); this dataset is useful in determining hydrocarbon potential of a sample.

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Appendices

Appendix 1 – Montney Formation Core Sample Location, Depth and Lithology

Legend

Column Label	Label Description
Sample No.	AGS sample number
Site No.	AGS site location number
Location UWI	Well location - unique well identifier
Sample Depth (metres)	Depth of core sample in metres (measured from core)
Lithology	Brief lithological description of sample
Formation/Group	Geological formation or group at depth of sample

Sample No.	Site No.	Location UWI	Sample Depth (metres)	Lithology	Formation/Group
8113	M25	100/06-03-076-12W6/00	2606.4	siltstone	Montney
8114	M25	100/06-03-076-12W6/00	2617.0	siltstone	Montney
8115	M25	100/06-03-076-12W6/00	2618.8	siltstone	Montney
8116	M25	100/06-03-076-12W6/00	2622.5	siltstone	Montney
8117	M25	100/06-03-076-12W6/00	2629.1	siltstone	Montney
8118	M25	100/06-03-076-12W6/00	2639.9	siltstone	Montney
8119	M14	100/13-33-067-04W6/00	2358.2	siltstone	Montney
8120	M14	100/13-33-067-04W6/00	2366.2	siltstone	Montney
8121	M14	100/13-33-067-04W6/00	2372.5	siltstone	Montney
8122	M14	100/13-33-067-04W6/00	2379.4	siltstone	Montney
8123	M33	100/12-27-080-13W6/00	1741.1	sandstone	Montney
8124	M33	100/12-27-080-13W6/00	1743.9	silty shale	Montney
8125	M33	100/12-27-080-13W6/00	1751.0	sandstone	Montney
8126	M33	100/12-27-080-13W6/00	1758.0	sandstone	Montney
8131	M37	102/13-04-083-06W6/00	1080.5	mudstone	Nordegg
8132	M37	102/13-04-083-06W6/00	1088.9	siltstone	Doig
8701	M27	100/14-09-077-11W6/00	2271.6	siltstone	Montney
8702	M27	100/14-09-077-11W6/00	2276.0	siltstone	Montney
8703	M27	100/14-09-077-11W6/00	2279.9	shaley siltstone	Montney
8704	M27	100/14-09-077-11W6/00	2281.5	siltstone	Montney
8705	M28	100/11-27-077-06W6/00	1741.2	siltstone	Montney
8706	M28	100/11-27-077-06W6/00	1746.6	silty sandstone	Montney
8707	M28	100/11-27-077-06W6/00	1750.2	siltstone	Montney
8708	M28	100/11-27-077-06W6/00	1751.1	siltstone	Montney
8709	M29	100/05-14-078-11W6/00	2189.9	siltstone	Montney
8710	M29	100/05-14-078-11W6/00	2193.5	siltstone	Montney
8711	M29	100/05-14-078-11W6/00	2200.9	siltstone	Montney
8712	M29	100/05-14-078-11W6/00	2206.2	siltstone	Montney
8713	M29	100/05-14-078-11W6/00	2214.4	siltstone	Montney
8714	M29	100/05-14-078-11W6/00	2220.9	siltstone	Montney
8715	M29	100/05-14-078-11W6/00	2255.5	siltstone	Montney
8716	M20	100/06-36-071-04W6/00	1889.2	siltstone and sandstone	Montney
8717	M20	100/06-36-071-04W6/00	1894.6	siltstone	Montney
8718	M20	100/06-36-071-04W6/00	1899.4	siltstone	Montney
8719	M20	100/06-36-071-04W6/00	1903.6	sandy siltstone	Montney
8720	M20	100/06-36-071-04W6/00	1907.5	siltstone	Montney
8721	M20	100/06-36-071-04W6/00	1911.1	siltstone	Montney
8722	M20	100/06-36-071-04W6/00	1916.6	sandstone	Montney
8723	M20	100/06-36-071-04W6/00	1919.2	siltstone	Montney
8724	M20	100/06-36-071-04W6/00	1922.6	siltstone	Montney
8725	M20	100/06-36-071-04W6/00	1931.2	siltstone and sandstone	Montney
8726	M20	100/06-36-071-04W6/00	1933.1	siltstone and sandstone	Montney
8727	M20	100/06-36-071-04W6/00	1938.7	siltstone and sandstone	Montney
8728	M20	100/06-36-071-04W6/00	1940.1	siltstone	Montney
8729	M20	100/06-36-071-04W6/00	1943.0	siltstone	Montney
8730	M23	100/05-32-073-12W6/00	2815.1	siltstone	Montney
8731	M23	100/05-32-073-12W6/00	2816.4	siltstone	Montney
8732	M23	100/05-32-073-12W6/00	2817.9	siltstone	Montney
8733	M23	100/05-32-073-12W6/00	2819.4	siltstone	Montney
8734	M23	100/05-32-073-12W6/00	2823.3	siltstone	Montney
8735	M23	100/05-32-073-12W6/00	2825.9	siltstone	Montney
8736	M23	100/05-32-073-12W6/00	2832.2	sandstone	Montney
8737	M7	103/10-34-064-19W5/00	1768.5	siltstone and sandstone	Montney
8738	M7	103/10-34-064-19W5/00	1770.7	siltstone and sandstone	Montney
8739	M7	103/10-34-064-19W5/00	1776.2	sandstone	Montney
8740	M7	103/10-34-064-19W5/00	1778.5	muddy siltstone	Montney
8741	M7	103/10-34-064-19W5/00	1778.7	coquina	Montney
8742	M7	103/10-34-064-19W5/00	1781.2	muddy siltstone and sandstone	Montney
8743	M7	103/10-34-064-19W5/00	1785.9	sandy siltstone	Montney
8744	M4	102/11-34-061-19W5/00	2163.5	sandy siltstone	Montney
8745	M4	102/11-34-061-19W5/00	2166.3	sandy siltstone	Montney
8746	M4	102/11-34-061-19W5/00	2169.7	silty sandstone	Montney
8747	M4	102/11-34-061-19W5/00	2171.4	sandy siltstone	Montney
8748	M4	102/11-34-061-19W5/00	2172.0	coquina	Montney
8749	M4	102/11-34-061-19W5/00	2176.6	siltstone	Montney
8750	M4	102/11-34-061-19W5/00	2180.4	sandstone	Montney

Sample No.	Site No.	Location UWI	Sample Depth (metres)	Lithology	Formation/Group
8751	M10	100/07-05-067-07W6/00	3076.3	sandy siltstone	Montney
8752	M10	100/07-05-067-07W6/00	3078.8	sandy siltstone	Montney
8753	M10	100/07-05-067-07W6/00	3080.3	siltstone	Montney
8754	M10	100/07-05-067-07W6/00	3081.4	siltstone	Montney
8755	M10	100/07-05-067-07W6/00	3084.5	siltstone	Montney
8756	M10	100/07-05-067-07W6/00	3088.4	sandy siltstone	Montney
8757	M10	100/07-05-067-07W6/00	3093.7	sandy siltstone	Montney
8758	M19	100/11-28-071-03W6/00	1820.5	siltstone and sandstone	Montney
8759	M19	100/11-28-071-03W6/00	1823.6	siltstone and sandstone	Montney
8760	M19	100/11-28-071-03W6/00	1826.4	siltstone	Montney
8761	M19	100/11-28-071-03W6/00	1829.9	siltstone and sandstone	Montney
8762	M19	100/11-28-071-03W6/00	1836.1	siltstone and sandstone	Montney
8763	M19	100/11-28-071-03W6/00	1839.1	sandy siltstone	Montney
8764	M19	100/11-28-071-03W6/00	1840.7	silty sandstone	Montney
8765	M19	100/11-28-071-03W6/00	1845.8	siltstone	Montney
8766	M19	100/11-28-071-03W6/00	1849.6	sandstone	Montney
8767	M19	100/11-28-071-03W6/00	1852.1	sandy siltstone	Montney
8768	M19	100/11-28-071-03W6/00	1857.6	siltstone and sandstone	Montney
8769	M19	100/11-28-071-03W6/00	1858.3	siltstone	Montney
8770	M19	100/11-28-071-03W6/00	1862.8	siltstone	Montney
8771	M19	100/11-28-071-03W6/00	1864.9	sandstone	Montney
8772	M19	100/11-28-071-03W6/00	1869.8	sandy siltstone	Montney
8773	M40	100/10-21-092-03W6/00	778.5	muddy siltstone	Montney
8774	M40	100/10-21-092-03W6/00	781.1	muddy siltstone	Montney
8775	M40	100/10-21-092-03W6/00	783.3	siltstone	Montney
8776	M40	100/10-21-092-03W6/00	784.6	sandy siltstone	Montney
8777	M40	100/10-21-092-03W6/00	787.3	siltstone	Montney
8778	M40	100/10-21-092-03W6/00	791.6	muddy siltstone with sandstone	Montney
8779	M40	100/10-21-092-03W6/00	795.7	mudstone	Montney
8780	M40	100/10-21-092-03W6/00	798.3	sandstone	Montney
8781	M15	100/13-05-068-01W6/00	2044.4	siltstone	Montney
8782	M15	100/13-05-068-01W6/00	2047.7	coquina	Montney
8783	M15	100/13-05-068-01W6/00	2048.8	sandstone	Montney
8784	M15	100/13-05-068-01W6/00	2055.4	silty sandstone	Montney
8785	M15	100/13-05-068-01W6/00	2057.4	siltstone	Montney
8786	M15	100/13-05-068-01W6/00	2235.3	sandy siltstone	Montney
8787	M15	100/13-05-068-01W6/00	2238.5	siltstone	Montney
8788	M15	100/13-05-068-01W6/00	2240.9	siltstone	Montney
8789	M15	100/13-05-068-01W6/00	2245.8	grainstone	Belloy
8790	M13	100/13-31-067-18W5/00	1628.1	shale	Nordegg
8791	M13	100/13-31-067-18W5/00	1658.7	sandy mudstone and siltstone	Montney
8792	M13	100/13-31-067-18W5/00	1662.1	sandy siltstone	Montney
8793	M13	100/13-31-067-18W5/00	1665.9	sandy siltstone	Montney
8794	M13	100/13-31-067-18W5/00	1672.9	silty sandstone	Montney
8795	M32	102/14-20-079-22W5/00	864.7	sandy siltstone	Montney
8796	M32	102/14-20-079-22W5/00	866.6	siltstone and sandstone	Montney
8797	M32	102/14-20-079-22W5/00	872.0	silty sandstone	Montney
8798	M32	102/14-20-079-22W5/00	876.7	siltstone and sandstone	Montney
8799	M32	102/14-20-079-22W5/00	879.2	sandy siltstone	Montney
8800	M5	100/11-24-062-20W5/00	2080.9	shale	Nordegg
8801	M5	100/11-24-062-20W5/00	2087.6	coquina	Montney
8802	M5	100/11-24-062-20W5/00	2090.3	coquina	Montney
8803	M5	100/11-24-062-20W5/00	2094.9	coquina	Montney
8804	M5	100/11-24-062-20W5/00	2097.3	sandy siltstone	Montney
8805	M5	100/11-24-062-20W5/00	2102.2	sandy siltstone	Montney
8806	M5	100/11-24-062-20W5/00	2105.1	sandy siltstone	Montney
8807	M5	100/11-24-062-20W5/00	2107.8	sandy siltstone	Montney
8808	M3	100/04-06-059-20W5/00	2643.9	shale	Nordegg
8809	M3	100/04-06-059-20W5/00	2644.3	shale	Nordegg
8810	M3	100/04-06-059-20W5/00	2645.9	sandstone	Montney
8811	M3	100/04-06-059-20W5/00	2648.2	silty sandstone	Montney
8812	M3	100/04-06-059-20W5/00	2651.1	sandy siltstone	Montney
8813	M3	100/04-06-059-20W5/00	2656.4	sandy siltstone	Montney
8814	M3	100/04-06-059-20W5/00	2658.8	sandy siltstone	Montney
8815	M3	100/04-06-059-20W5/00	2660.9	sandy siltstone	Montney
8816	M1	100/11-14-057-23W5/00	3007.1	siltstone	Montney

Sample No.	Site No.	Location UWI	Sample Depth (metres)	Lithology	Formation/Group
8817	M1	100/11-14-057-23W5/00	3008.7	sandy siltstone	Montney
8818	M1	100/11-14-057-23W5/00	3010.8	siltstone	Montney
8819	M1	100/11-14-057-23W5/00	3013.3	siltstone	Montney
8820	M1	100/11-14-057-23W5/00	3013.9	coquina	Montney
8821	M1	100/11-14-057-23W5/00	3019.4	sandstone	Montney
8822	M21	100/06-33-072-25W5/00	1590.1	siltstone	Montney
8823	M21	100/06-33-072-25W5/00	1592.2	siltstone	Montney
8824	M21	100/06-33-072-25W5/00	1595.5	sandy siltstone	Montney
8825	M21	100/06-33-072-25W5/00	1597.5	sandy siltstone	Montney
8826	M21	100/06-33-072-25W5/00	1602.0	siltstone	Montney
8827	M21	100/06-33-072-25W5/00	1607.4	sandy siltstone	Montney
8828	M22	100/06-34-072-25W5/00	1535.4	shale	Nordegg
8829	M22	100/06-34-072-25W5/00	1536.1	shale	Nordegg
8830	M22	100/06-34-072-25W5/00	1538.3	siltstone	Montney
8831	M22	100/06-34-072-25W5/00	1542.5	sandy siltstone	Montney
8832	M22	100/06-34-072-25W5/00	1545.4	siltstone	Montney
8833	M22	100/06-34-072-25W5/00	1550.0	sandy siltstone	Montney
8834	M2	100/16-23-057-06W6/00	2479.9	silty shale	Doig
8835	M2	100/16-23-057-06W6/00	2480.8	siltstone	Doig
8836	M2	100/16-23-057-06W6/00	2481.1	shaley siltstone	Doig
8837	M2	100/16-23-057-06W6/00	2482.4	lag	Doig
8838	M2	100/16-23-057-06W6/00	2485.3	siltstone	Montney
8839	M2	100/16-23-057-06W6/00	2487.2	siltstone	Montney
8840	M2	100/16-23-057-06W6/00	2489.3	siltstone	Montney
8841	M2	100/16-23-057-06W6/00	2491.1	siltstone	Montney
8842	M2	100/16-23-057-06W6/00	2515.2	siltstone	Montney
8843	M2	100/16-23-057-06W6/00	2516.4	siltstone	Montney
8844	M2	100/16-23-057-06W6/00	2519.2	siltstone	Montney
8845	M2	100/16-23-057-06W6/00	2521.0	silty sandstone	Montney
8846	M2	100/16-23-057-06W6/00	2522.8	siltstone	Montney
8847	M2	100/16-23-057-06W6/00	2646.6	siltstone	Montney
8848	M2	100/16-23-057-06W6/00	2649.0	siltstone	Montney
8849	M2	100/16-23-057-06W6/00	2650.2	siltstone	Montney
8850	M2	100/16-23-057-06W6/00	2652.1	siltstone	Montney
8851	M2	100/16-23-057-06W6/00	2687.4	siltstone	Montney
8852	M2	100/16-23-057-06W6/00	2688.0	sandstone	Montney
8853	M2	100/16-23-057-06W6/00	2689.6	siltstone	Montney
8854	M2	100/16-23-057-06W6/00	2691.7	siltstone	Montney
8855	M2	100/16-23-057-06W6/00	2694.4	sandy siltstone	Montney
8856	M2	100/16-23-057-06W6/00	2696.3	sandy siltstone	Montney
8857	M2	100/16-23-057-06W6/00	2699.9	sandy siltstone	Montney
8858	M2	100/16-23-057-06W6/00	2703.6	siltstone	Montney
8859	M30	102/11-34-078-02W6/00	1770.3	shaley siltstone	Montney
8860	M30	102/11-34-078-02W6/00	1774.8	siltstone	Montney
8861	M30	102/11-34-078-02W6/00	1778.0	sandy siltstone	Montney
8862	M30	102/11-34-078-02W6/00	1779.9	sandy siltstone	Montney
8863	M30	102/11-34-078-02W6/00	1780.7	silty sandstone	Montney
8864	M30	102/11-34-078-02W6/00	1782.2	sandy siltstone	Montney
8865	M30	102/11-34-078-02W6/00	1785.3	siltstone and sandstone	Montney
8866	M30	102/11-34-078-02W6/00	1787.3	sandy siltstone	Montney
8867	M26	100/15-06-076-03W6/00	1444.9	sandy siltstone	Doig
8868	M26	100/15-06-076-03W6/00	1446.0	siltstone	Doig
8869	M26	100/15-06-076-03W6/00	1449.6	siltstone	Doig
8870	M26	100/15-06-076-03W6/00	1452.0	siltstone	Doig
8871	M26	100/15-06-076-03W6/00	1453.7	siltstone	Doig
8872	M26	100/15-06-076-03W6/00	1457.6	siltstone	Montney
8873	M26	100/15-06-076-03W6/00	1458.6	sandy siltstone	Montney
8874	M26	100/15-06-076-03W6/00	1458.9	siltstone	Montney
8875	M9	100/16-31-066-23W5/00	1708.6	sandy siltstone	Montney
8876	M9	100/16-31-066-23W5/00	1711.5	sandy siltstone	Montney
8877	M9	100/16-31-066-23W5/00	1713.7	silty sandstone	Montney
8878	M9	100/16-31-066-23W5/00	1718.1	siltstone	Montney
8879	M9	100/16-31-066-23W5/00	1720.0	sandy siltstone	Montney
8880	M9	100/16-31-066-23W5/00	1721.9	siltstone	Montney
8881	M9	100/16-31-066-23W5/00	1725.5	siltstone	Montney
8882	M11	100/12-07-067-24W5/00	1904.4	shale or calcilutite	Nordegg

Sample No.	Site No.	Location UWI	Sample Depth (metres)	Lithology	Formation/Group
8883	M11	100/12-07-067-24W5/00	1905.9	shale	Nordegg
8884	M11	100/12-07-067-24W5/00	1908.3	shale	Nordegg
8885	M11	100/12-07-067-24W5/00	1908.8	sandy siltstone	Montney
8886	M11	100/12-07-067-24W5/00	1910.1	siltstone	Montney
8887	M11	100/12-07-067-24W5/00	1914.4	sandy siltstone	Montney
8888	M11	100/12-07-067-24W5/00	1917.6	siltstone	Montney
8889	M11	100/12-07-067-24W5/00	1920.5	sandy siltstone	Montney
8890	M11	100/12-07-067-24W5/00	1922.6	siltstone	Montney
8891	M6	100/07-14-064-25W5/00	2289.0	shale or calcilutite.	Nordegg
8892	M6	100/07-14-064-25W5/00	2289.6	shale	Nordegg
8893	M6	100/07-14-064-25W5/00	2291.5	sandy siltstone	Montney
8894	M6	100/07-14-064-25W5/00	2295.2	sandy siltstone	Montney
8895	M6	100/07-14-064-25W5/00	2297.3	siltstone	Montney
8896	M6	100/07-14-064-25W5/00	2300.2	siltstone	Montney
8897	M6	100/07-14-064-25W5/00	2304.0	shaley siltstone	Montney
8898	M6	100/07-14-064-25W5/00	2306.9	shaley siltstone	Montney
8899	M8	100/06-14-066-06W6/00	3026.4	siltstone	Montney
8900	M8	100/06-14-066-06W6/00	3030.6	siltstone	Montney
8901	M8	100/06-14-066-06W6/00	3034.3	siltstone	Montney
8902	M8	100/06-14-066-06W6/00	3037.8	siltstone	Montney
8903	M8	100/06-14-066-06W6/00	3040.6	siltstone	Montney
8904	M8	100/06-14-066-06W6/00	3044.1	siltstone	Montney
8905	M39	102/01-14-091-12W6/00	1110.8	shaley siltstone	Montney
8906	M39	102/01-14-091-12W6/00	1111.9	silty sandstone	Montney
8907	M39	102/01-14-091-12W6/00	1113.4	silty sandstone	Montney
8908	M39	102/01-14-091-12W6/00	1116.9	silty sandstone	Montney
8909	M39	102/01-14-091-12W6/00	1118.2	sandy siltstone	Montney
8910	M38	100/04-32-084-12W6/00	1581.3	siltstone	Montney
8911	M38	100/04-32-084-12W6/00	1582.3	sandy siltstone	Montney
8912	M38	100/04-32-084-12W6/00	1584.1	siltstone	Montney
8913	M38	100/04-32-084-12W6/00	1586.0	silty sandstone	Montney
8914	M38	100/04-32-084-12W6/00	1587.0	sandy siltstone	Montney
8915	M38	100/04-32-084-12W6/00	1592.5	siltstone	Montney
8916	M35	100/14-30-082-07W6/00	1231.2	siltstone	Montney
8917	M35	100/14-30-082-07W6/00	1233.9	siltstone	Montney
8918	M35	100/14-30-082-07W6/00	1235.6	siltstone	Montney
8919	M35	100/14-30-082-07W6/00	1238.7	sandy siltstone	Montney
8920	M35	100/14-30-082-07W6/00	1240.6	siltstone	Montney
8921	M35	100/14-30-082-07W6/00	1241.6	silty sandstone	Montney
8922	M35	100/14-30-082-07W6/00	1243.9	siltstone	Montney
8923	M35	100/14-30-082-07W6/00	1245.7	siltstone	Montney
8924	M35	100/14-30-082-07W6/00	1248.3	sandy siltstone	Montney
8925	M34	100/15-08-081-12W6/00	1824.9	siltstone	Montney
8926	M34	100/15-08-081-12W6/00	1827.7	siltstone	Montney
8927	M34	100/15-08-081-12W6/00	1830.1	siltstone	Montney
8928	M34	100/15-08-081-12W6/00	1833.1	siltstone	Montney
8929	M34	100/15-08-081-12W6/00	1836.0	siltstone	Montney
8930	M34	100/15-08-081-12W6/00	1839.1	siltstone	Montney
8931	M36	100/11-32-082-25W5/00	924.8	shale	Nordegg
8932	M36	100/11-32-082-25W5/00	926.4	shale	Nordegg
8933	M36	100/11-32-082-25W5/00	927.4	sandy siltstone	Montney
8934	M36	100/11-32-082-25W5/00	929.0	sandy siltstone	Montney
8935	M36	100/11-32-082-25W5/00	933.9	siltstone	Montney
8936	M36	100/11-32-082-25W5/00	936.7	siltstone	Montney
8937	M36	100/11-32-082-25W5/00	940.4	sandstone	Montney
8938	M18	100/02-30-071-20W5/00	1316.1	shale	Nordegg
8939	M18	100/02-30-071-20W5/00	1318.1	shale	Nordegg
8940	M18	100/02-30-071-20W5/00	1319.6	sandstone	Montney
8941	M18	100/02-30-071-20W5/00	1322.2	sandstone	Montney
8942	M18	100/02-30-071-20W5/00	1324.3	sandy siltstone	Montney
8943	M18	100/02-30-071-20W5/00	1327.4	siltstone	Montney
8944	M12	100/14-27-067-08W6/00	3013.6	sandy siltstone	Montney
8945	M12	100/14-27-067-08W6/00	3017.1	silty sandstone	Montney
8946	M12	100/14-27-067-08W6/00	3019.3	silty sandstone	Montney
8947	M12	100/14-27-067-08W6/00	3021.5	siltstone	Montney
8948	M12	100/14-27-067-08W6/00	3026.9	siltstone	Montney

Sample No.	Site No.	Location UWI	Sample Depth (metres)	Lithology	Formation/Group
8949	M12	100/14-27-067-08W6/00	3029.7	sandy siltstone	Montney
8950	M12	100/14-27-067-08W6/00	3032.0	sandy siltstone	Montney
8951	M16	100/06-23-068-08W6/00	2972.8	sandstone	Montney
8952	M16	100/06-23-068-08W6/00	2975.0	sandstone	Belloy
8953	M16	100/06-23-068-08W6/00	2975.7	conglomerate	Belloy
8954	M16	100/06-23-068-08W6/00	2980.7	sandstone	Belloy
8955	M16	100/06-23-068-08W6/00	2982.4	sandstone	Belloy
8956	M31	100/06-12-079-12W6/00	2013.6	sandy siltstone	Montney
8957	M31	100/06-12-079-12W6/00	2016.1	sandy siltstone	Montney
8958	M31	100/06-12-079-12W6/00	2020.1	sandy siltstone	Montney
8959	M31	100/06-12-079-12W6/00	2024.0	sandy siltstone	Montney
8960	M31	100/06-12-079-12W6/00	2024.7	sandy siltstone	Montney
8961	M31	100/06-12-079-12W6/00	2028.5	sandy siltstone	Montney
8962	M31	100/06-12-079-12W6/00	2030.9	sandy siltstone	Montney
8963	M24	100/01-14-075-11W6/00	2477.5	sandy siltstone	Montney
8964	M24	100/01-14-075-11W6/00	2480.3	siltstone	Montney
8965	M24	100/01-14-075-11W6/00	2483.0	shaley siltstone	Montney
8966	M24	100/01-14-075-11W6/00	2486.5	sandy siltstone	Montney
8967	M24	100/01-14-075-11W6/00	2489.2	siltstone	Montney
8968	M24	100/01-14-075-11W6/00	2491.8	shaley siltstone	Montney
8969	M24	100/01-14-075-11W6/00	2495.1	silty sandstone	Montney
8970	M17	100/05-24-068-22W5/00	1552.9	shale	Nordegg
8971	M17	100/05-24-068-22W5/00	1553.5	shale	Nordegg
8972	M17	100/05-24-068-22W5/00	1556.3	coquina	Montney
8973	M17	100/05-24-068-22W5/00	1559.2	silty sandstone	Montney
8974	M17	100/05-24-068-22W5/00	1560.2	silty sandstone	Montney
8975	M17	100/05-24-068-22W5/00	1562.5	silty sandstone	Montney
8976	M17	100/05-24-068-22W5/00	1564.7	sandy siltstone	Montney
8977	M17	100/05-24-068-22W5/00	1568.3	sandy siltstone	Montney
9247	M15	100/13-05-068-01W6/00	2240.9	duplicate of sample 8788	Montney
9248	M13	100/13-31-067-18W5/00	1662.1	duplicate of sample 8792	Montney
9249	M5	100/11-24-062-20W5/00	2105.1	duplicate of sample 8806	Montney
9250		standard		standard Green River shale USGS	
9251	M18	100/02-30-071-20W5/00	1324.3	duplicate of sample 8942	Montney
9252	M17	100/05-24-068-22W5/00	1568.3	duplicate of sample 8977	Montney
9253	M31	100/06-12-079-12W6/00	2013.5	duplicate of sample 8956	Montney
9254	M21	100/06-33-072-25W5/00	1590.1 - 1592.2	combined samples 8822 and 8823	Montney
9255	M23	100/05-32-073-12W6/00	2816.4 - 2823.3	combined samples 8731, 8732, 8733, 8734	Montney
9256	M10	100/07-05-067-07W6/00	3088.4 - 3093.7	combined samples 8756, 8757	Montney
9257	M2	100/16-23-057-06W6/00	2646.6 - 2650.2	combined samples 8847, 8848, 8849	Montney
9258	M6	100/07-14-064-25W5/00	2297.3 - 2306.9	combined samples 8895, 8896, 8897, 8898	Montney
9259	M8	100/06-14-066-06W6/00	3030.6 - 3044.1	combined samples 8900, 8901, 8902, 8903, 8904	Montney
9260	M34	100/15-08-081-12W6/00	1827.7 - 1839.1	combined samples 8926, 8927, 8928, 8929, 8930	Montney

Appendix 2 – Montney Formation Core Samples Analyzed

Legend
Y = Sample data presented in this report
x = Sample data presented in other Alberta Geological Survey reports (see Table 1 for details)
z = Data are being analyzed and will be distributed in a future report
Analyses presented in this report

Column Label	Label Description
Sample No.	AGS sample number
Site No.	Site location number
Rock Eval™ TOC	Rock Eval™ pyrolysis is used to identify the type and maturity of organic matter and to detect petroleum potential in sediments. Total Organic Carbon is a measure of the amount of organic carbon in the sediment, measured in weight per cent.
XRD-Bulk	X-Ray diffraction analysis of whole rock mineralogy
XRD-Clay	X-Ray diffraction analysis of clay mineralogy
Organic Pet.	Petrographic imaging and description of organic macerals
Thin Section	Thin section of sample
Adsorption Isotherm	Gas adsorption analysis to determine gas-holding capacity of sample
SEM	Scanning Electron Microscope
Mini-perm	Analysis to determine permeability
Porosimetry	Analysis to determine pore throat size
Pycnometry	Analysis to determine grain density
Texture with Clay Mineralogy	Determination of sand, silt and clay size distribution in weight percent with clay mineralogy on clay separates.

Sample No.	Site No.	RockEval TOC	XRD-Bulk	XRD-Clay	Organic Pet.	Thin Section	Adsorption Isotherm	SEM	Mini-perm	Porosimetry	Pycnometry	Texture with Clay Mineralogy
8113	M25	Y										
8114	M25	Y										
8115	M25	Y				z			x			
8116	M25	Y										
8117	M25	Y			z							
8118	M25	Y										
8119	M14	Y							x			z
8120	M14	Y										
8121	M14	Y										
8122	M14	Y			z							
8123	M33	Y										
8124	M33	Y			z							z
8125	M33	Y				z						
8126	M33	Y	x									
8131	M37	Y			z							
8132	M37	Y										
8701	M27	Y										
8702	M27	Y			z					x	x	
8703	M27	Y										
8704	M27	Y										
8705	M28	Y			z			x				
8706	M28	Y										z
8707	M28	Y				z			x			
8708	M28	Y										
8709	M29	Y			z			x				
8710	M29	Y										
8711	M29	Y										
8712	M29	Y										
8713	M29	Y										
8714	M29	Y			z							
8715	M29	Y										
8716	M20	Y										
8717	M20											
8718	M20	Y				z			x			
8719	M20	Y										
8720	M20	Y										
8721	M20	Y										
8722	M20	Y										
8723	M20	Y										
8724	M20	Y			z							
8725	M20	Y										
8726	M20											
8727	M20	Y										
8728	M20											
8729	M20	Y			z							
8730	M23	Y	x	x								
8731	M23							x				
8732	M23	Y			z							
8733	M23											
8734	M23	Y										
8735	M23											
8736	M23	Y										
8737	M7	Y										
8738	M7											
8739	M7	Y			z			x				
8740	M7											
8741	M7											
8742	M7											
8743	M7	Y										
8744	M4							x				
8745	M4	Y			z							
8746	M4											
8747	M4	Y										
8748	M4											
8749	M4											
8750	M4	Y										
8751	M10	Y			z							
8752	M10											
8753	M10	Y	x	x								
8754	M10	Y										
8755	M10	Y			z							
8756	M10	Y										
8757	M10	Y			z							
8758	M19	Y										
8759	M19											
8760	M19	Y										
8761	M19	Y	x	x								
8762	M19	Y										
8763	M19											
8764	M19	Y								z	x	
8765	M19	Y			z							
8766	M19											
8767	M19	Y										
8768	M19	Y										
8769	M19											
8770	M19	Y			z							
8771	M19											
8772	M19	Y										
8773	M40											
8774	M40	Y			z							
8775	M40											
8776	M40											
8777	M40											
8778	M40											
8779	M40											
8780	M40	Y										
8781	M15	Y										
8782	M15	Y										
8783	M15											
8784	M15	Y										
8785	M15	Y			z							
8786	M15	Y				z			x			z
8787	M15											
8788	M15	Y			z							
8789	M15	Y			z							

Sample No.	Site No.	RockEval TOC	XRD-Bulk	XRD-Clay	Organic Pet.	Thin Section	Adsorption Isotherm	SEM	Mini-perm	Porosimetry	Pycnometry	Texture with Clay Mineralogy
8790	M13	Y			z							
8791	M13											
8792	M13	Y										
8793	M13	Y			z							
8794	M13	Y										
8795	M32											
8796	M32	Y			z							
8797	M32											
8798	M32											
8799	M32	Y										
8800	M5	Y										
8801	M5											
8802	M5											
8803	M5											
8804	M5											
8805	M5											
8806	M5	Y			z							
8807	M5											
8808	M3	Y										
8809	M3											
8810	M3											
8811	M3											
8812	M3											
8813	M3	Y			z							
8814	M3											
8815	M3											
8816	M1											
8817	M1											
8818	M1											
8819	M1	Y	x	x	z							
8820	M1											
8821	M1											
8822	M21	Y										
8823	M21	Y										
8824	M21	Y			z							
8825	M21											
8826	M21	Y										
8827	M21	Y										
8828	M22	Y										
8829	M22											
8830	M22											
8831	M22	Y			z							
8832	M22											
8833	M22											
8834	M2	Y										
8835	M2											
8836	M2											
8837	M2	Y										
8838	M2	Y										
8839	M2	Y										
8840	M2	Y				z			x			
8841	M2	Y										
8842	M2	Y										
8843	M2	Y										
8844	M2	Y										
8845	M2											
8846	M2											
8847	M2	Y			z							
8848	M2	Y										
8849	M2	Y										
8850	M2	Y										z
8851	M2	Y										
8852	M2											
8853	M2	Y			z							
8854	M2	Y	x	x								
8855	M2	Y										
8856	M2	Y							x			z
8857	M2	Y										
8858	M2	Y						x		z	x	
8859	M30	Y										
8860	M30											
8861	M30											
8862	M30	Y			z							
8863	M30											
8864	M30											
8865	M30											
8866	M30	Y										
8867	M26	Y										
8868	M26											
8869	M26	Y										
8870	M26											
8871	M26											
8872	M26											
8873	M26											
8874	M26	Y			z							
8875	M9	Y			z							
8876	M9	Y										
8877	M9											
8878	M9	Y				z		x	x	z	x	
8879	M9	Y										
8880	M9											
8881	M9	Y										
8882	M11	Y										
8883	M11	Y										
8884	M11	Y										
8885	M11											
8886	M11	Y										
8887	M11	Y										
8888	M11	Y			z							
8889	M11	Y										
8890	M11											
8891	M6	Y										
8892	M6											
8893	M6	Y										
8894	M6	Y										

Sample No.	Site No.	RockEval TOC	XRD-Bulk	XRD-Clay	Organic Pet.	Thin Section	Adsorption Isotherm	SEM	Mini-perm	Porosimetry	Pycnometry	Texture with Clay Mineralogy
8895	M6	Y				z						
8896	M6											
8897	M6	Y	x		z							
8898	M6	Y										
8899	M8	Y	x	x								
8900	M8	Y										
8901	M8	Y						x				
8902	M8	Y			z	z			x			
8903	M8	Y										
8904	M8	Y								z	x	
8905	M39	Y	x									
8906	M39											
8907	M39											
8908	M39	Y				z			x	z	x	
8909	M39	Y			z							
8910	M38	Y			z							
8911	M38											
8912	M38	Y										
8913	M38											
8914	M38	Y										
8915	M38	Y										
8916	M35	Y										
8917	M35											
8918	M35	Y							x			
8919	M35	Y	x	x								
8920	M35											
8921	M35	Y										
8922	M35											
8923	M35	Y			z							
8924	M35	Y				z						
8925	M34											
8926	M34	Y						x				
8927	M34											
8928	M34	Y			z							
8929	M34											
8930	M34	Y										
8931	M36	Y										
8932	M36											
8933	M36	Y										
8934	M36	Y			z							
8935	M36	Y										
8936	M36	Y										
8937	M36	Y										
8938	M18	Y										
8939	M18											
8940	M18	Y										
8941	M18											
8942	M18	Y			z							
8943	M18											
8944	M12											
8945	M12	Y										
8946	M12											
8947	M12	Y										
8948	M12	Y				z						z
8949	M12											
8950	M12	Y			z							
8951	M16	Y										
8952	M16	Y										
8953	M16	Y										
8954	M16											
8955	M16	Y										
8956	M31	Y				z						
8957	M31	Y										
8958	M31	Y										
8959	M31	Y										
8960	M31											
8961	M31	Y			z							
8962	M31											
8963	M24	Y										
8964	M24	Y			z							
8965	M24											
8966	M24	Y										
8967	M24	Y										
8968	M24											
8969	M24	Y										
8970	M17											
8971	M17	Y										
8972	M17	Y										
8973	M17	Y			z							
8974	M17											
8975	M17	Y										
8976	M17											
8977	M17	Y										
9247	M15	Y										
9248	M13	Y										
9249	M5	Y										
9250	Standard											
9251	M18	Y										
9252	M17	Y										
9253	M31	Y			z							
9254	M21		x	x								
9255	M23						Y					
9256	M10						Y					
9257	M2						Y					
9258	M6						Y					
9259	M8						Y					
9260	M34						Y					

Appendix 3a – Montney Formation Adsorption Isotherm Summary and Point Data

Legend

Column Label	Label Description
Sample No.	AGS sample number
Site No.	AGS sample location number
Depth (Metres)	Sample depth in metres (measured from core)
TOC wt. %	Total organic carbon in weight per cent
Analysis Temperature Celsius	Temperature in degrees Celsius
As Received Moisture wt. %	Sample moisture content in weight per cent
PL Raw Basis MPa	Pressure - Langmuir pressure raw basis in megapascals
VL Raw Basis scc/g	Volume - Langmuir volume raw basis in standard cubic centimetres per gram
PL Raw Basis psia	Pressure - Langmuir pressure raw basis in pounds per square inch absolute
VL Raw Basis scf/ton	Volume - Langmuir volume raw basis in standard cubic feet per ton
Point No.	Individual measurement
Gas Content Raw Basis scc/g	Gas content in standard cubic centimetres per gram
Pressure Raw Basis psia	Pressure raw basis in pounds per square inch absolute
Gas Content Raw Basis scf/ton	Gas content in standard cubic feet per ton

Adsorption Isotherm Summary and Point Data

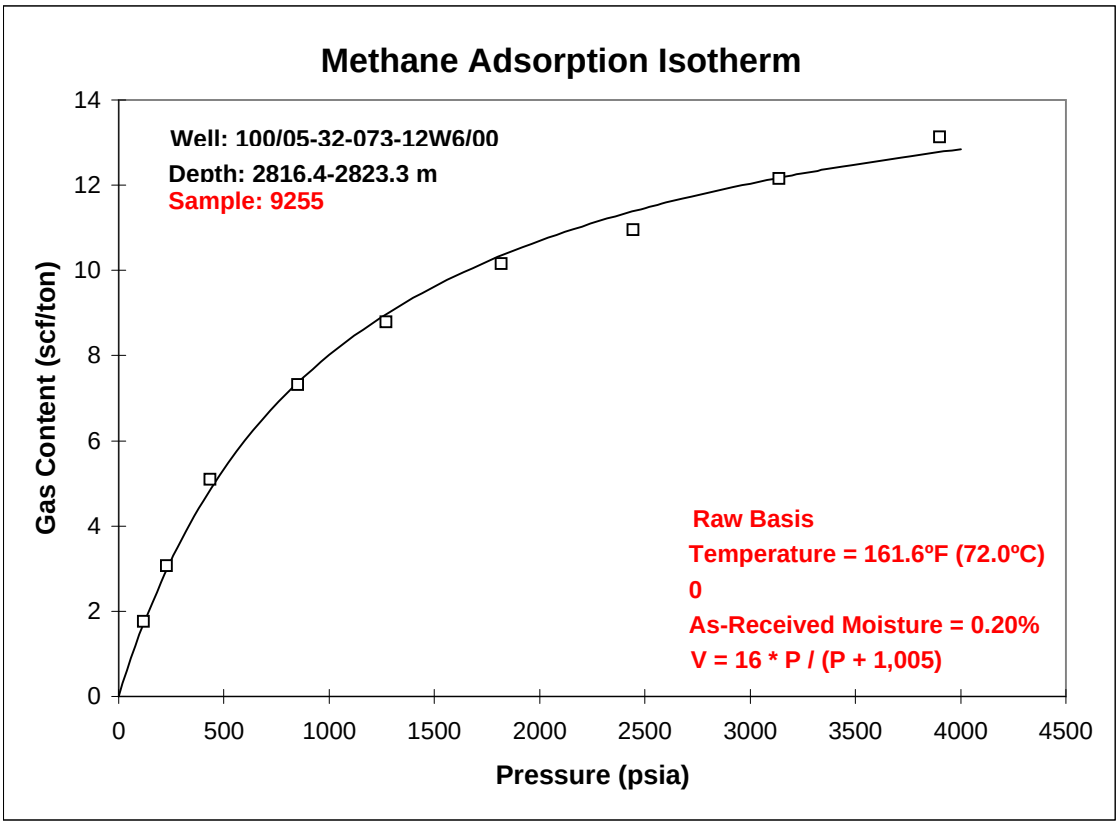
Sample No.	Site No.	Depth (Metres)	TOC wt. %	Analysis Temperature Celsius	As Received Moisture wt. %	PL Raw Basis MPa	VL Raw Basis scc/g	PL Raw Basis psia	VL Raw Basis scf/ton
9255	**M23**	2816.4 - 2823.3	1.83	72	0.20	6.93	0.50	1,005.2	16.1
9256	**M10**	3088.4 - 3093.7	1.17	72	0.13	6.92	0.30	1,003.7	11.0
9257	**M2**	2646.6 - 2650.2	1.14	60	0.17	5.66	0.80	820.8	26.5
9258	**M6**	2297.3 - 2306.9	0.47	61	0.60	5.71	0.40	828.1	12.0
9259	**M8**	3030.6 - 3044.1	0.93	80	0.28	8.61	0.40	1,248.3	11.9
9260	**M34**	1827.7 - 1839.1	0.66	55	0.13	6.72	0.50	974.3	14.9

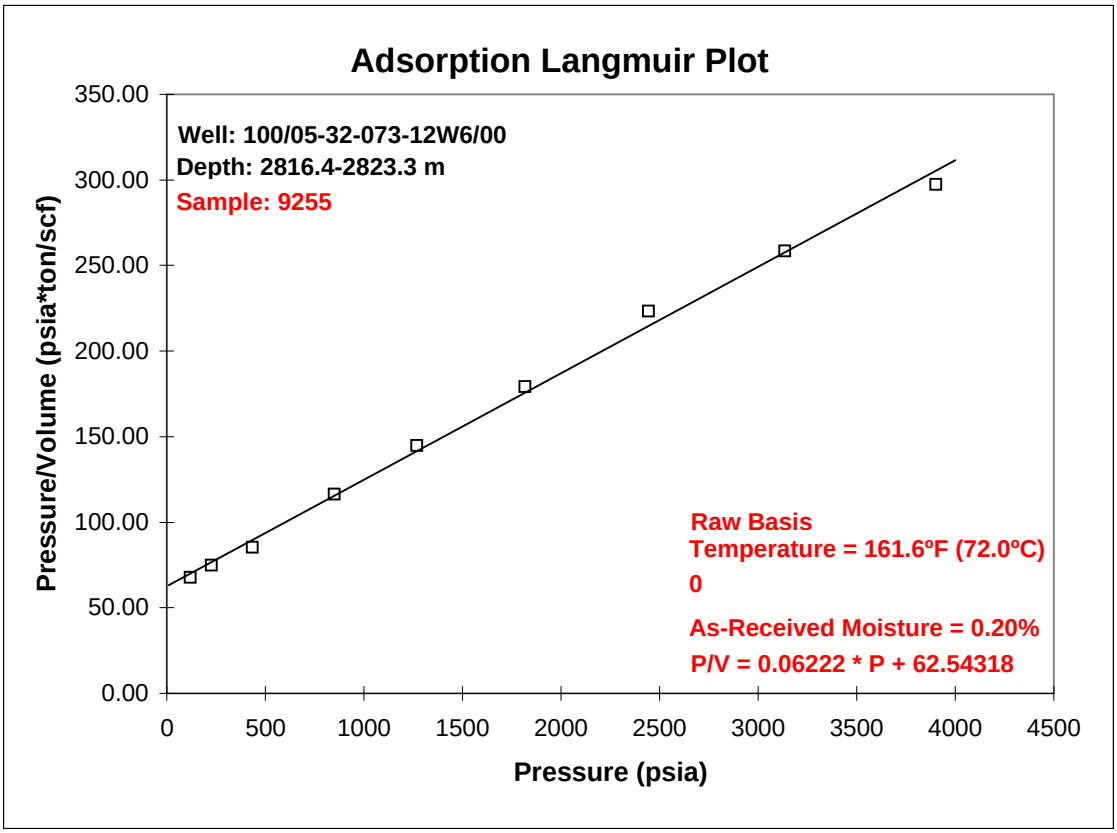
Adsorption Isotherm Point Data

Sample No.	Point No.	Pressure Raw Basis MPa	Gas Content Raw Basis scc/g	Pressure Raw Basis psia	Gas Content Raw Basis scf/ton
9255	1	0.82	0.06	119	1.8
	2	1.58	0.10	229	3.1
	3	3.00	0.16	435	5.1
	4	5.87	0.23	852	7.3
	5	8.76	0.27	1,270	8.8
	6	12.53	0.32	1,817	10.2
	7	16.86	0.34	2,445	11.0
	8	21.63	0.38	3,137	12.2
	9	26.90	0.41	3,902	13.2
9256	1	0.83	0.04	121	1.2
	2	1.56	0.06	226	1.9
	3	3.04	0.11	441	3.4
	4	5.95	0.17	863	5.3
	5	8.84	0.20	1,282	6.3
	6	12.68	0.22	1,839	6.9
	7	17.05	0.25	2,473	7.9
	8	21.86	0.27	3,170	8.5
	9	27.21	0.27	3,947	8.7
9257	1	0.78	0.12	113	3.7
	2	1.50	0.20	217	6.3
	3	2.94	0.27	426	8.5
	4	5.76	0.40	835	12.7
	5	8.65	0.49	1,255	15.6
	6	12.42	0.55	1,802	17.6
	7	16.52	0.62	2,396	20.0
	8	21.59	0.66	3,132	21.1
	9	26.97	0.69	3,912	22.2
9258	1	0.77	0.05	112	1.6
	2	1.48	0.09	215	2.9
	3	2.90	0.13	421	4.1
	4	5.69	0.18	825	5.8
	5	8.57	0.22	1,243	6.9
	6	12.31	0.24	1,785	7.8
	7	16.35	0.27	2,372	8.5
	8	21.39	0.30	3,102	9.5
	9	26.79	0.32	3,886	10.2
9259	1	0.82	0.03	119	1.1
	2	1.56	0.06	226	1.8
	3	3.01	0.10	437	3.2
	4	6.03	0.16	874	5.0
	5	8.81	0.18	1,278	5.9
	6	13.08	0.22	1,897	7.1
	7	17.24	0.25	2,501	8.0
	8	21.15	0.26	3,067	8.4
	9	27.38	0.29	3,971	9.2
9260	1	0.45	0.03	65	0.9
	2	0.82	0.05	119	1.5
	3	1.58	0.09	229	2.9

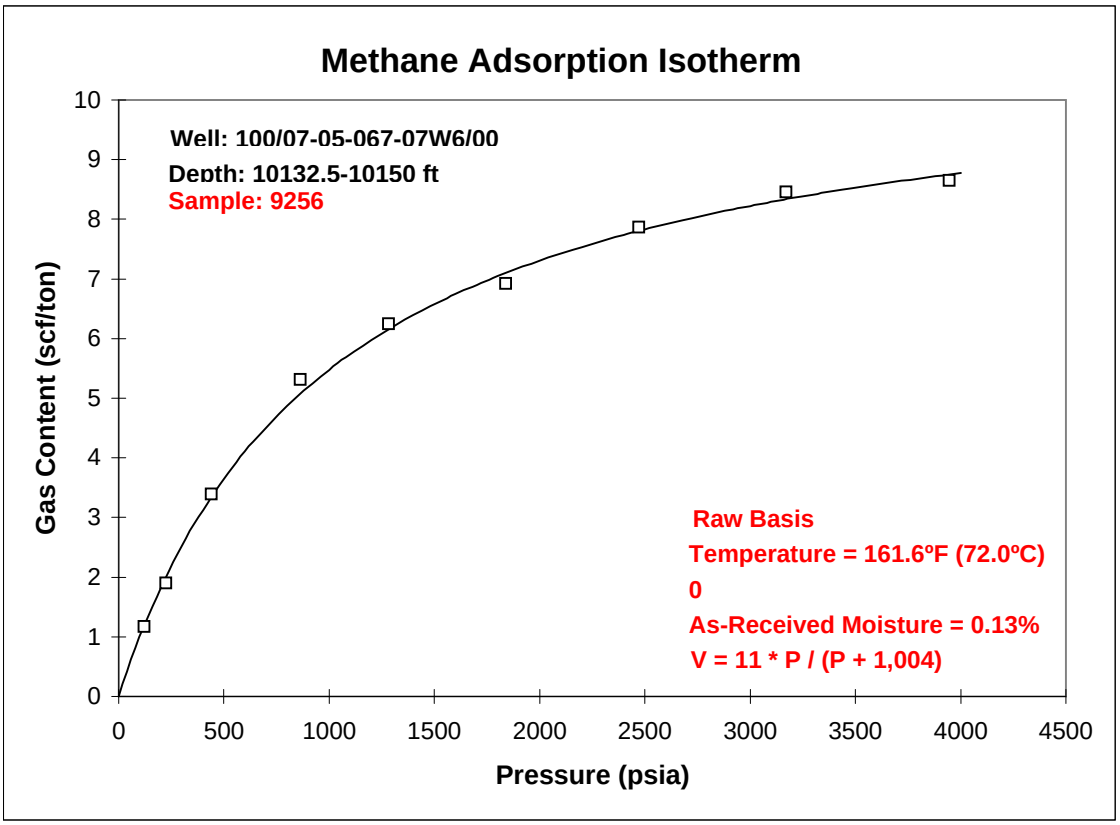
Sample No.	Point No.	Pressure Raw Basis MPa	Gas Content Raw Basis scc/g	Pressure Raw Basis psia	Gas Content Raw Basis scf/ton
	4	2.99	0.16	434	5.0
	5	5.87	0.22	852	6.9
	6	8.67	0.28	1,257	8.9
	7	12.50	0.31	1,813	9.8
	8	16.44	0.33	2,384	10.6
	9	20.77	0.35	3,013	11.1

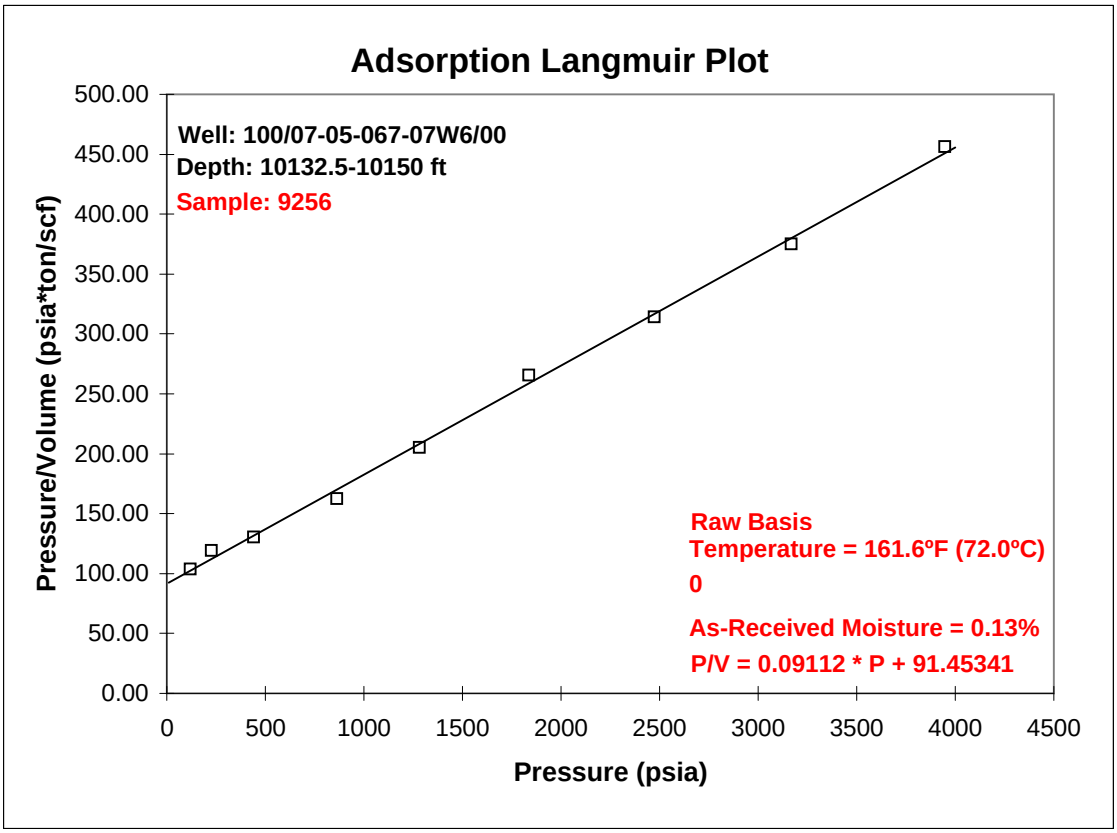
Appendix 3b – Montney Formation Adsorption Isotherm Graphs



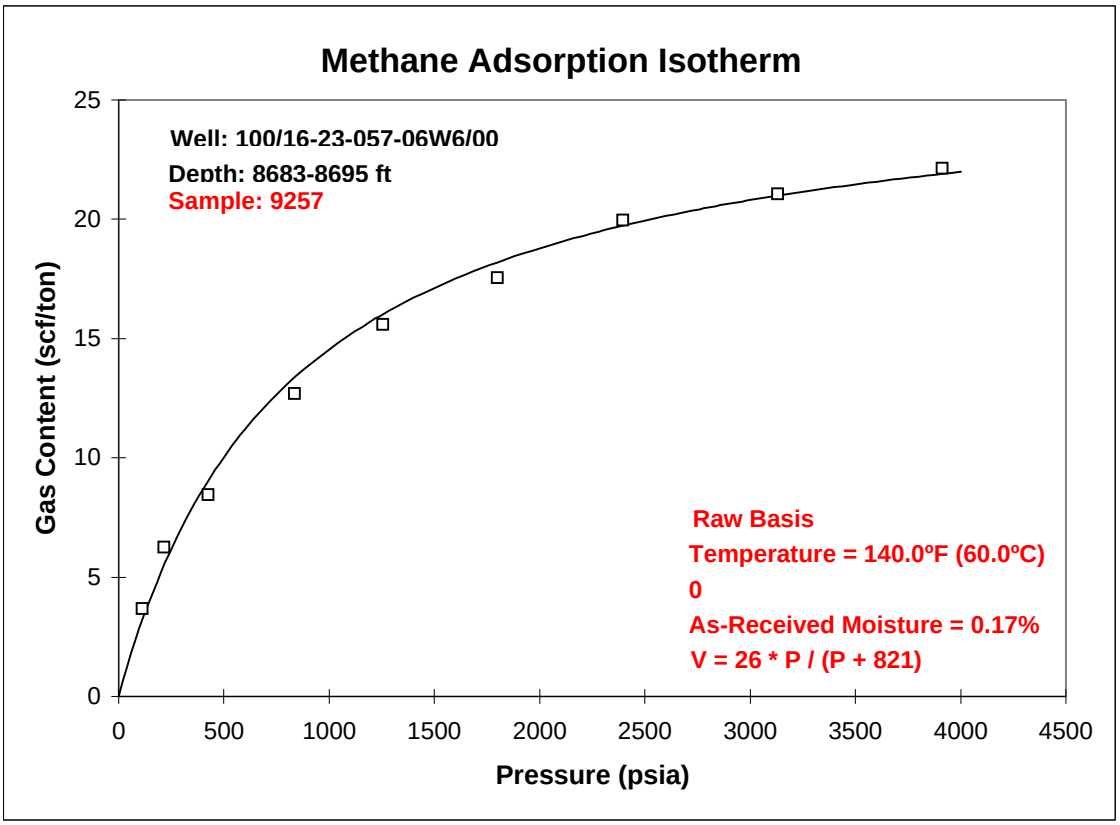


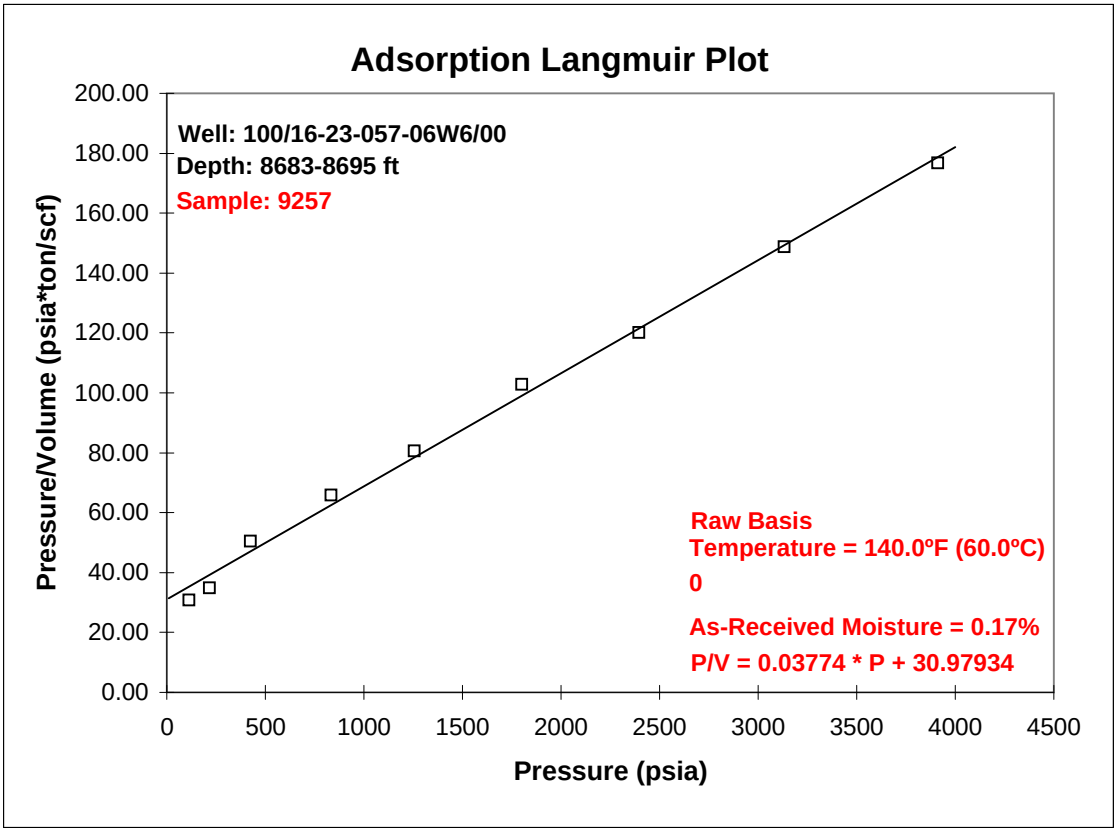
SI Unit graphs not available





SI Unit graphs not available





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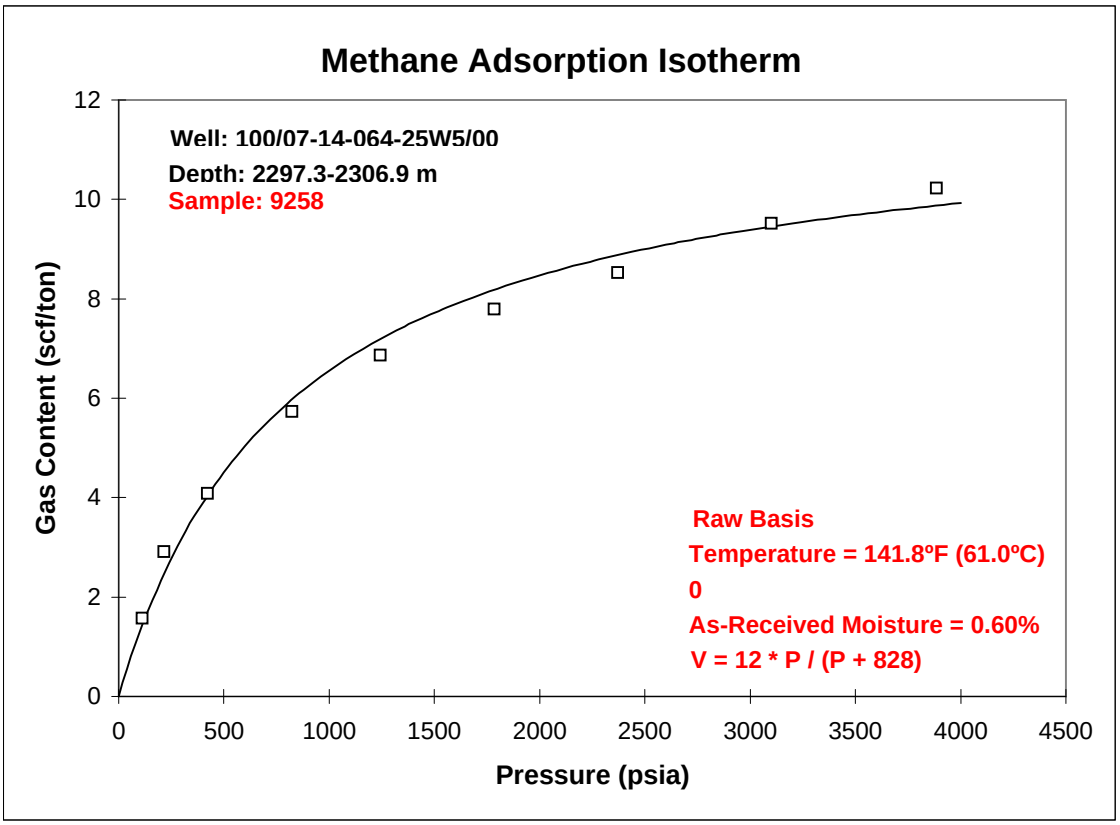

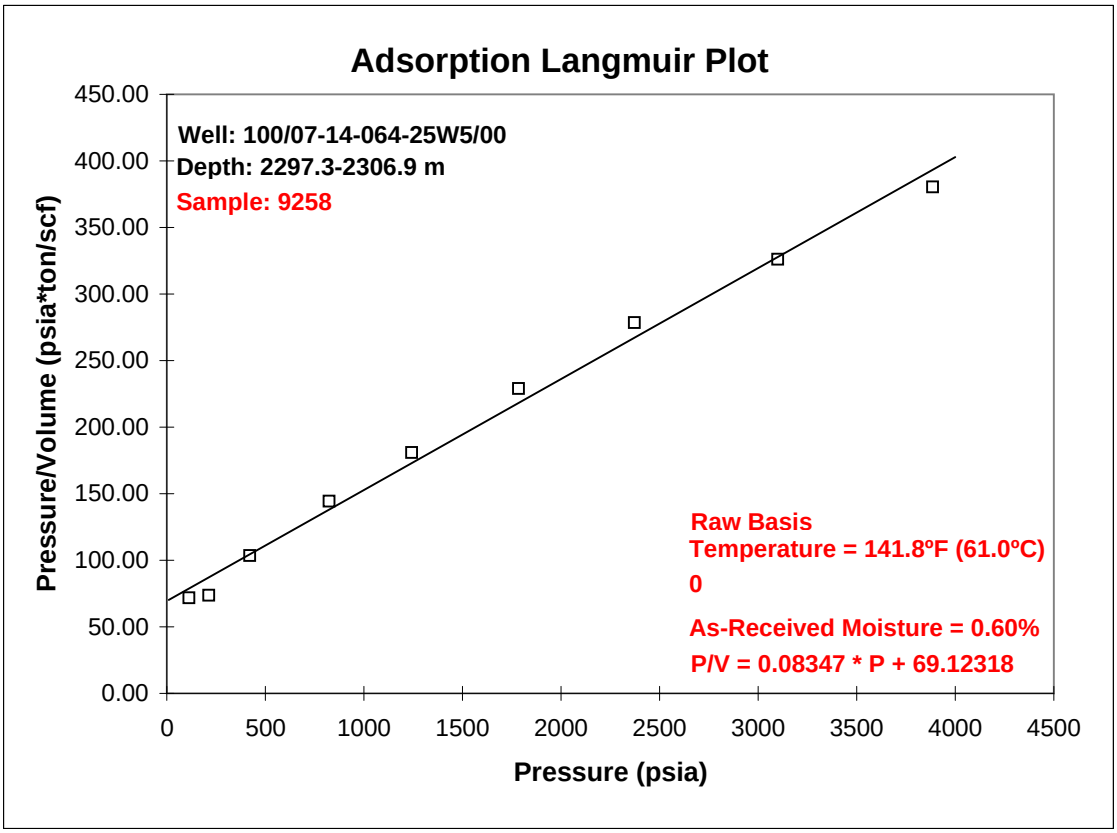

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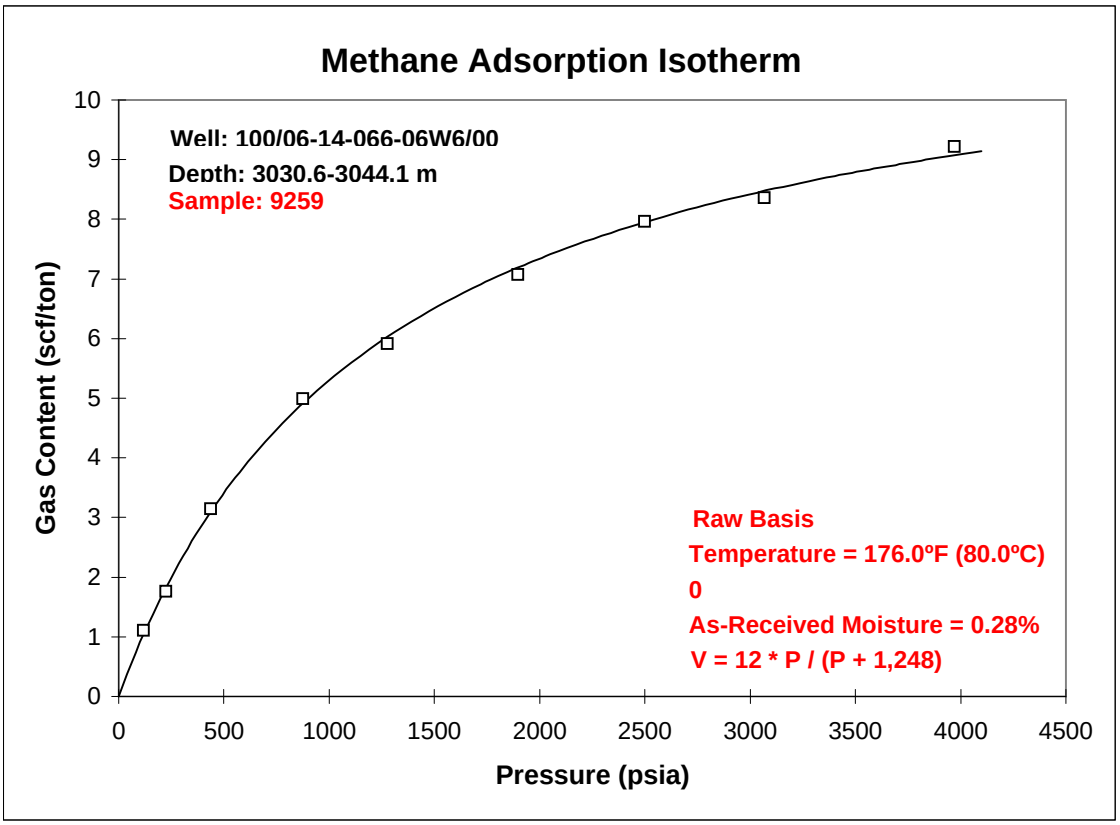

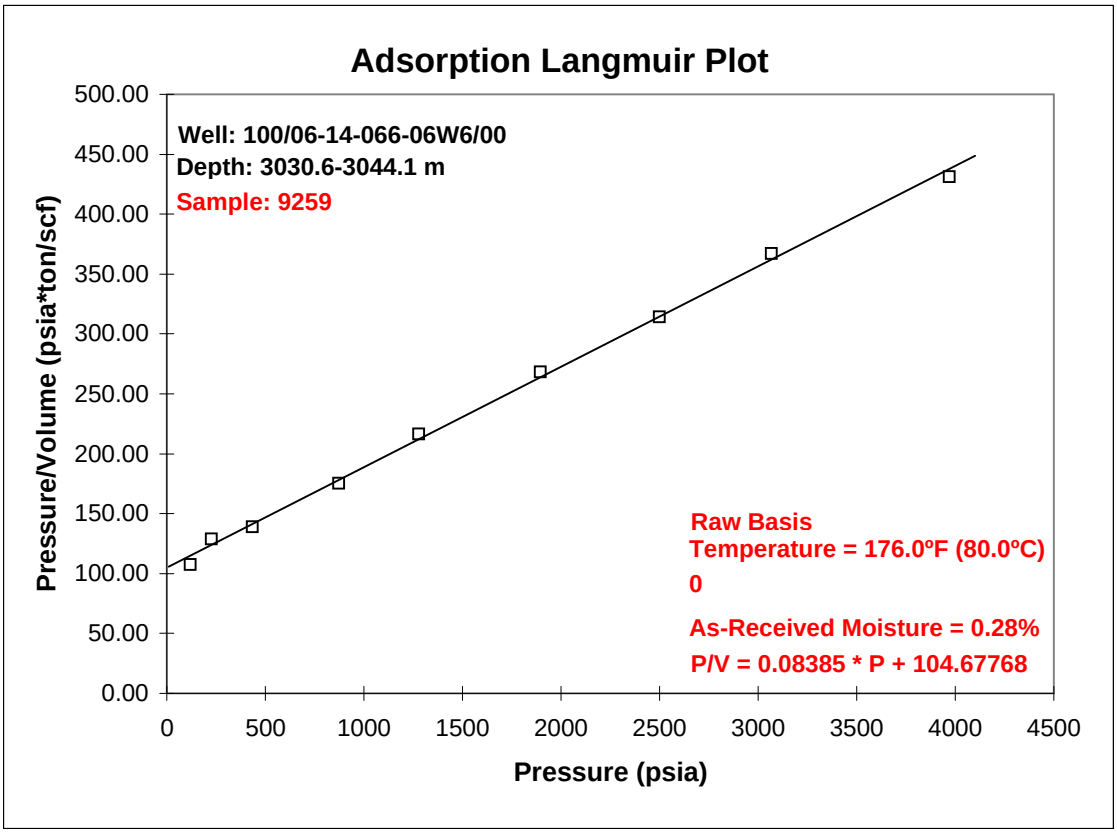

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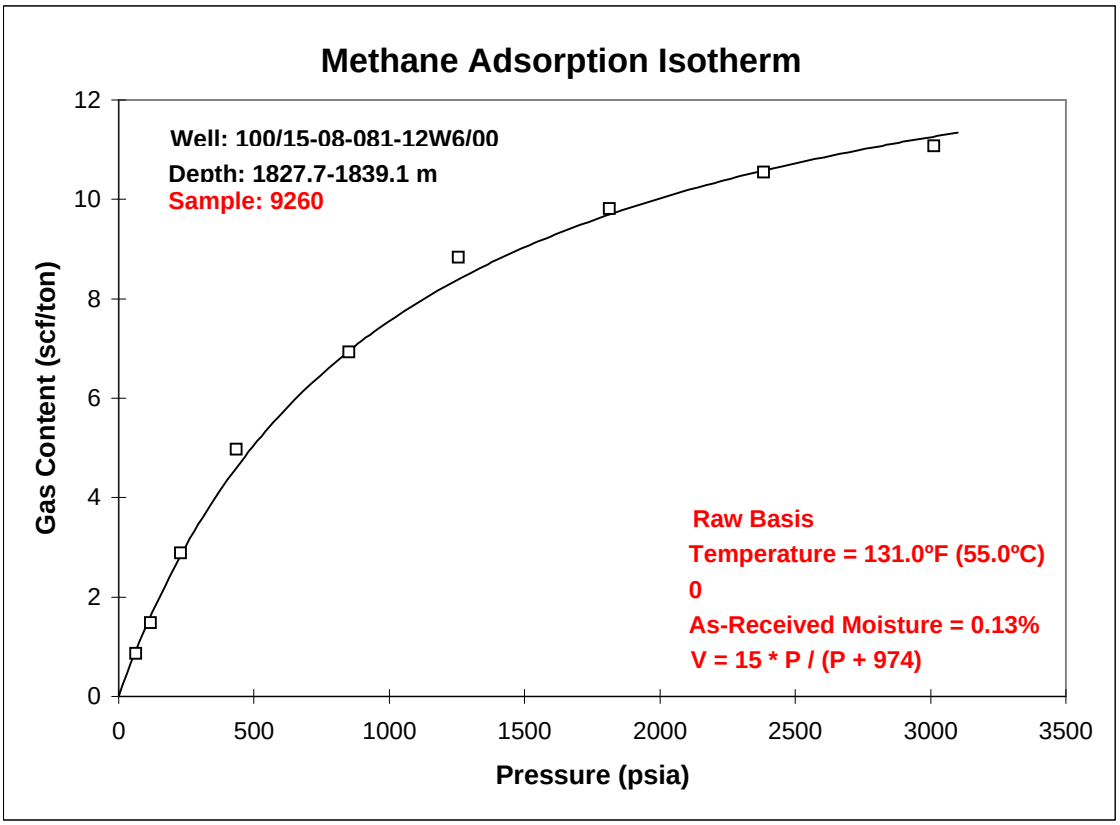

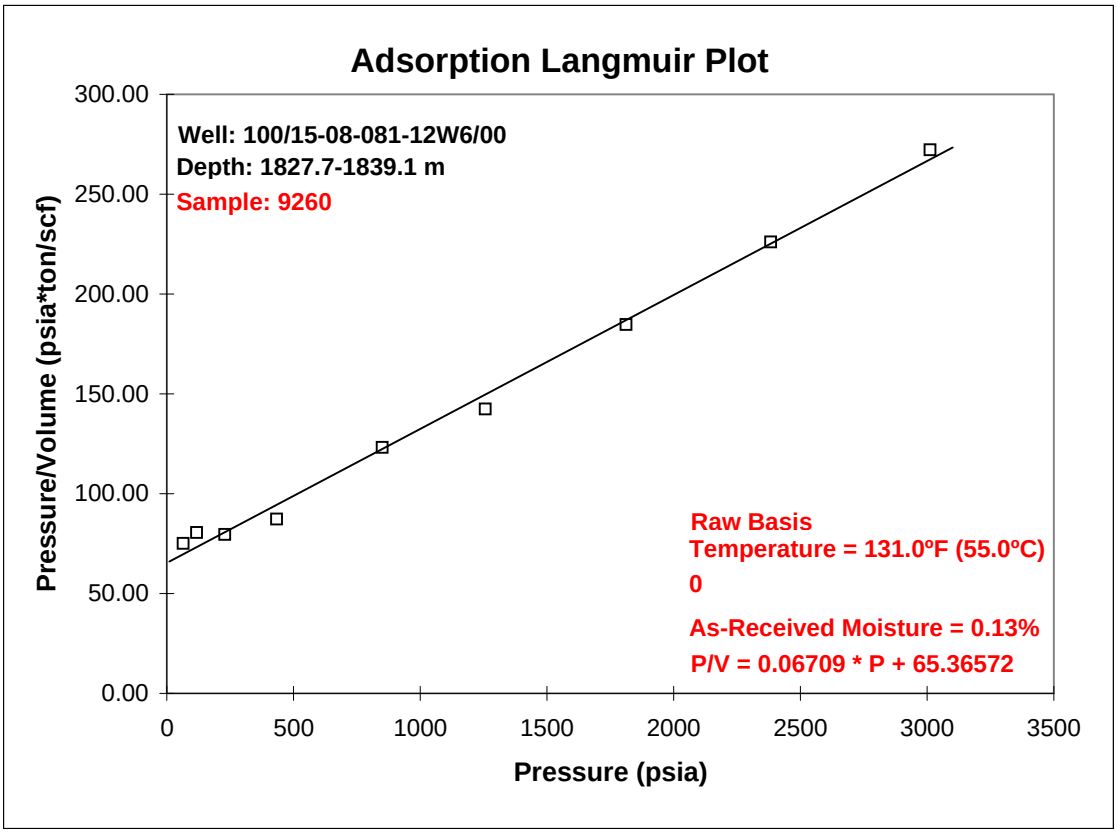

SI Unit graphs not available

Appendix 4 – Montney Formation Rock Eval™ SIX TOC

Legend

Column Label	Label Description
Sample No.	AGS sample number
Site No.	AGS site location number
Qty g	Sample weight in grams
S1	Amount of free hydrocarbons (in milligrams of hydrocarbon per gram of rock), rounded to two digits
S2	Amount of hydrocarbons generated through thermal cracking, rounded to two digits (in milligrams of hydrocarbon per gram of rock)
PI	Production index, S1/(S1+S2), calculation is computer generated and based on a five decimal points for S1 and S2. The computer then calculates PI and rounds the data to two digits.
S3	Milligrams CO_2 per gram of rock
Max T Celsius	Rock Eval II - adjusted temperature of maximum hydrocarbon generation calculated from Peak T
Peak T Celsius	Temperature of maximum hydrocarbon generation from Rock Eval SIX
TOC wt. %	Total organic carbon in weight per cent
HI	Hydrogen index - (100 * S2)/TOC, rounded to a whole number
OI	Oxygen index - (100 * S3)/TOC, rounded to a whole number
MINC wt. %	Mineral carbon in weight per cent

Sample No.	Site No.	Qty g	S1 mg/g	S2 mg/g	PI	S3	Max T Celsius	Peak T Celsius	TOC wt. %	HI	OI	MINC wt. %
8113	M25	70.7	0.22	0.12	0.65	0.23	421	460	0.80	15	29	4.3
8114	M25	70.6	0.16	0.09	0.64	0.26	398	437	0.55	16	47	5.9
8115	M25	70.7	0.08	0.08	0.50	0.22	454	493	0.79	10	28	4.4
8116	M25	71.1	0.09	0.08	0.53	0.20	307	346	0.68	12	29	2.7
8117	M25	70.9	0.11	0.10	0.52	0.20	297	336	0.88	11	23	1.9
8118	M25	70.8	0.20	0.10	0.65	0.18	298	337	0.75	13	24	1.9
8119	M14	70.4	0.72	0.94	0.43	0.13	421	460	0.49	192	27	2.2
8120	M14	70.8	0.66	0.93	0.41	0.17	434	473	0.55	169	31	1.2
8121	M14	70.1	0.67	0.53	0.56	0.14	414	453	0.25	212	56	4.7
8122	M14	70.2	0.52	1.58	0.25	0.19	436	475	0.72	219	26	0.9
8123	M33	70.4	2.53	2.02	0.56	0.15	418	457	0.66	306	23	2.4
8124	M33	70.2	0.97	2.51	0.28	0.29	444	483	1.37	183	21	2.9
8125	M33	70.9	0.30	0.24	0.56	0.17	442	481	0.32	75	53	2.3
8126	M33	70.8	0.22	0.24	0.47	0.23	443	482	0.25	96	92	2.8
8131	M37	70.9	4.84	83.84	0.05	0.36	436	475	13.99	599	3	2.1
8132	M37	70.3	10.33	33.92	0.23	0.22	440	479	7.21	470	3	11.6
8701	M27	70.4	1.06	0.76	0.58	0.02	449	488	0.96	79	2	3.5
8702	M27	70.4	1.88	1.01	0.65	0.23	452	491	1.22	83	19	1.9
8703	M27	70.2	0.68	0.65	0.51	0.23	398	437	0.72	90	32	4.9
8704	M27	70.6	0.44	0.52	0.46	0.17	437	476	0.93	56	18	1.8
8705	M28	70.4	0.41	4.36	0.09	0.27	442	481	0.98	445	28	1.2
8706	M28	70.8	1.43	2.25	0.39	0.26	439	478	0.81	278	32	1.1
8707	M28	71.0	1.11	3.24	0.26	0.37	439	478	0.82	395	45	3.3
8708	M28	70.6	1.12	2.42	0.32	0.25	439	478	0.87	278	29	3.2
8709	M29	70.0	1.28	1.27	0.50	0.15	432	471	0.78	163	19	1.8
8710	M29	69.9	1.14	1.19	0.49	0.20	425	464	0.62	192	32	2.3
8712	M29	70.7	0.86	0.75	0.53	0.21	438	477	0.68	110	31	2.1
8713	M29	70.7	0.78	1.21	0.39	0.14	451	490	1.20	101	12	7.0
8714	M29	71.0	1.86	1.82	0.51	0.18	449	488	1.77	103	10	1.3
8715	M29	70.6	2.12	1.69	0.56	0.21	431	470	1.08	156	19	3.5
8716	M20	70.1	0.40	4.45	0.08	0.21	446	485	1.10	405	19	2.8
8718	M20	70.3	0.71	4.23	0.14	0.21	442	481	1.39	304	15	4.5
8719	M20	71.0	0.38	5.09	0.07	0.20	448	487	1.53	333	13	3.8
8720	M20	70.0	0.37	6.87	0.05	0.21	444	483	1.76	390	12	1.6
8721	M20	70.6	1.46	3.33	0.30	0.22	440	479	1.47	227	15	1.7
8722	M20	70.7	0.76	0.48	0.61	0.11	316	355	0.20	240	55	2.4
8723	M20	70.2	0.49	5.73	0.08	0.08	440	479	1.55	370	5	0.3
8724	M20	70.7	0.39	6.55	0.06	0.12	441	480	1.95	336	6	0.3
8725	M20	70.9	0.26	5.50	0.05	0.09	445	484	1.34	410	7	0.7
8727	M20	70.2	1.10	2.21	0.33	0.14	437	476	0.78	283	18	2.2
8729	M20	70.9	1.40	2.83	0.33	0.14	437	476	1.03	275	14	1.9
8730	M23	70.3	0.62	0.27	0.70	0.20	305	344	1.42	19	14	2.1
8732	M23	70.2	1.26	0.45	0.74	0.22	302	341	1.82	25	12	2.2
8734	M23	70.3	0.32	0.30	0.52	0.19	311	350	1.75	17	11	2.1
8736	M23	70.4	0.08	0.07	0.55	0.27	393	432	0.26	27	104	4.1
8737	M7	70.3	0.57	1.16	0.33	0.00	428	467	0.35	331	0	2.7
8739	M7	70.3	2.02	2.30	0.47	0.15	420	459	0.72	319	21	3.4
8743	M7	70.3	0.07	0.19	0.27	0.26	434	473	0.30	63	87	3.5
8745	M4	70.2	0.55	0.53	0.51	0.22	440	479	0.45	118	49	2.9
8747	M4	70.6	0.05	0.23	0.18	0.20	436	475	0.06	383	333	1.8

Sample No.	Site No.	Qty g	S1 mg/g	S2 mg/g	PI	S3	Max T Celsius	Peak T Celsius	TOC wt. %	HI	OI	MINC wt. %
8750	M4	70.7	0.68	0.72	0.48	0.22	417	456	0.37	195	59	5.8
8751	M10	70.9	0.92	0.41	0.69	0.15	449	488	1.46	28	10	1.3
8753	M10	70.0	0.42	0.22	0.66	0.15	450	489	0.87	25	17	2.2
8754	M10	70.6	0.50	0.28	0.64	0.00	445	484	0.92	30	0	2.3
8755	M10	70.5	0.68	0.45	0.60	0.12	444	483	1.29	35	9	1.2
8756	M10	70.4	0.52	0.29	0.64	0.15	451	490	1.07	27	14	2.2
8757	M10	70.0	0.48	0.23	0.67	0.18	447	486	1.08	21	17	4.0
8758	M19	70.3	0.20	0.67	0.23	0.12	437	476	0.55	122	22	3.0
8760	M19	70.5	0.22	9.77	0.02	0.23	440	479	1.72	568	13	3.1
8761	M19	70.8	0.81	2.73	0.23	0.17	436	475	0.71	385	24	3.1
8762	M19	70.2	0.46	7.85	0.06	0.32	438	477	1.50	523	21	2.4
8764	M19	70.6	0.68	2.17	0.24	0.23	438	477	0.57	381	40	2.7
8765	M19	70.5	0.62	23.33	0.03	0.24	436	475	3.64	641	7	1.5
8767	M19	70.7	0.46	11.93	0.04	0.38	438	477	2.22	537	17	2.4
8768	M19	70.3	0.70	4.49	0.13	0.13	437	476	0.99	454	13	1.5
8770	M19	70.3	0.47	9.05	0.05	0.16	437	476	1.59	569	10	0.6
8772	M19	70.6	0.40	1.14	0.26	0.23	439	478	0.42	271	55	1.7
8774	M40	70.2	0.84	0.62	0.58	0.43	302	341	0.22	282	195	0.2
8780	M40	70.0	3.06	12.46	0.20	0.18	416	455	1.69	737	11	0.1
8781	M15	70.3	0.23	1.25	0.16	0.27	433	472	0.57	219	47	2.4
8782	M15	70.2	0.05	0.13	0.28	0.31	428	467	0.31	42	100	10.0
8784	M15	70.8	0.49	0.79	0.38	0.16	432	471	0.37	214	43	3.1
8785	M15	70.8	0.18	5.71	0.03	0.23	441	480	1.05	544	22	1.2
8786	M15	70.6	0.59	2.10	0.22	0.14	432	471	0.65	323	22	3.2
8788	M15	70.1	0.52	2.13	0.20	0.06	440	479	0.75	284	8	2.9
8789	M15	70.3	0.54	0.49	0.52	0.17	415	454	0.16	306	106	6.2
8790	M13	70.4	0.74	60.30	0.01	0.29	440	479	11.67	517	2	1.2
8792	M13	70.5	0.25	0.16	0.61	0.10	421	460	0.14	114	71	2.6
8793	M13	70.7	0.32	0.20	0.62	0.14	409	448	0.34	59	41	2.5
8794	M13	70.2	0.42	0.55	0.43	0.30	415	454	0.19	289	158	3.4
8796	M32	70.5	1.52	1.16	0.57	0.14	353	392	0.39	297	36	1.6
8799	M32	70.7	0.76	0.44	0.63	0.18	299	338	0.20	220	90	1.1
8800	M5	71.0	1.36	19.33	0.07	0.38	443	482	8.79	220	4	3.9
8806	M5	70.0	0.40	0.57	0.41	0.29	411	450	0.26	219	112	3.7
8808	M3	51.0	0.33	2.52	0.11	0.43	476	516	6.67	38	6	4.9
8813	M3	70.7	0.02	0.09	0.18	0.15	421	461	0.11	82	136	2.8
8819	M1	70.3	0.02	0.08	0.21	0.23	352	392	0.13	62	177	0.6
8822	M21	70.3	0.40	2.53	0.14	0.29	427	466	0.76	333	38	1.2
8823	M21	70.6	0.95	5.49	0.15	0.16	430	469	1.26	436	13	0.9
8824	M21	70.3	0.45	8.84	0.05	0.20	430	469	1.72	514	12	0.8
8826	M21	71.0	0.12	0.65	0.16	0.24	425	464	0.32	203	75	2.7
8827	M21	70.5	0.46	5.36	0.08	0.26	430	469	1.05	510	25	1.1
8828	M21	70.8	2.86	95.77	0.03	0.42	433	472	14.54	659	3	2.4
8831	M21	70.8	1.77	5.23	0.25	0.25	430	469	1.24	422	20	0.8
8834	M2	50.5	0.06	0.33	0.14	0.14	607	646	3.73	9	4	1.6
8837	M2	70.2	0.10	0.15	0.40	0.04	601	640	1.10	14	4	1.2
8838	M2	70.4	0.06	0.06	0.50	0.24	409	448	0.27	22	89	4.6
8839	M2	70.3	0.06	0.11	0.37	0.18	411	450	0.43	26	42	3.6
8840	M2	70.1	0.03	0.06	0.33	0.18	407	446	0.14	43	129	2.2
8841	M2	70.7	0.03	0.08	0.24	0.22	403	442	0.22	36	100	2.9

Sample No.	Site No.	Qty g	S1 mg/g	S2 mg/g	PI	S3	Max T Celsius	Peak T Celsius	TOC wt. %	HI	OI	MINC wt. %
8842	M2	70.0	0.08	0.09	0.44	0.23	340	379	0.18	50	128	1.8
8843	M2	70.2	0.01	0.09	0.12	0.13	543	582	0.84	11	15	0.3
8844	M2	70.0	0.02	0.04	0.28	0.17	403	442	0.13	31	131	2.6
8847	M2	70.4	0.09	0.17	0.33	0.11	466	505	1.26	13	9	2.3
8848	M2	70.8	0.32	0.22	0.60	0.00	297	336	1.02	22	0	2.5
8849	M2	70.7	0.21	0.21	0.51	0.18	461	500	1.34	16	13	1.8
8850	M2	70.5	0.08	0.11	0.44	0.15	459	498	0.90	12	17	2.9
8851	M2	70.1	0.30	0.29	0.51	0.15	307	346	1.27	23	12	2.0
8853	M2	70.5	0.33	0.16	0.68	0.18	462	501	1.30	12	14	2.7
8854	M2	70.5	0.27	0.14	0.65	0.17	304	343	0.93	15	18	2.8
8855	M2	70.0	0.35	0.12	0.74	0.15	473	512	1.02	12	15	3.4
8856	M2	70.7	0.44	0.24	0.65	0.14	296	335	1.27	19	11	1.8
8857	M2	70.2	0.23	0.16	0.60	0.14	484	523	1.28	12	11	2.5
8858	M2	70.3	0.09	0.13	0.40	0.17	465	504	1.25	10	14	1.6
8859	M30	70.0	0.35	0.27	0.56	0.32	296	335	0.26	104	123	1.5
8862	M30	70.0	1.71	4.01	0.30	0.13	421	460	0.94	427	14	2.1
8866	M30	70.8	1.72	4.31	0.29	0.15	426	465	0.87	495	17	2.5
8867	M26	70.2	1.20	1.56	0.43	0.16	433	472	0.48	325	33	3.7
8869	M26	70.2	0.67	1.78	0.27	0.33	438	477	1.91	93	17	1.3
8874	M26	70.4	0.66	3.24	0.17	0.23	433	472	0.86	377	27	3.9
8875	M9	70.5	0.82	0.86	0.49	0.29	418	457	0.37	232	78	3.4
8876	M9	70.2	0.71	0.85	0.45	0.19	429	468	0.33	258	58	2.8
8878	M9	70.4	0.40	0.35	0.53	0.22	422	461	0.32	109	69	1.9
8879	M9	70.8	0.06	0.59	0.09	0.30	429	468	0.31	190	97	1.2
8881	M9	70.0	0.10	0.49	0.17	0.27	430	469	0.19	258	142	1.1
8882	M11	70.5	5.53	82.28	0.06	0.57	438	477	13.75	598	4	6.7
8883	M11	70.5	6.21	94.90	0.06	0.70	438	477	15.47	613	5	7.6
8884	M11	50.5	2.61	116.22	0.02	0.32	442	481	19.09	609	2	1.0
8886	M11	70.4	1.88	2.77	0.40	0.15	423	462	0.64	433	23	2.2
8887	M11	70.6	1.20	2.97	0.29	0.14	431	470	0.68	437	21	2.0
8888	M11	70.8	3.01	7.81	0.28	0.19	435	474	1.75	446	11	1.4
8889	M11	70.8	1.86	2.35	0.44	0.14	432	471	0.74	318	19	2.2
8891	M6	70.7	2.01	52.08	0.04	0.67	438	477	11.65	447	6	3.9
8893	M6	70.7	0.35	0.57	0.38	0.23	427	466	0.35	163	66	2.3
8894	M6	71.3	0.07	0.31	0.18	0.18	424	463	0.22	141	82	1.3
8895	M6	70.6	0.40	2.91	0.12	0.12	437	476	0.81	359	15	0.7
8897	M6	70.5	0.50	4.20	0.11	0.11	437	476	0.97	433	11	0.5
8898	M6	70.4	0.47	3.56	0.12	0.14	437	476	0.79	451	18	0.5
8899	M8	70.1	0.93	0.84	0.52	0.10	445	484	1.28	66	8	1.5
8900	M8	70.9	0.79	0.76	0.51	0.13	333	372	1.23	62	11	1.2
8901	M8	70.5	0.76	0.69	0.53	0.12	326	365	0.87	79	14	2.9
8902	M8	70.5	0.71	0.66	0.52	0.14	331	370	0.88	75	16	1.7
8903	M8	70.9	0.60	0.53	0.53	0.12	327	366	0.84	63	14	1.5
8904	M8	70.3	0.45	0.41	0.52	0.12	315	354	0.82	50	15	1.9
8905	M39	70.5	2.50	30.42	0.08	0.32	438	477	6.31	482	5	1.6
8908	M39	70.5	1.09	2.88	0.27	0.21	436	475	0.71	406	30	2.2
8909	M39	70.3	1.73	5.83	0.23	0.22	435	474	1.45	402	15	1.9
8910	M38	70.2	0.93	14.48	0.06	0.50	437	476	2.84	510	18	2.3
8912	M38	70.6	0.88	5.26	0.14	0.28	438	477	1.22	431	23	1.7
8914	M38	70.7	0.44	2.51	0.15	0.18	439	478	0.60	418	30	1.5

Sample No.	Site No.	Qty g	S1 mg/g	S2 mg/g	PI	S3	Max T Celsius	Peak T Celsius	TOC wt. %	HI	OI	MINC wt. %
8915	M38	70.8	0.32	1.33	0.19	0.63	431	470	0.82	162	77	1.6
8916	M35	70.4	0.70	2.90	0.19	0.22	437	476	0.87	333	25	2.5
8918	M35	70.9	0.33	0.79	0.30	0.21	434	473	0.31	255	68	2.9
8919	M35	70.3	0.25	0.72	0.25	0.19	435	474	0.31	232	61	2.4
8921	M35	70.4	1.48	1.87	0.44	0.11	434	473	0.66	283	17	2.1
8923	M35	70.5	2.15	16.13	0.12	0.24	436	475	2.75	587	9	1.0
8924	M35	70.6	0.27	0.89	0.23	0.09	435	474	0.35	254	26	1.9
8926	M34	70.1	0.93	2.00	0.32	0.13	441	480	0.72	278	18	2.3
8928	M34	71.0	1.45	2.08	0.41	0.20	441	480	0.80	260	25	2.1
8930	M34	70.7	0.69	0.85	0.45	0.12	441	480	0.39	218	31	1.8
8931	M36	70.1	4.91	103.73	0.05	0.71	425	464	14.14	734	5	2.9
8933	M36	70.2	1.52	1.81	0.46	0.12	413	452	0.51	355	24	12.9
8934	M36	70.5	0.30	0.19	0.61	0.61	294	333	0.72	26	85	6.6
8935	M36	70.8	0.15	0.15	0.49	0.55	299	338	0.28	54	196	3.9
8936	M36	70.9	0.27	0.21	0.57	0.34	299	338	0.32	66	106	2.7
8937	M36	70.6	2.19	0.46	0.83	0.12	293	332	0.34	135	35	2.6
8938	M18	70.8	1.83	75.72	0.02	0.25	433	472	11.64	651	2	1.2
8940	M18	70.7	0.63	1.20	0.34	0.04	418	457	0.26	462	15	3.9
8942	M18	70.5	0.63	2.62	0.19	0.20	423	462	0.52	504	38	3.0
8945	M12	70.7	0.09	0.08	0.54	0.09	417	456	0.24	33	38	2.8
8947	M12	70.8	0.24	0.10	0.70	0.13	433	472	1.12	9	12	2.7
8948	M12	70.4	0.24	0.12	0.66	0.10	306	345	0.89	13	11	1.7
8950	M12	70.0	0.77	0.24	0.76	0.02	298	337	1.28	19	2	2.1
8951	M16	70.9	0.11	0.10	0.52	0.09	306	345	0.23	43	39	3.0
8952	M16	71.0	0.04	0.04	0.54	0.13	295	334	0.38	11	34	4.9
8953	M16	70.2	0.02	0.03	0.31	0.08	339	378	0.04	75	200	0.0
8955	M16	70.8	0.09	0.14	0.39	0.06	415	454	0.05	280	120	0.1
8956	M31	70.2	0.69	1.20	0.36	0.14	441	480	0.61	197	23	2.1
8957	M31	70.2	0.63	0.91	0.41	0.10	438	477	0.48	190	21	2.0
8958	M31	69.8	0.65	0.88	0.42	0.09	431	470	0.37	238	24	2.4
8959	M31	70.5	0.96	0.95	0.50	0.15	432	471	0.40	238	38	2.2
8961	M31	70.5	1.59	1.78	0.47	0.11	436	475	0.72	247	15	1.8
8963	M24	70.9	1.13	0.88	0.56	0.08	448	487	1.10	80	7	1.5
8964	M24	70.7	0.91	1.05	0.47	0.19	453	492	1.33	79	14	2.0
8966	M24	70.3	0.66	0.81	0.45	0.12	448	487	0.97	84	12	1.6
8967	M24	70.0	0.42	0.62	0.40	0.13	448	487	1.07	58	12	1.7
8969	M24	70.2	0.04	0.26	0.13	0.10	418	457	0.37	70	27	2.9
8971	M17	70.3	1.55	77.37	0.02	0.27	440	479	13.83	559	2	1.1
8972	M17	70.3	1.96	2.28	0.46	0.14	417	456	0.61	374	23	12.5
8973	M17	70.3	1.75	2.40	0.42	0.23	419	458	0.59	407	39	2.7
8975	M17	70.6	0.84	1.70	0.33	0.13	417	456	0.46	370	28	2.1
8977	M17	70.7	0.38	0.82	0.32	0.21	418	457	0.54	152	39	4.7
9247	M15	70.4	0.30	2.08	0.13	0.34	441	481	0.93	224	37	3.0
9248	M13	70.5	0.35	0.21	0.62	0.29	422	462	0.25	84	116	3.3
9249	M5	70.7	0.63	0.88	0.41	0.27	397	437	0.34	259	79	4.1
9251	M18	70.5	0.81	0.88	0.48	0.21	311	350	0.28	314	75	1.8
9252	M17	70.8	0.34	0.40	0.46	0.24	307	346	0.24	167	100	3.1
9253	M31	70.5	0.67	1.08	0.38	0.13	442	481	0.64	169	20	2.2