

Sample Summary

Olsson Associates

Job No: D45524

Mesa Energy CBU 29-12 Sampling

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
D45524-1	04/22/13	15:45 JS	04/24/13	SO	Soil	CBU 29-12 555
D45524-1A	04/22/13	15:45 JS	04/24/13	SO	Soil	CBU 29-12 555
D45524-2	04/22/13	16:05 JS	04/24/13	SO	Soil	CBU 29-12 556
D45524-2A	04/22/13	16:05 JS	04/24/13	SO	Soil	CBU 29-12 556

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Report of Analysis

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Client Sample ID:	CBU 29-12 555	Date Sampled:	04/22/13
Lab Sample ID:	D45524-1	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	74.1
Method:	SW846 8260B		
Project:	Mesa Energy CBU 29-12 Sampling		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V26754.D	1	05/02/13	BD	n/a	n/a	V5V1626
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.10 g	5.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	84	42	ug/kg	
108-88-3	Toluene	162	170	84	ug/kg	J
100-41-4	Ethylbenzene	52.5	170	32	ug/kg	J
1330-20-7	Xylene (total)	ND	330	170	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	102%		64-130%
460-00-4	4-Bromofluorobenzene	105%		62-131%
17060-07-0	1,2-Dichloroethane-D4	95%		70-130%

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

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Client Sample ID:	CBU 29-12 555	Date Sampled:	04/22/13
Lab Sample ID:	D45524-1	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	74.1
Method:	SW846 8270C BY SIM SW846 3546		
Project:	Mesa Energy CBU 29-12 Sampling		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G14242.D	1	04/26/13	DC	04/26/13	OP7764	E3G695
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	11	5.8	ug/kg	
120-12-7	Anthracene	ND	11	5.8	ug/kg	
56-55-3	Benzo(a)anthracene	ND	11	5.8	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	11	5.8	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	11	5.8	ug/kg	
50-32-8	Benzo(a)pyrene	ND	11	5.8	ug/kg	
218-01-9	Chrysene	9.8	11	5.8	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	11	5.8	ug/kg	
206-44-0	Fluoranthene	ND	11	5.8	ug/kg	
86-73-7	Fluorene	ND	11	6.7	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	11	5.8	ug/kg	
91-20-3	Naphthalene	36.8	16	14	ug/kg	
129-00-0	Pyrene	19.6	11	5.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	56%		10-159%
321-60-8	2-Fluorobiphenyl	53%		19-131%
1718-51-0	Terphenyl-d14	80%		18-150%

ND = Not detected MDL - Method Detection Limit
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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

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Client Sample ID:	CBU 29-12 555	
Lab Sample ID:	D45524-1	Date Sampled: 04/22/13
Matrix:	SO - Soil	Date Received: 04/24/13
Method:	SW846 8015B	Percent Solids: 74.1
Project:	Mesa Energy CBU 29-12 Sampling	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB20178.D	1	04/24/13	BR	n/a	n/a	GGB1106
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	17	8.4	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	96%		60-140%		

ND = Not detected MDL - Method Detection Limit
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 N = Indicates presumptive evidence of a compound

Report of Analysis

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Client Sample ID:	CBU 29-12 555	Date Sampled:	04/22/13
Lab Sample ID:	D45524-1	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	74.1
Method:	SW846-8015B SW846 3546		
Project:	Mesa Energy CBU 29-12 Sampling		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD23779.D	1	04/25/13	TU	04/25/13	OP7759	GFD1195
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	117	9.0	6.7	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	64%		35-130%		

ND = Not detected MDL - Method Detection Limit
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 N = Indicates presumptive evidence of a compound

Report of Analysis

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Client Sample ID:	CBU 29-12 555	Date Sampled:	04/22/13
Lab Sample ID:	D45524-1	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	74.1
Project:	Mesa Energy CBU 29-12 Sampling		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	5.3	0.14	mg/kg	5	04/25/13	04/29/13 JB	SW846 6020A ³	SW846 3050B ⁵
Barium	3270	1.4	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Boron	11.3	6.8	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Cadmium	< 1.4	1.4	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Chromium	10.2	1.4	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Copper	13.5	1.4	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Lead	9.4	6.8	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Mercury	< 0.11	0.11	mg/kg	1	04/25/13	04/25/13 JM	SW846 7471B ¹	SW846 7471B ⁶
Nickel	12.3	4.1	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Selenium	< 6.8	6.8	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Silver	< 4.1	4.1	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Zinc	361	4.1	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴

(1) Instrument QC Batch: MA3500

(2) Instrument QC Batch: MA3503

(3) Instrument QC Batch: MA3513

(4) Prep QC Batch: MP9910

(5) Prep QC Batch: MP9911

(6) Prep QC Batch: MP9912

RL = Reporting Limit

Report of Analysis

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Client Sample ID:	CBU 29-12 555	Date Sampled:	04/22/13
Lab Sample ID:	D45524-1	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	74.1
Project:	Mesa Energy CBU 29-12 Sampling		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	2130	1.0	umhos/cm	1	04/25/13	KB	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	04/29/13	KB	SW846 3060A/7196A
Chromium, Trivalent ^a	10.2	2.4	mg/kg	1	04/29/13	KB	SW846 3060A/7196A M
Redox Potential Vs H2	226		mv	1	04/25/13	AK	ASTM D1498-76M
Solids, Percent	74.1		%	1	04/25/13	SWT	SM19 2540B M
pH	8.42		su	1	04/25/13 14:45	KB	SW846 9045D

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

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Client Sample ID:	CBU 29-12 555	Date Sampled:	04/22/13
Lab Sample ID:	D45524-1A	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	74.1
Project:	Mesa Energy CBU 29-12 Sampling		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	44.1	2.0	mg/l	1	04/25/13	04/25/13 JB	SW846 6010C ¹	SW846 3010A/M ²
Magnesium	11.7	1.0	mg/l	1	04/25/13	04/25/13 JB	SW846 6010C ¹	SW846 3010A/M ²
Sodium	401	2.0	mg/l	1	04/25/13	04/25/13 JB	SW846 6010C ¹	SW846 3010A/M ²

(1) Instrument QC Batch: MA3503

(2) Prep QC Batch: MP9915

RL = Reporting Limit

Report of Analysis

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Client Sample ID:	CBU 29-12 555	Date Sampled:	04/22/13
Lab Sample ID:	D45524-1A	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	74.1
Project:	Mesa Energy CBU 29-12 Sampling		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	13.9		ratio	1	04/25/13 13:55	JB	USDA HANDBOOK 60

(a) Calculated as: $(\text{Na meq/L}) / \sqrt{[(\text{Ca meq/L}) + (\text{Mg meq/L})/2]}$

RL = Reporting Limit

Report of Analysis

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Client Sample ID:	CBU 29-12 556	Date Sampled:	04/22/13
Lab Sample ID:	D45524-2	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	81.3
Method:	SW846 8260B		
Project:	Mesa Energy CBU 29-12 Sampling		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V26755.D	1	05/02/13	BD	n/a	n/a	V5V1626
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.06 g	5.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	72	36	ug/kg	
108-88-3	Toluene	ND	140	72	ug/kg	
100-41-4	Ethylbenzene	ND	140	27	ug/kg	
1330-20-7	Xylene (total)	ND	290	140	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	101%		64-130%
460-00-4	4-Bromofluorobenzene	103%		62-131%
17060-07-0	1,2-Dichloroethane-D4	97%		70-130%

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Report of Analysis

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Client Sample ID:	CBU 29-12 556	Date Sampled:	04/22/13
Lab Sample ID:	D45524-2	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	81.3
Method:	SW846 8270C BY SIM SW846 3546		
Project:	Mesa Energy CBU 29-12 Sampling		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G14319.D	1	04/30/13	DC	04/30/13	OP7779	E3G698
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	10	5.3	ug/kg	
120-12-7	Anthracene	ND	10	5.3	ug/kg	
56-55-3	Benzo(a)anthracene	ND	10	5.3	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	10	5.3	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	10	5.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	10	5.3	ug/kg	
218-01-9	Chrysene	ND	10	5.3	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	10	5.3	ug/kg	
206-44-0	Fluoranthene	ND	10	5.3	ug/kg	
86-73-7	Fluorene	ND	10	6.1	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	10	5.3	ug/kg	
91-20-3	Naphthalene	ND	14	13	ug/kg	
129-00-0	Pyrene	ND	10	5.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	70%		10-159%
321-60-8	2-Fluorobiphenyl	70%		19-131%
1718-51-0	Terphenyl-d14	86%		18-150%

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

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Client Sample ID:	CBU 29-12 556	Date Sampled:	04/22/13
Lab Sample ID:	D45524-2	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	81.3
Method:	SW846 8015B		
Project:	Mesa Energy CBU 29-12 Sampling		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB20179.D	1	04/24/13	BR	n/a	n/a	GGB1106
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	14	7.2	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	98%		60-140%		

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
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 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

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Client Sample ID:	CBU 29-12 556	
Lab Sample ID:	D45524-2	Date Sampled: 04/22/13
Matrix:	SO - Soil	Date Received: 04/24/13
Method:	SW846-8015B SW846 3546	Percent Solids: 81.3
Project:	Mesa Energy CBU 29-12 Sampling	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD23781.D	1	04/25/13	TU	04/25/13	OP7759	GFD1195
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	23.7	8.2	6.2	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	63%		35-130%		

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

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Client Sample ID:	CBU 29-12 556	Date Sampled:	04/22/13
Lab Sample ID:	D45524-2	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	81.3
Project:	Mesa Energy CBU 29-12 Sampling		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	0.99	0.12	mg/kg	5	04/25/13	04/29/13 JB	SW846 6020A ³	SW846 3050B ⁵
Barium	274	1.2	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Boron	6.4	6.0	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Cadmium	< 1.2	1.2	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Chromium	3.2	1.2	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Copper	6.7	1.2	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Lead	6.4	6.0	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Mercury	< 0.11	0.11	mg/kg	1	04/25/13	04/25/13 JM	SW846 7471B ¹	SW846 7471B ⁶
Nickel	5.3	3.6	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Selenium	< 6.0	6.0	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Silver	< 3.6	3.6	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴
Zinc	19.6	3.6	mg/kg	1	04/25/13	04/25/13 JB	SW846 6010C ²	SW846 3050B ⁴

(1) Instrument QC Batch: MA3500

(2) Instrument QC Batch: MA3503

(3) Instrument QC Batch: MA3513

(4) Prep QC Batch: MP9910

(5) Prep QC Batch: MP9911

(6) Prep QC Batch: MP9912

RL = Reporting Limit

Report of Analysis

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Client Sample ID:	CBU 29-12 556	Date Sampled:	04/22/13
Lab Sample ID:	D45524-2	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	81.3
Project:	Mesa Energy CBU 29-12 Sampling		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	2020	1.0	umhos/cm	1	04/25/13	KB	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	04/29/13	KB	SW846 3060A/7196A
Chromium, Trivalent ^a	3.2	2.2	mg/kg	1	04/29/13	KB	SW846 3060A/7196A M
Redox Potential Vs H2	212		mv	1	04/25/13	AK	ASTM D1498-76M
Solids, Percent	81.3		%	1	04/25/13	SWT	SM19 2540B M
pH	8.64		su	1	04/25/13 14:45	KB	SW846 9045D

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

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Client Sample ID:	CBU 29-12 556	Date Sampled:	04/22/13
Lab Sample ID:	D45524-2A	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	81.3
Project:	Mesa Energy CBU 29-12 Sampling		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	70.1	2.0	mg/l	1	04/25/13	04/25/13 JB	SW846 6010C ¹	SW846 3010A/M ²
Magnesium	16.1	1.0	mg/l	1	04/25/13	04/25/13 JB	SW846 6010C ¹	SW846 3010A/M ²
Sodium	364	2.0	mg/l	1	04/25/13	04/25/13 JB	SW846 6010C ¹	SW846 3010A/M ²

(1) Instrument QC Batch: MA3503

(2) Prep QC Batch: MP9915

RL = Reporting Limit

Report of Analysis

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Client Sample ID:	CBU 29-12 556	Date Sampled:	04/22/13
Lab Sample ID:	D45524-2A	Date Received:	04/24/13
Matrix:	SO - Soil	Percent Solids:	81.3
Project:	Mesa Energy CBU 29-12 Sampling		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	10.2		ratio	1	04/25/13 13:09	JB	USDA HANDBOOK 60

(a) Calculated as: $(\text{Na meq/L}) / \sqrt{[(\text{Ca meq/L}) + (\text{Mg meq/L})/2]}$

RL = Reporting Limit