May 2, 2016

Mr. Zach Toellner
Marathon Oil Company
1501 Stampede Avenue
Cody, Wyoming 82414

Re: 596-19C Well Pad
Excavation Oversight and Sampling
Garfield County, Colorado

Dear Mr. Toellner:

Apex Companies, LLC (Apex) is pleased to present this letter report summarizing the results of the excavation and sampling activities completed at the above referenced site (herein referred to as facility or site). Activities were completed in accordance with the Colorado Oil & Gas Conservation Commission (COGCC) 900 Series Rules.

The 596-19C location is situated in Section 19 of Township 5 South and Range 96 West. It is Apex's understanding that during the initial excavation activities no soil samples were collected. Apex's objective in April 2016 was to collect samples in accordance with COGCC regulation to document the successful remediation of the release.

An earthwork contractor used a trackhoe to excavate the backfill and suspect soils identified in the release area. Apex personnel provided excavation support with continuous field screening using a Photoionization Detector (PID) as well as visual and olfactory observation. When PID readings were below 50 parts per million (PPM) and soils no longer had a hydrocarbon odor or visible staining, confirmation samples were collected and submitted to a lab for analysis of the organic contaminants listed in COGCC Table 910-1.

Table 1 presents summarized laboratory results from excavation samples. A diagram showing the sample locations can be found in **Attachment A** and the laboratory results are included in **Attachment B**.

Final analytical results show the excavation bottom and sidewall soils meet COGCC Table 910-1 standards for the organic constituents of concern (TPH, BTEX, PAH). Arsenic exceeds the allowable concentration in Table 910-1, but is within the range of background values for this area. Marathon can request that the background values be considered as an alternative allowable limit to Table 910-1. The inorganic constituent pH is above allowable levels, however the excavation bottom is over six feet below surface and will be well below the agronomic/root zone (three feet) when backfilled, and will have no effect on revegetation efforts.

Apex appreciates the opportunity to provide environmental consulting services to Marathon Oil Company with this project. Should you have any questions or require additional information, please contact me at (970) 263-8679.

Sincerely,
Apex Companies, LLC

Jana Nilsen
Senior Project Manager

Attachments

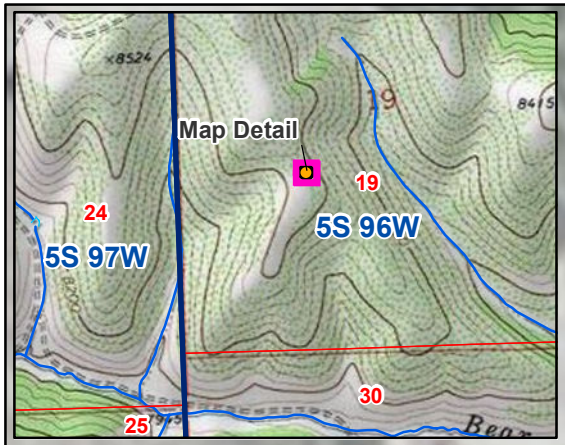
TABLE 1

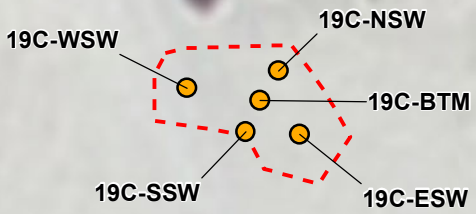
Client Sample ID: Date Sampled:		19C_WSW 4/12/2016	19C_NSW 4/12/2016	19C_ESW 4/12/2016	19C_SSW 4/12/2016	19C_BTM 4/12/2016	19C_2015_STOCKPILE 4/12/2016	19C_2016_STOCKPILE 4/12/2016
Matrix:		**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
GC/MS Volatiles (SW846 8260B)								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	ug/kg	ND	ND	ND	ND	ND	ND	10
GC/MS Semi-volatiles (SW846 8270C BY SIM)								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	8.3	ND	ND
Benzo(a)anthracene	ug/kg	ND	4.0 J	ND	ND	21	ND	ND
Benzo(b)fluoranthene	ug/kg	2.6 J	7.8	ND	4.1 J	19.9	3.1 J	ND
Benzo(k)fluoranthene	ug/kg	ND	3.4 J	ND	ND	7.4	ND	ND
Benzo(a)pyrene	ug/kg	ND	5.7	ND	ND	14.5	ND	ND
Chrysene	ug/kg	ND	3.3 J	ND	ND	19.2	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	3.5 J	ND	ND
Fluoranthene	ug/kg	ND	4.7 J	ND	ND	50	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	6.7	ND	ND
Indeno(1,2,3-cd)pyrene	ug/kg	ND	7	ND	ND	10.5	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	12.2	ND	ND
Pyrene	ug/kg	ND	2.7 J	ND	ND	39.2	ND	ND
GC Volatiles (SW846 8015B)								
TPH-GRO (C6-C10)	mg/kg	ND	ND	ND	ND	16.4	ND	13.6 J
GC Semi-volatiles (SW846-8015B)								
TPH-DRO (C10-C28)	mg/kg	ND	13.9	ND	ND	80.4	ND	20.7
Metals Analysis								
Arsenic	mg/kg	**9.8**	**5**	**9**	**6.6**	**6**	**5.9**	**6.3**
Barium	mg/kg	456	489	518	457	429	453	552
Cadmium	mg/kg	ND	ND	ND	ND	ND	ND	ND
Chromium, Hexavalent	mg/kg	ND	ND	ND	ND	ND	ND	ND
Chromium, Trivalent	mg/kg	59.2	47.9	58.3	51.3	45.6	49.4	47.3
Copper	mg/kg	8.7	10.2	8.8	10	9.4	8.9	9.4
Lead	mg/kg	19.8	20.5	19.1	18.2	17.2	17.1	16.6
Mercury	mg/kg	ND	ND	ND	ND	ND	ND	ND
Nickel	mg/kg	27.9	22.6	28.4	25.4	23.9	24.9	23.5
Selenium	mg/kg	7.6	8.3	ND	5.9	6.4	ND	ND
Silver	mg/kg	5.9	4.8	5.2	4.9	4.5	4.6	4.7
Zinc	mg/kg	48.3	45.3	49.3	47.2	44.4	45.1	44.5
General Chemistry								
Specific Conductivity	umhos/cm	185	153	162	291	245	768	224
Sodium Adsorption Ratio	ratio	1.28	0.717	1.02	2.41	1.97	3.66	2.48
pH	su	**9.22**	8.98	**9.14**	**9.21**	8.87	**9.01**	8.88

APEX

ATTACHMENT 1

Sampling Location Diagrams





0 10 20
Feet

N

Marathon Oil

596-19C Release Excavation Map

Legend

- Sample Location
- Excavation Extent

Site Characteristics

Legal Location: NWSW, Sec 19, T5S R96W
County: Garfield
Land Use: Rangeland
Topography: 5-30% slopes
Run-Off Risk: High
Excavation Area: 295 sq-ft
Soil Type: Parachute-Irigul complex
Receiving Waters: Unnamed trib, 800-ft East

REVISED	BY	COMMENT
4/29/2016	BJB	Figure 1

APEX
Apex Companies, LLC
beau.bergstrom@apexcos.com
M:\Projects\Marathon\Piceance\Projects\Remediation\596_19C_Form_19_Ex_20160429.mxd

ATTACHMENT 2

Laboratory Analytical Reports

e-Hardcopy 2.0
Automated Report

Technical Report for

Marathon Oil Company

19C Flowline Release

SGS Accutest Job Number: D81711

Sampling Date: 04/12/16

Report to:

Marathon Oil Company
251 N. Parachute Ave
Parachute, CO 81635
zjtoellner@marathonoil.com

ATTN: Zach Toellner

Total number of pages in report: **126**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Scott Heideman
Laboratory Director

Client Service contact: Renea Lewis 303-425-6021

Certifications: CO (CO00049), ID, NE (CO00049), ND (R-027), NJ (CO 0007), OK (D9942), UT (NELAP CO00049), LA (LA150028), TX (T104704511), WY
CO (CO00049), EPA 515.4 Provisional

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Sample Summary

Marathon Oil Company

Job No: D81711

19C Flowline Release

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
D81711-1	04/12/16	09:50	JN	04/13/16	SO	Soil	19C_2015_STOCKPILE
D81711-1A	04/12/16	09:50	JN	04/13/16	SO	Soil	19C_2015_STOCKPILE
D81711-2	04/12/16	15:19	JN	04/13/16	SO	Soil	19C_WSW
D81711-2A	04/12/16	15:19	JN	04/13/16	SO	Soil	19C_WSW
D81711-3	04/12/16	15:25	JN	04/13/16	SO	Soil	19C_NSW
D81711-3A	04/12/16	15:25	JN	04/13/16	SO	Soil	19C_NSW
D81711-4	04/12/16	15:30	JN	04/13/16	SO	Soil	19C_ESW
D81711-4A	04/12/16	15:30	JN	04/13/16	SO	Soil	19C_ESW
D81711-5	04/12/16	15:35	JN	04/13/16	SO	Soil	19C_SSW
D81711-5A	04/12/16	15:35	JN	04/13/16	SO	Soil	19C_SSW
D81711-6	04/12/16	15:45	JN	04/13/16	SO	Soil	19C_BTM
D81711-6A	04/12/16	15:45	JN	04/13/16	SO	Soil	19C_BTM
D81711-7	04/12/16	16:00	JN	04/13/16	SO	Soil	19C_2016_STOCKPILE

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

Sample Summary
(continued)

Marathon Oil Company

Job No: D81711

19C Flowline Release

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
D81711-7A	04/12/16	16:00	JN	04/13/16	SO	Soil	19C_2016_STOCKPILE

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

Summary of Hits

Job Number: D81711
Account: Marathon Oil Company
Project: 19C Flowline Release
Collected: 04/12/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
D81711-1	**19C_2015_STOCKPILE**					
Benzo(b)fluoranthene		3.1 J	5.5	2.7	ug/kg	SW846 8270C BY SIM
Arsenic		5.9	0.12		mg/kg	SW846 6020A
Barium		453	1.2		mg/kg	SW846 6010C
Chromium		49.4	1.2		mg/kg	SW846 6010C
Copper		8.9	1.2		mg/kg	SW846 6010C
Lead		17.1	5.9		mg/kg	SW846 6010C
Nickel		24.9	3.5		mg/kg	SW846 6010C
Silver		4.6	3.5		mg/kg	SW846 6010C
Zinc		45.1	3.5		mg/kg	SW846 6010C
Specific Conductivity		768	1.0		umhos/cm	SM 2510B-2011 MOD
Chromium, Trivalent [a]		49.4	2.2		mg/kg	SW846 3060A/7196A M
Redox Potential Vs H2		462			mv	ASTM D1498-76M
pH		9.01			su	SW846 9045D
D81711-1A	**19C_2015_STOCKPILE**					
Calcium		39.5	2.0		mg/l	SW846 6010C
Magnesium		7.03	1.0		mg/l	SW846 6010C
Sodium		95.1	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [b]		3.66			ratio	USDA HANDBOOK 60
D81711-2	**19C_WSW**					
Benzo(b)fluoranthene		2.6 J	5.5	2.6	ug/kg	SW846 8270C BY SIM
Arsenic		9.8	0.13		mg/kg	SW846 6020A
Barium		456	1.3		mg/kg	SW846 6010C
Chromium		59.2	1.3		mg/kg	SW846 6010C
Copper		8.7	1.3		mg/kg	SW846 6010C
Lead		19.8	6.3		mg/kg	SW846 6010C
Nickel		27.9	3.8		mg/kg	SW846 6010C
Selenium		7.6	6.3		mg/kg	SW846 6010C
Silver		5.9	3.8		mg/kg	SW846 6010C
Zinc		48.3	3.8		mg/kg	SW846 6010C
Specific Conductivity		185	1.0		umhos/cm	SM 2510B-2011 MOD
Chromium, Trivalent [a]		59.2	2.3		mg/kg	SW846 3060A/7196A M
Redox Potential Vs H2		476			mv	ASTM D1498-76M
pH		9.22			su	SW846 9045D
D81711-2A	**19C_WSW**					
Calcium		15.0	2.0		mg/l	SW846 6010C
Magnesium		2.98	1.0		mg/l	SW846 6010C
Sodium		20.8	2.0		mg/l	SW846 6010C

Summary of Hits

Job Number: D81711
Account: Marathon Oil Company
Project: 19C Flowline Release
Collected: 04/12/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Sodium Adsorption Ratio [b]		1.28			ratio	USDA HANDBOOK 60
D81711-3	**19C_NSW**					
Benzo(a)anthracene		4.0 J	5.5	2.7	ug/kg	SW846 8270C BY SIM
Benzo(b)fluoranthene		7.8	5.5	2.7	ug/kg	SW846 8270C BY SIM
Benzo(k)fluoranthene		3.4 J	5.5	2.7	ug/kg	SW846 8270C BY SIM
Benzo(a)pyrene		5.7	5.5	2.7	ug/kg	SW846 8270C BY SIM
Chrysene		3.3 J	5.5	2.7	ug/kg	SW846 8270C BY SIM
Fluoranthene		4.7 J	5.5	2.7	ug/kg	SW846 8270C BY SIM
Indeno(1,2,3-cd)pyrene		7.0	5.5	4.3	ug/kg	SW846 8270C BY SIM
Pyrene		2.7 J	5.5	2.7	ug/kg	SW846 8270C BY SIM
TPH-DRO (C10-C28)		13.9	13	12	mg/kg	SW846-8015B
Arsenic		5.0	0.13		mg/kg	SW846 6020A
Barium		489	1.3		mg/kg	SW846 6010C
Chromium		47.9	1.3		mg/kg	SW846 6010C
Copper		10.2	1.3		mg/kg	SW846 6010C
Lead		20.5	6.3		mg/kg	SW846 6010C
Nickel		22.6	3.8		mg/kg	SW846 6010C
Selenium		8.3	6.3		mg/kg	SW846 6010C
Silver		4.8	3.8		mg/kg	SW846 6010C
Zinc		45.3	3.8		mg/kg	SW846 6010C
Specific Conductivity		153	1.0		umhos/cm	SM 2510B-2011 MOD
Chromium, Trivalent [a]		47.9	2.3		mg/kg	SW846 3060A/7196A M
Redox Potential Vs H2		488			mv	ASTM D1498-76M
pH		8.98			su	SW846 9045D
D81711-3A	**19C_NSW**					
Calcium		17.5	2.0		mg/l	SW846 6010C
Magnesium		3.78	1.0		mg/l	SW846 6010C
Sodium		12.7	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [b]		0.717			ratio	USDA HANDBOOK 60
D81711-4	**19C_ESW**					
Arsenic		9.0	0.12		mg/kg	SW846 6020A
Barium		518	1.2		mg/kg	SW846 6010C
Chromium		58.3	1.2		mg/kg	SW846 6010C
Copper		8.8	1.2		mg/kg	SW846 6010C
Lead		19.1	6.0		mg/kg	SW846 6010C
Nickel		28.4	3.6		mg/kg	SW846 6010C
Silver		5.2	3.6		mg/kg	SW846 6010C
Zinc		49.3	3.6		mg/kg	SW846 6010C
Specific Conductivity		162	1.0		umhos/cm	SM 2510B-2011 MOD

Summary of Hits

Job Number: D81711
Account: Marathon Oil Company
Project: 19C Flowline Release
Collected: 04/12/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Chromium, Trivalent [a]		58.3	2.2		mg/kg	SW846 3060A/7196A M
Redox Potential Vs H2		485			mv	ASTM D1498-76M
pH		9.14			su	SW846 9045D
D81711-4A	**19C_ESW**					
Calcium		16.8	2.0		mg/l	SW846 6010C
Magnesium		3.08	1.0		mg/l	SW846 6010C
Sodium		17.4	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [b]		1.02			ratio	USDA HANDBOOK 60
D81711-5	**19C_SSW**					
Benzo(b)fluoranthene		4.1 J	5.4	2.6	ug/kg	SW846 8270C BY SIM
Arsenic		6.6	0.11		mg/kg	SW846 6020A
Barium		457	1.1		mg/kg	SW846 6010C
Chromium		51.3	1.1		mg/kg	SW846 6010C
Copper		10	1.1		mg/kg	SW846 6010C
Lead		18.2	5.7		mg/kg	SW846 6010C
Nickel		25.4	3.4		mg/kg	SW846 6010C
Selenium		5.9	5.7		mg/kg	SW846 6010C
Silver		4.9	3.4		mg/kg	SW846 6010C
Zinc		47.2	3.4		mg/kg	SW846 6010C
Specific Conductivity		291	1.0		umhos/cm	SM 2510B-2011 MOD
Chromium, Trivalent [a]		51.3	2.1		mg/kg	SW846 3060A/7196A M
Redox Potential Vs H2		473			mv	ASTM D1498-76M
pH		9.21			su	SW846 9045D
D81711-5A	**19C_SSW**					
Calcium		18.9	2.0		mg/l	SW846 6010C
Magnesium		3.87	1.0		mg/l	SW846 6010C
Sodium		44.1	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [b]		2.41			ratio	USDA HANDBOOK 60
D81711-6	**19C_BTM**					
Anthracene		8.3	5.6	2.7	ug/kg	SW846 8270C BY SIM
Benzo(a)anthracene		21.0	5.6	2.7	ug/kg	SW846 8270C BY SIM
Benzo(b)fluoranthene		19.9	5.6	2.7	ug/kg	SW846 8270C BY SIM
Benzo(k)fluoranthene		7.4	5.6	2.7	ug/kg	SW846 8270C BY SIM
Benzo(a)pyrene		14.5	5.6	2.7	ug/kg	SW846 8270C BY SIM
Chrysene		19.2	5.6	2.7	ug/kg	SW846 8270C BY SIM
Dibenzo(a,h)anthracene		3.5 J	5.6	2.7	ug/kg	SW846 8270C BY SIM
Fluoranthene		50.0	5.6	2.7	ug/kg	SW846 8270C BY SIM

Summary of Hits

Job Number: D81711
Account: Marathon Oil Company
Project: 19C Flowline Release
Collected: 04/12/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Fluorene		6.7	5.6	2.7	ug/kg	SW846 8270C BY SIM
Indeno(1,2,3-cd)pyrene		10.5	5.6	4.3	ug/kg	SW846 8270C BY SIM
Naphthalene		12.2	5.6	3.3	ug/kg	SW846 8270C BY SIM
Pyrene		39.2	5.6	2.7	ug/kg	SW846 8270C BY SIM
TPH-GRO (C6-C10)		16.4	16	7.8	mg/kg	SW846 8015B
TPH-DRO (C10-C28)		80.4	13	12	mg/kg	SW846-8015B
Arsenic		6.0	0.12		mg/kg	SW846 6020A
Barium		429	1.2		mg/kg	SW846 6010C
Chromium		45.6	1.2		mg/kg	SW846 6010C
Copper		9.4	1.2		mg/kg	SW846 6010C
Lead		17.2	6.1		mg/kg	SW846 6010C
Nickel		23.9	3.6		mg/kg	SW846 6010C
Selenium		6.4	6.1		mg/kg	SW846 6010C
Silver		4.5	3.6		mg/kg	SW846 6010C
Zinc		44.4	3.6		mg/kg	SW846 6010C
Specific Conductivity		245	1.0		umhos/cm	SM 2510B-2011 MOD
Chromium, Trivalent [a]		45.6	2.2		mg/kg	SW846 3060A/7196A M
Redox Potential Vs H2		493			mv	ASTM D1498-76M
pH		8.87			su	SW846 9045D
D81711-6A	**19C_BTM**					
Calcium		18.3	2.0		mg/l	SW846 6010C
Magnesium		3.49	1.0		mg/l	SW846 6010C
Sodium		35.1	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [b]		1.97			ratio	USDA HANDBOOK 60
D81711-7	**19C_2016_STOCKPILE**					
Xylene (total)		10.0	2.7	1.3	ug/kg	SW846 8260B
TPH-GRO (C6-C10)		13.6 J	16	8.0	mg/kg	SW846 8015B
TPH-DRO (C10-C28)		20.7	13	12	mg/kg	SW846-8015B
Arsenic		6.3	0.13		mg/kg	SW846 6020A
Barium		552	1.3		mg/kg	SW846 6010C
Chromium		47.3	1.3		mg/kg	SW846 6010C
Copper		9.4	1.3		mg/kg	SW846 6010C
Lead		16.6	6.4		mg/kg	SW846 6010C
Nickel		23.5	3.9		mg/kg	SW846 6010C
Silver		4.7	3.9		mg/kg	SW846 6010C
Zinc		44.5	3.9		mg/kg	SW846 6010C
Specific Conductivity		224	1.0		umhos/cm	SM 2510B-2011 MOD
Chromium, Trivalent [a]		47.3	2.3		mg/kg	SW846 3060A/7196A M
Redox Potential Vs H2		463			mv	ASTM D1498-76M
pH		8.88			su	SW846 9045D

Summary of Hits

Job Number: D81711
Account: Marathon Oil Company
Project: 19C Flowline Release
Collected: 04/12/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
D81711-7A	**19C_2016_STOCKPILE**					
Calcium		12.9	2.0		mg/l	SW846 6010C
Magnesium		2.66	1.0		mg/l	SW846 6010C
Sodium		37.4	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [b]		2.48			ratio	USDA HANDBOOK 60

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)
(b) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	19C_2015_STOCKPILE		
Lab Sample ID:	D81711-1	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	78.3
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V36823.D	1	04/18/16	AK	n/a	n/a	V5V2135
Run #2							

	Initial Weight
Run #1	5.02 g
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.3	0.64	ug/kg	
108-88-3	Toluene	ND	2.5	1.3	ug/kg	
100-41-4	Ethylbenzene	ND	2.5	0.64	ug/kg	
1330-20-7	Xylene (total)	ND	2.7	1.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		70-130%
2037-26-5	Toluene-D8	99%		64-130%
460-00-4	4-Bromofluorobenzene	97%		62-131%
17060-07-0	1,2-Dichloroethane-D4	97%		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

Client Sample ID:	19C_2015_STOCKPILE		
Lab Sample ID:	D81711-1	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8270C BY SIM SW846 3546	**Percent Solids:**	78.3
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G27448.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387
Run #2							

	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	5.5	2.7	ug/kg	
120-12-7	Anthracene	ND	5.5	2.7	ug/kg	
56-55-3	Benzo(a)anthracene	ND	5.5	2.7	ug/kg	
205-99-2	Benzo(b)fluoranthene	3.1	5.5	2.7	ug/kg	J
207-08-9	Benzo(k)fluoranthene	ND	5.5	2.7	ug/kg	
50-32-8	Benzo(a)pyrene	ND	5.5	2.7	ug/kg	
218-01-9	Chrysene	ND	5.5	2.7	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	5.5	2.7	ug/kg	
206-44-0	Fluoranthene	ND	5.5	2.7	ug/kg	
86-73-7	Fluorene	ND	5.5	2.7	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.5	4.2	ug/kg	
91-20-3	Naphthalene	ND	5.5	3.3	ug/kg	
129-00-0	Pyrene	ND	5.5	2.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	77%		11-164%
321-60-8	2-Fluorobiphenyl	83%		14-138%
1718-51-0	Terphenyl-d14	90%		35-139%

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

Client Sample ID:	19C_2015_STOCKPILE		
Lab Sample ID:	D81711-1	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8015B	**Percent Solids:**	78.3
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB35197.D	1	04/15/16	AK	n/a	n/a	GGB1815
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	16	7.8	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	97%		60-140%

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

Client Sample ID:	19C_2015_STOCKPILE		
Lab Sample ID:	D81711-1	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846-8015B SW846 3546	**Percent Solids:**	78.3
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FI36768.D	1	04/15/16	GN	04/14/16	OP13405	GFI1708
Run #2							

	Initial Weight	Final Volume
Run #1	20.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	13	12	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	97%		20-130%

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

Client Sample ID:	19C_2015_STOCKPILE		
Lab Sample ID:	D81711-1	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.3
Project:	19C Flowline Release		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	5.9	0.12	mg/kg	5	04/15/16	04/19/16	RM	SW846 6020A [2]	SW846 3050B [6]
Barium	453	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Boron	< 5.9	5.9	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Cadmium	< 1.2	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Chromium	49.4	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Copper	8.9	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Lead	17.1	5.9	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Mercury	< 0.10	0.10	mg/kg	1	04/14/16	04/14/16	BR	SW846 7471B [1]	SW846 7471B [4]
Nickel	24.9	3.5	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Selenium	< 5.9	5.9	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Silver	4.6	3.5	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Zinc	45.1	3.5	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]

(1) Instrument QC Batch: MA7212
(2) Instrument QC Batch: MA7224
(3) Instrument QC Batch: MA7226
(4) Prep QC Batch: MP18465
(5) Prep QC Batch: MP18480
(6) Prep QC Batch: MP18481

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_2015_STOCKPILE		
Lab Sample ID:	D81711-1	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.3
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	78.3		%	1	04/14/16	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	768	1.0	umhos/cm	1	04/14/16	JD	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	04/14/16 08:00	MR	SW846 3060A/7196A
Chromium, Trivalent [a]	49.4	2.2	mg/kg	1	04/19/16 10:01	AS	SW846 3060A/7196A M
Redox Potential Vs H2	462		mv	1	04/15/16	JD	ASTM D1498-76M
pH	9.01		su	1	04/15/16 14:00	TB	SW846 9045D

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

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_2015_STOCKPILE		
Lab Sample ID:	D81711-1A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.3
Project:	19C Flowline Release		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	39.5	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Magnesium	7.03	1.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Sodium	95.1	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]

(1) Instrument QC Batch: MA7223
(2) Prep QC Batch: MP18482

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_2015_STOCKPILE		
Lab Sample ID:	D81711-1A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.3
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	3.66		ratio	1	04/15/16 12:18	JM	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_WSW		
Lab Sample ID:	D81711-2	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	79.2
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V36850.D	1	04/19/16	AK	n/a	n/a	V5V2136
Run #2							

	Initial Weight
Run #1	1.00 g
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	6.3	3.2	ug/kg	
108-88-3	Toluene	ND	13	6.3	ug/kg	
100-41-4	Ethylbenzene	ND	13	3.2	ug/kg	
1330-20-7	Xylene (total)	ND	13	6.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		70-130%
2037-26-5	Toluene-D8	95%		64-130%
460-00-4	4-Bromofluorobenzene	97%		62-131%
17060-07-0	1,2-Dichloroethane-D4	101%		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

Client Sample ID:	19C_WSW		
Lab Sample ID:	D81711-2	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8270C BY SIM SW846 3546	**Percent Solids:**	79.2
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G27445.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387
Run #2							

	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	5.5	2.6	ug/kg	
120-12-7	Anthracene	ND	5.5	2.6	ug/kg	
56-55-3	Benzo(a)anthracene	ND	5.5	2.6	ug/kg	
205-99-2	Benzo(b)fluoranthene	2.6	5.5	2.6	ug/kg	J
207-08-9	Benzo(k)fluoranthene	ND	5.5	2.6	ug/kg	
50-32-8	Benzo(a)pyrene	ND	5.5	2.6	ug/kg	
218-01-9	Chrysene	ND	5.5	2.6	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	5.5	2.6	ug/kg	
206-44-0	Fluoranthene	ND	5.5	2.6	ug/kg	
86-73-7	Fluorene	ND	5.5	2.6	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.5	4.2	ug/kg	
91-20-3	Naphthalene	ND	5.5	3.3	ug/kg	
129-00-0	Pyrene	ND	5.5	2.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	72%		11-164%
321-60-8	2-Fluorobiphenyl	75%		14-138%
1718-51-0	Terphenyl-d14	85%		35-139%

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

Client Sample ID:	19C_WSW		
Lab Sample ID:	D81711-2	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8015B	**Percent Solids:**	79.2
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB35198.D	1	04/15/16	AK	n/a	n/a	GGB1815
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	15	7.6	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	100%		60-140%

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

Client Sample ID: 19C_WSW
Lab Sample ID: D81711-2
Matrix: SO - Soil
Method: SW846-8015B SW846 3546
Project: 19C Flowline Release

Date Sampled: 04/12/16
Date Received: 04/13/16
Percent Solids: 79.2

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FI36762.D	1	04/15/16	GN	04/14/16	OP13405	GFI1708
Run #2							

	Initial Weight	Final Volume
Run #1	20.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	13	12	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	92%		20-130%

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

Client Sample ID:	19C_WSW		
Lab Sample ID:	D81711-2	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	79.2
Project:	19C Flowline Release		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	9.8	0.13	mg/kg	5	04/15/16	04/19/16	RM	SW846 6020A [2]	SW846 3050B [6]
Barium	456	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Boron	< 6.3	6.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Cadmium	< 1.3	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Chromium	59.2	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Copper	8.7	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Lead	19.8	6.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Mercury	< 0.099	0.099	mg/kg	1	04/14/16	04/14/16	BR	SW846 7471B [1]	SW846 7471B [4]
Nickel	27.9	3.8	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Selenium	7.6	6.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Silver	5.9	3.8	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Zinc	48.3	3.8	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]

(1) Instrument QC Batch: MA7212
(2) Instrument QC Batch: MA7224
(3) Instrument QC Batch: MA7226
(4) Prep QC Batch: MP18465
(5) Prep QC Batch: MP18480
(6) Prep QC Batch: MP18481

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_WSW		
Lab Sample ID:	D81711-2	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	79.2
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	79.2		%	1	04/14/16	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	185	1.0	umhos/cm	1	04/14/16	JD	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	04/15/16 08:00	MR	SW846 3060A/7196A
Chromium, Trivalent [a]	59.2	2.3	mg/kg	1	04/19/16 11:20	AS	SW846 3060A/7196A M
Redox Potential Vs H2	476		mv	1	04/15/16	JD	ASTM D1498-76M
pH	9.22		su	1	04/15/16 14:00	TB	SW846 9045D

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

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_WSW		
Lab Sample ID:	D81711-2A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	79.2
Project:	19C Flowline Release		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	15.0	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Magnesium	2.98	1.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Sodium	20.8	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]

(1) Instrument QC Batch: MA7223
(2) Prep QC Batch: MP18482

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_WSW		
Lab Sample ID:	D81711-2A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	79.2
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	1.28		ratio	1	04/15/16 11:59	JM	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_NSW		
Lab Sample ID:	D81711-3	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	78.1
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V36829.D	1	04/18/16	AK	n/a	n/a	V5V2135
Run #2							

	Initial Weight
Run #1	5.04 g
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.3	0.64	ug/kg	
108-88-3	Toluene	ND	2.5	1.3	ug/kg	
100-41-4	Ethylbenzene	ND	2.5	0.64	ug/kg	
1330-20-7	Xylene (total)	ND	2.7	1.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		70-130%
2037-26-5	Toluene-D8	96%		64-130%
460-00-4	4-Bromofluorobenzene	97%		62-131%
17060-07-0	1,2-Dichloroethane-D4	104%		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

Client Sample ID:	19C_NSW		
Lab Sample ID:	D81711-3	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8270C BY SIM SW846 3546	**Percent Solids:**	78.1
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G27449.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387
Run #2							

	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	5.5	2.7	ug/kg	
120-12-7	Anthracene	ND	5.5	2.7	ug/kg	
56-55-3	Benzo(a)anthracene	4.0	5.5	2.7	ug/kg	J
205-99-2	Benzo(b)fluoranthene	7.8	5.5	2.7	ug/kg	
207-08-9	Benzo(k)fluoranthene	3.4	5.5	2.7	ug/kg	J
50-32-8	Benzo(a)pyrene	5.7	5.5	2.7	ug/kg	
218-01-9	Chrysene	3.3	5.5	2.7	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	5.5	2.7	ug/kg	
206-44-0	Fluoranthene	4.7	5.5	2.7	ug/kg	J
86-73-7	Fluorene	ND	5.5	2.7	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	7.0	5.5	4.3	ug/kg	
91-20-3	Naphthalene	ND	5.5	3.3	ug/kg	
129-00-0	Pyrene	2.7	5.5	2.7	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	54%		11-164%
321-60-8	2-Fluorobiphenyl	64%		14-138%
1718-51-0	Terphenyl-d14	78%		35-139%

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

Client Sample ID:	19C_NSW		
Lab Sample ID:	D81711-3	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8015B	**Percent Solids:**	78.1
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB35199.D	1	04/15/16	AK	n/a	n/a	GGB1815
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	16	7.8	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	101%		60-140%

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

Client Sample ID:	19C_NSW		
Lab Sample ID:	D81711-3	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846-8015B SW846 3546	**Percent Solids:**	78.1
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FI36770.D	1	04/15/16	GN	04/14/16	OP13405	GFI1708
Run #2							

	Initial Weight	Final Volume
Run #1	20.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	13.9	13	12	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	98%		20-130%

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

Client Sample ID:	19C_NSW		
Lab Sample ID:	D81711-3	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.1
Project:	19C Flowline Release		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	5.0	0.13	mg/kg	5	04/15/16	04/19/16	RM	SW846 6020A [2]	SW846 3050B [6]
Barium	489	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Boron	< 6.3	6.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Cadmium	< 1.3	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Chromium	47.9	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Copper	10.2	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Lead	20.5	6.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Mercury	< 0.10	0.10	mg/kg	1	04/14/16	04/14/16	BR	SW846 7471B [1]	SW846 7471B [4]
Nickel	22.6	3.8	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Selenium	8.3	6.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Silver	4.8	3.8	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Zinc	45.3	3.8	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]

(1) Instrument QC Batch: MA7212
(2) Instrument QC Batch: MA7224
(3) Instrument QC Batch: MA7226
(4) Prep QC Batch: MP18465
(5) Prep QC Batch: MP18480
(6) Prep QC Batch: MP18481

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_NSW		
Lab Sample ID:	D81711-3	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.1
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	78.1		%	1	04/14/16	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	153	1.0	umhos/cm	1	04/14/16	JD	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	04/15/16 08:00	MR	SW846 3060A/7196A
Chromium, Trivalent [a]	47.9	2.3	mg/kg	1	04/19/16 11:25	AS	SW846 3060A/7196A M
Redox Potential Vs H2	488		mv	1	04/15/16	JD	ASTM D1498-76M
pH	8.98		su	1	04/15/16 14:00	TB	SW846 9045D

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

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_NSW		
Lab Sample ID:	D81711-3A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.1
Project:	19C Flowline Release		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	17.5	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Magnesium	3.78	1.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Sodium	12.7	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]

(1) Instrument QC Batch: MA7223
(2) Prep QC Batch: MP18482

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_NSW		
Lab Sample ID:	D81711-3A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.1
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	0.717		ratio	1	04/15/16 12:23	JM	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_ESW		
Lab Sample ID:	D81711-4	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	78.8
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V36830.D	1	04/18/16	AK	n/a	n/a	V5V2135
Run #2							

	Initial Weight
Run #1	5.00 g
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.3	0.63	ug/kg	
108-88-3	Toluene	ND	2.5	1.3	ug/kg	
100-41-4	Ethylbenzene	ND	2.5	0.63	ug/kg	
1330-20-7	Xylene (total)	ND	2.7	1.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		70-130%
2037-26-5	Toluene-D8	97%		64-130%
460-00-4	4-Bromofluorobenzene	95%		62-131%
17060-07-0	1,2-Dichloroethane-D4	99%		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

Client Sample ID:	19C_ESW		
Lab Sample ID:	D81711-4	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8270C BY SIM SW846 3546	**Percent Solids:**	78.8
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G27450.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387
Run #2							

	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	5.5	2.7	ug/kg	
120-12-7	Anthracene	ND	5.5	2.7	ug/kg	
56-55-3	Benzo(a)anthracene	ND	5.5	2.7	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	5.5	2.7	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	5.5	2.7	ug/kg	
50-32-8	Benzo(a)pyrene	ND	5.5	2.7	ug/kg	
218-01-9	Chrysene	ND	5.5	2.7	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	5.5	2.7	ug/kg	
206-44-0	Fluoranthene	ND	5.5	2.7	ug/kg	
86-73-7	Fluorene	ND	5.5	2.7	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.5	4.2	ug/kg	
91-20-3	Naphthalene	ND	5.5	3.3	ug/kg	
129-00-0	Pyrene	ND	5.5	2.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	75%		11-164%
321-60-8	2-Fluorobiphenyl	80%		14-138%
1718-51-0	Terphenyl-d14	90%		35-139%

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

Client Sample ID:	19C_ESW		
Lab Sample ID:	D81711-4	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8015B	**Percent Solids:**	78.8
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB35200.D	1	04/15/16	AK	n/a	n/a	GGB1815
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	16	7.8	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	106%		60-140%

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

Client Sample ID:	19C_ESW		
Lab Sample ID:	D81711-4	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846-8015B SW846 3546	**Percent Solids:**	78.8
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FI36772.D	1	04/15/16	GN	04/14/16	OP13405	GFI1708
Run #2							

	Initial Weight	Final Volume
Run #1	20.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	13	12	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	98%		20-130%

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

Client Sample ID:	19C_ESW		
Lab Sample ID:	D81711-4	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.8
Project:	19C Flowline Release		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	9.0	0.12	mg/kg	5	04/15/16	04/19/16	RM	SW846 6020A [2]	SW846 3050B [6]
Barium	518	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Boron	< 6.0	6.0	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Cadmium	< 1.2	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Chromium	58.3	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Copper	8.8	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Lead	19.1	6.0	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Mercury	< 0.10	0.10	mg/kg	1	04/14/16	04/14/16	BR	SW846 7471B [1]	SW846 7471B [4]
Nickel	28.4	3.6	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Selenium	< 6.0	6.0	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Silver	5.2	3.6	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Zinc	49.3	3.6	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]

(1) Instrument QC Batch: MA7212
(2) Instrument QC Batch: MA7224
(3) Instrument QC Batch: MA7226
(4) Prep QC Batch: MP18465
(5) Prep QC Batch: MP18480
(6) Prep QC Batch: MP18481

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_ESW		
Lab Sample ID:	D81711-4	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.8
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	78.8		%	1	04/14/16	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	162	1.0	umhos/cm	1	04/14/16	JD	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	04/15/16 08:00	MR	SW846 3060A/7196A
Chromium, Trivalent [a]	58.3	2.2	mg/kg	1	04/19/16 11:30	AS	SW846 3060A/7196A M
Redox Potential Vs H2	485		mv	1	04/15/16	JD	ASTM D1498-76M
pH	9.14		su	1	04/15/16 14:00	TB	SW846 9045D

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

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_ESW		
Lab Sample ID:	D81711-4A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.8
Project:	19C Flowline Release		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	16.8	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Magnesium	3.08	1.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Sodium	17.4	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]

(1) Instrument QC Batch: MA7223
(2) Prep QC Batch: MP18482

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_ESW		
Lab Sample ID:	D81711-4A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	78.8
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	1.02		ratio	1	04/15/16 12:28	JM	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_SSW		
Lab Sample ID:	D81711-5	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	80.0
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V36831.D	1	04/18/16	AK	n/a	n/a	V5V2135
Run #2							

	Initial Weight
Run #1	5.04 g
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.2	0.62	ug/kg	
108-88-3	Toluene	ND	2.5	1.2	ug/kg	
100-41-4	Ethylbenzene	ND	2.5	0.62	ug/kg	
1330-20-7	Xylene (total)	ND	2.6	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		70-130%
2037-26-5	Toluene-D8	98%		64-130%
460-00-4	4-Bromofluorobenzene	98%		62-131%
17060-07-0	1,2-Dichloroethane-D4	100%		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

Client Sample ID:	19C_SSW		
Lab Sample ID:	D81711-5	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8270C BY SIM SW846 3546	**Percent Solids:**	80.0
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G27451.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387
Run #2							

	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	5.4	2.6	ug/kg	
120-12-7	Anthracene	ND	5.4	2.6	ug/kg	
56-55-3	Benzo(a)anthracene	ND	5.4	2.6	ug/kg	
205-99-2	Benzo(b)fluoranthene	4.1	5.4	2.6	ug/kg	J
207-08-9	Benzo(k)fluoranthene	ND	5.4	2.6	ug/kg	
50-32-8	Benzo(a)pyrene	ND	5.4	2.6	ug/kg	
218-01-9	Chrysene	ND	5.4	2.6	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	5.4	2.6	ug/kg	
206-44-0	Fluoranthene	ND	5.4	2.6	ug/kg	
86-73-7	Fluorene	ND	5.4	2.6	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.4	4.2	ug/kg	
91-20-3	Naphthalene	ND	5.4	3.3	ug/kg	
129-00-0	Pyrene	ND	5.4	2.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		11-164%
321-60-8	2-Fluorobiphenyl	66%		14-138%
1718-51-0	Terphenyl-d14	82%		35-139%

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

Client Sample ID:	19C_SSW		
Lab Sample ID:	D81711-5	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8015B	**Percent Solids:**	80.0
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB35201.D	1	04/15/16	AK	n/a	n/a	GGB1815
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	15	7.6	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
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

Client Sample ID:	19C_SSW		
Lab Sample ID:	D81711-5	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846-8015B SW846 3546	**Percent Solids:**	80.0
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FI36774.D	1	04/16/16	GN	04/14/16	OP13405	GFI1708
Run #2							

	Initial Weight	Final Volume
Run #1	20.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	12	12	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	103%		20-130%

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

Client Sample ID:	19C_SSW		
Lab Sample ID:	D81711-5	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	80.0
Project:	19C Flowline Release		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	6.6	0.11	mg/kg	5	04/15/16	04/19/16	RM	SW846 6020A [2]	SW846 3050B [6]
Barium	457	1.1	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Boron	< 5.7	5.7	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Cadmium	< 1.1	1.1	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Chromium	51.3	1.1	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Copper	10	1.1	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Lead	18.2	5.7	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Mercury	< 0.096	0.096	mg/kg	1	04/14/16	04/14/16	BR	SW846 7471B [1]	SW846 7471B [4]
Nickel	25.4	3.4	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Selenium	5.9	5.7	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Silver	4.9	3.4	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Zinc	47.2	3.4	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]

(1) Instrument QC Batch: MA7212
(2) Instrument QC Batch: MA7224
(3) Instrument QC Batch: MA7226
(4) Prep QC Batch: MP18465
(5) Prep QC Batch: MP18480
(6) Prep QC Batch: MP18481

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_SSW		
Lab Sample ID:	D81711-5	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	80.0
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	80		%	1	04/14/16	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	291	1.0	umhos/cm	1	04/14/16	JD	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	04/15/16 08:00	MR	SW846 3060A/7196A
Chromium, Trivalent [a]	51.3	2.1	mg/kg	1	04/19/16 11:35	AS	SW846 3060A/7196A M
Redox Potential Vs H2	473		mv	1	04/15/16	JD	ASTM D1498-76M
pH	9.21		su	1	04/15/16 14:00	TB	SW846 9045D

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

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_SSW		
Lab Sample ID:	D81711-5A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	80.0
Project:	19C Flowline Release		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	18.9	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Magnesium	3.87	1.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Sodium	44.1	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]

(1) Instrument QC Batch: MA7223
(2) Prep QC Batch: MP18482

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_SSW		
Lab Sample ID:	D81711-5A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	80.0
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	2.41		ratio	1	04/15/16 12:33	JM	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_BTM		
Lab Sample ID:	D81711-6	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	77.6
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V36832.D	1	04/18/16	AK	n/a	n/a	V5V2135
Run #2							

	Initial Weight
Run #1	4.97 g
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.3	0.65	ug/kg	
108-88-3	Toluene	ND	2.6	1.3	ug/kg	
100-41-4	Ethylbenzene	ND	2.6	0.65	ug/kg	
1330-20-7	Xylene (total)	ND	2.7	1.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		70-130%
2037-26-5	Toluene-D8	98%		64-130%
460-00-4	4-Bromofluorobenzene	94%		62-131%
17060-07-0	1,2-Dichloroethane-D4	104%		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

Client Sample ID:	19C_BTM		
Lab Sample ID:	D81711-6	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8270C BY SIM SW846 3546	**Percent Solids:**	77.6
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G27452.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387
Run #2							

	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	5.6	2.7	ug/kg	
120-12-7	Anthracene	8.3	5.6	2.7	ug/kg	
56-55-3	Benzo(a)anthracene	21.0	5.6	2.7	ug/kg	
205-99-2	Benzo(b)fluoranthene	19.9	5.6	2.7	ug/kg	
207-08-9	Benzo(k)fluoranthene	7.4	5.6	2.7	ug/kg	
50-32-8	Benzo(a)pyrene	14.5	5.6	2.7	ug/kg	
218-01-9	Chrysene	19.2	5.6	2.7	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	3.5	5.6	2.7	ug/kg	J
206-44-0	Fluoranthene	50.0	5.6	2.7	ug/kg	
86-73-7	Fluorene	6.7	5.6	2.7	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	10.5	5.6	4.3	ug/kg	
91-20-3	Naphthalene	12.2	5.6	3.3	ug/kg	
129-00-0	Pyrene	39.2	5.6	2.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	52%		11-164%
321-60-8	2-Fluorobiphenyl	93%		14-138%
1718-51-0	Terphenyl-d14	96%		35-139%

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

Client Sample ID:	19C_BTM		
Lab Sample ID:	D81711-6	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8015B	**Percent Solids:**	77.6
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB35202.D	1	04/15/16	AK	n/a	n/a	GGB1815
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	16.4	16	7.8	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
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

Client Sample ID:	19C_BTM		
Lab Sample ID:	D81711-6	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846-8015B SW846 3546	**Percent Solids:**	77.6
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FI36776.D	1	04/16/16	GN	04/14/16	OP13405	GFI1708
Run #2							

	Initial Weight	Final Volume
Run #1	20.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	80.4	13	12	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	111%		20-130%

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

Client Sample ID:	19C_BTM		
Lab Sample ID:	D81711-6	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	77.6
Project:	19C Flowline Release		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	6.0	0.12	mg/kg	5	04/15/16	04/19/16	RM	SW846 6020A [2]	SW846 3050B [6]
Barium	429	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Boron	< 6.1	6.1	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Cadmium	< 1.2	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Chromium	45.6	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Copper	9.4	1.2	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Lead	17.2	6.1	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Mercury	< 0.10	0.10	mg/kg	1	04/14/16	04/14/16	BR	SW846 7471B [1]	SW846 7471B [4]
Nickel	23.9	3.6	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Selenium	6.4	6.1	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Silver	4.5	3.6	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Zinc	44.4	3.6	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]

(1) Instrument QC Batch: MA7212
(2) Instrument QC Batch: MA7224
(3) Instrument QC Batch: MA7226
(4) Prep QC Batch: MP18465
(5) Prep QC Batch: MP18480
(6) Prep QC Batch: MP18481

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_BTM		
Lab Sample ID:	D81711-6	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	77.6
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	77.6		%	1	04/14/16	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	245	1.0	umhos/cm	1	04/14/16	JD	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	04/15/16 08:00	MR	SW846 3060A/7196A
Chromium, Trivalent [a]	45.6	2.2	mg/kg	1	04/19/16 11:40	AS	SW846 3060A/7196A M
Redox Potential Vs H2	493		mv	1	04/15/16	JD	ASTM D1498-76M
pH	8.87		su	1	04/15/16 14:00	TB	SW846 9045D

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

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_BTM		
Lab Sample ID:	D81711-6A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	77.6
Project:	19C Flowline Release		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	18.3	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Magnesium	3.49	1.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Sodium	35.1	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]

(1) Instrument QC Batch: MA7223
(2) Prep QC Batch: MP18482

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_BTM		
Lab Sample ID:	D81711-6A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	77.6
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	1.97		ratio	1	04/15/16 12:53	JM	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_2016_STOCKPILE		
Lab Sample ID:	D81711-7	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	76.8
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V36833.D	1	04/18/16	AK	n/a	n/a	V5V2135
Run #2							

	Initial Weight
Run #1	5.05 g
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.3	0.64	ug/kg	
108-88-3	Toluene	ND	2.6	1.3	ug/kg	
100-41-4	Ethylbenzene	ND	2.6	0.64	ug/kg	
1330-20-7	Xylene (total)	10.0	2.7	1.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		70-130%
2037-26-5	Toluene-D8	98%		64-130%
460-00-4	4-Bromofluorobenzene	97%		62-131%
17060-07-0	1,2-Dichloroethane-D4	102%		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

Client Sample ID:	19C_2016_STOCKPILE		
Lab Sample ID:	D81711-7	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8270C BY SIM SW846 3546	**Percent Solids:**	76.8
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G27453.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387
Run #2							

	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	5.6	2.7	ug/kg	
120-12-7	Anthracene	ND	5.6	2.7	ug/kg	
56-55-3	Benzo(a)anthracene	ND	5.6	2.7	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	5.6	2.7	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	5.6	2.7	ug/kg	
50-32-8	Benzo(a)pyrene	ND	5.6	2.7	ug/kg	
218-01-9	Chrysene	ND	5.6	2.7	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	5.6	2.7	ug/kg	
206-44-0	Fluoranthene	ND	5.6	2.7	ug/kg	
86-73-7	Fluorene	ND	5.6	2.7	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.6	4.3	ug/kg	
91-20-3	Naphthalene	ND	5.6	3.4	ug/kg	
129-00-0	Pyrene	ND	5.6	2.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	54%		11-164%
321-60-8	2-Fluorobiphenyl	78%		14-138%
1718-51-0	Terphenyl-d14	87%		35-139%

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

Client Sample ID:	19C_2016_STOCKPILE		
Lab Sample ID:	D81711-7	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846 8015B	**Percent Solids:**	76.8
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB35203.D	1	04/15/16	AK	n/a	n/a	GGB1815
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	13.6	16	8.0	mg/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	93%		60-140%

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

Client Sample ID:	19C_2016_STOCKPILE		
Lab Sample ID:	D81711-7	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
Method:	SW846-8015B SW846 3546	**Percent Solids:**	76.8
Project:	19C Flowline Release		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FI36778.D	1	04/16/16	GN	04/14/16	OP13405	GFI1708
Run #2							

	Initial Weight	Final Volume
Run #1	20.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	20.7	13	12	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	104%		20-130%

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

Client Sample ID:	19C_2016_STOCKPILE		
Lab Sample ID:	D81711-7	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	76.8
Project:	19C Flowline Release		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	6.3	0.13	mg/kg	5	04/15/16	04/19/16	RM	SW846 6020A [2]	SW846 3050B [6]
Barium	552	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Boron	< 6.4	6.4	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Cadmium	< 1.3	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Chromium	47.3	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Copper	9.4	1.3	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Lead	16.6	6.4	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Mercury	< 0.10	0.10	mg/kg	1	04/14/16	04/14/16	BR	SW846 7471B [1]	SW846 7471B [4]
Nickel	23.5	3.9	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Selenium	< 6.4	6.4	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Silver	4.7	3.9	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]
Zinc	44.5	3.9	mg/kg	1	04/15/16	04/19/16	AS	SW846 6010C [3]	SW846 3050B [5]

(1) Instrument QC Batch: MA7212
(2) Instrument QC Batch: MA7224
(3) Instrument QC Batch: MA7226
(4) Prep QC Batch: MP18465
(5) Prep QC Batch: MP18480
(6) Prep QC Batch: MP18481

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_2016_STOCKPILE		
Lab Sample ID:	D81711-7	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	76.8
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	76.8		%	1	04/14/16	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	224	1.0	umhos/cm	1	04/14/16	JD	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	04/15/16 08:00	MR	SW846 3060A/7196A
Chromium, Trivalent [a]	47.3	2.3	mg/kg	1	04/19/16 11:45	AS	SW846 3060A/7196A M
Redox Potential Vs H2	463		mv	1	04/15/16	JD	ASTM D1498-76M
pH	8.88		su	1	04/15/16 14:00	TB	SW846 9045D

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

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_2016_STOCKPILE		
Lab Sample ID:	D81711-7A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	76.8
Project:	19C Flowline Release		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	12.9	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Magnesium	2.66	1.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]
Sodium	37.4	2.0	mg/l	1	04/15/16	04/15/16	JM	SW846 6010C [1]	SW846 3010A/M [2]

(1) Instrument QC Batch: MA7223
(2) Prep QC Batch: MP18482

RL = Reporting Limit

Report of Analysis

Client Sample ID:	19C_2016_STOCKPILE		
Lab Sample ID:	D81711-7A	**Date Sampled:**	04/12/16
Matrix:	SO - Soil	**Date Received:**	04/13/16
		Percent Solids:	76.8
Project:	19C Flowline Release		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	2.48		ratio	1	04/15/16 12:58	JM	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

ACCUTEST LABORATORIES

CHAIN OF CUSTODY

PAGE 1 OF 1

4036 Youngfield Street, Wheat Ridge, CO 80033
TEL. 303-425-6021 FAX: 303-425-6854
www.accutest.com

FED-EX Tracking #: | Bottle Order Control #:
Accutest Quote #: | Accutest Job #: D81711

Client / Reporting Information

Company Name: Marathon Oil Company
Street Address: 251 N. Parachute Avenue
City: Parachute, CO 81635
Project Contact: Zach Toellner - zjtoellner@marathonoil.com
Phone #: (970) 260-0772
Sampler(s) Name(s): Jaara Nielsen

Project Information

Project Name: 19C Flowline Release
Street:
City: State:
Project #:
Client Purchase Order #: 4800011767
Project Manager:

Billing Information (If different from Report to)

Company Name:
Street Address:
City:
Attention: Dustin Snow - dsnow@marathonoil.com

Requested Analysis (see TEST CODE sheet)

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL- Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB-Field Blank; EB-Equipment Blank; RB- Rinse Blank; TB-Trip Blank

Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	COGCC Table 910-1	TPH-GRO	TPH-DRO	BTEX	LAB USE ONLY
	19C - 2015 - Stockpile		4/2/16	0950	JW	SO	4									X				01
	19C - WSW			1518												X				02
	19C - NSW			1525												X				03
	19C - ESW			1530												X				04
	19C - SSW			1535												X				05
	19C - BTM			1545												X				06
	19C - 2016 - Stockpile			1600												X				07
																				PB
																				MP

Turnaround Time (Business days)

- [ ] Std. 15 Business Days
- [ ] Std. 10 Business Days
- [ ] 5 Day RUSH
- [X] 3 Day Emergency
- [ ] 2 Day Emergency
- [ ] 1 Day Emergency
- [ ]

Emergency & Rush T/A data available VIA Lablink

Approved By (Accutest PM): / Date:

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [X] COMMBN
- [ ] COMMBN+
- [ ]
- [ ] State Forms Required
- [ ] Send Forms to State
- [ ] Report by Fax
- [X] Report by PDF
- [X] EDD Format

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
Commercial BN = Results/QC/Narrative (+ = chromatograms)

Comments / Special Instructions

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time: 04/2/16 1830	Received By: 1	Relinquished By: 2	Date Time:	Received By: 2 4-13-16 1345
Relinquished by Sampler: 3	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4 TRB
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal # Co	[X] Intact [ ] Not Intact	Preserved where applicable [X] On Ice [X] Cooler Temp. 4.6

D81711: Chain of Custody
Page 1 of 2

SGS Accutest Sample Receipt Summary

Job Number: D81711 **Client:** MARATHON **Project:** 19C FLOWLINE RELEASE

Date / Time Received: 4/13/2016 1:45:00 PM **Delivery Method:** **Airbill #'s:** co

Cooler Temps (Initial/Adjusted): #1: (4.6/4.6);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Cooler temp verification:	Bar Therm;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☐	☑
2. Trip Blank listed on COC:	☐		☐	☑
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Comments

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

D81711: Chain of Custody
Page 2 of 2

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V2135-MB	5V36820.D	1	04/18/16	AK	n/a	n/a	V5V2135

The QC reported here applies to the following samples: **Method:** SW846 8260B

D81711-1, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.50	ug/kg	
100-41-4	Ethylbenzene	ND	2.0	0.50	ug/kg	
108-88-3	Toluene	ND	2.0	1.0	ug/kg	
1330-20-7	Xylene (total)	ND	2.1	1.0	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	70-130%
2037-26-5	Toluene-D8	99%	64-130%
460-00-4	4-Bromofluorobenzene	96%	62-131%
17060-07-0	1,2-Dichloroethane-D4	97%	70-130%

Method Blank Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V2135-MB	5V36821.D	1	04/18/16	AK	n/a	n/a	V5V2135

The QC reported here applies to the following samples: **Method:** SW846 8260B

D81711-1, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	50	25	ug/kg	
100-41-4	Ethylbenzene	ND	100	25	ug/kg	
108-88-3	Toluene	ND	100	50	ug/kg	
1330-20-7	Xylene (total)	ND	110	50	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	103%	70-130%
2037-26-5	Toluene-D8	97%	64-130%
460-00-4	4-Bromofluorobenzene	96%	62-131%
17060-07-0	1,2-Dichloroethane-D4	102%	70-130%

Method Blank Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V2136-MB	5V36846.D	1	04/19/16	AK	n/a	n/a	V5V2136

The QC reported here applies to the following samples: **Method:** SW846 8260B

D81711-2

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.50	ug/kg	
100-41-4	Ethylbenzene	ND	2.0	0.50	ug/kg	
108-88-3	Toluene	ND	2.0	1.0	ug/kg	
1330-20-7	Xylene (total)	ND	2.1	1.0	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	100%	70-130%
2037-26-5	Toluene-D8	97%	64-130%
460-00-4	4-Bromofluorobenzene	96%	62-131%
17060-07-0	1,2-Dichloroethane-D4	95%	70-130%

Method Blank Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V2136-MB	5V36847.D	1	04/19/16	AK	n/a	n/a	V5V2136

The QC reported here applies to the following samples: **Method:** SW846 8260B

D81711-2

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	50	25	ug/kg	
100-41-4	Ethylbenzene	ND	100	25	ug/kg	
108-88-3	Toluene	ND	100	50	ug/kg	
1330-20-7	Xylene (total)	ND	110	50	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	100%	70-130%
2037-26-5	Toluene-D8	98%	64-130%
460-00-4	4-Bromofluorobenzene	99%	62-131%
17060-07-0	1,2-Dichloroethane-D4	102%	70-130%

Blank Spike Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V2135-BS	5V36822.D	1	04/18/16	AK	n/a	n/a	V5V2135

The QC reported here applies to the following samples: **Method:** SW846 8260B

D81711-1, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	45.4	91	70-130
100-41-4	Ethylbenzene	50	47.0	94	70-130
108-88-3	Toluene	50	45.2	90	70-130
1330-20-7	Xylene (total)	150	141	94	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	100%	70-130%
2037-26-5	Toluene-D8	102%	64-130%
460-00-4	4-Bromofluorobenzene	97%	62-131%
17060-07-0	1,2-Dichloroethane-D4	95%	70-130%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V2136-BS	5V36848.D	1	04/19/16	AK	n/a	n/a	V5V2136

The QC reported here applies to the following samples: **Method:** SW846 8260B

D81711-2

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	47.9	96	70-130
100-41-4	Ethylbenzene	50	48.9	98	70-130
108-88-3	Toluene	50	46.2	92	70-130
1330-20-7	Xylene (total)	150	145	97	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	101%	70-130%
2037-26-5	Toluene-D8	99%	64-130%
460-00-4	4-Bromofluorobenzene	98%	62-131%
17060-07-0	1,2-Dichloroethane-D4	102%	70-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D81711-1MS	5V36824.D	1	04/18/16	AK	n/a	n/a	V5V2135
D81711-1MSD	5V36825.D	1	04/18/16	AK	n/a	n/a	V5V2135
D81711-1	5V36823.D	1	04/18/16	AK	n/a	n/a	V5V2135

The QC reported here applies to the following samples: **Method:** SW846 8260B

D81711-1, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	D81711-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		64.2	48.4	75	64.5	52.7	82	9	64-139/30
100-41-4	Ethylbenzene	ND		64.2	46.0	72	64.5	53.1	82	14	68-136/30
108-88-3	Toluene	ND		64.2	43.9	68	64.5	50.0	78	13	60-130/30
1330-20-7	Xylene (total)	ND		193	140	73	194	154	80	10	58-142/30

CAS No.	Surrogate Recoveries	MS	MSD	D81711-1	Limits
1868-53-7	Dibromofluoromethane	114%	104%	103%	70-130%
2037-26-5	Toluene-D8	97%	100%	99%	64-130%
460-00-4	4-Bromofluorobenzene	94%	98%	97%	62-131%
17060-07-0	1,2-Dichloroethane-D4	106%	93%	97%	70-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D81711-2MS	5V36851.D	1	04/19/16	AK	n/a	n/a	V5V2136
D81711-2MSD	5V36852.D	1	04/19/16	AK	n/a	n/a	V5V2136
D81711-2	5V36850.D	1	04/19/16	AK	n/a	n/a	V5V2136

The QC reported here applies to the following samples: **Method:** SW846 8260B

D81711-2

CAS No.	Compound	D81711-2 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		304	256	84	316	270	86	5	64-139/30
100-41-4	Ethylbenzene	ND		304	253	83	316	270	86	7	68-136/30
108-88-3	Toluene	ND		304	241	79	316	260	82	8	60-130/30
1330-20-7	Xylene (total)	ND		911	760	83	947	800	84	5	58-142/30

CAS No.	Surrogate Recoveries	MS	MSD	D81711-2	Limits
1868-53-7	Dibromofluoromethane	107%	104%	102%	70-130%
2037-26-5	Toluene-D8	99%	98%	95%	64-130%
460-00-4	4-Bromofluorobenzene	98%	97%	97%	62-131%
17060-07-0	1,2-Dichloroethane-D4	102%	96%	101%	70-130%

* = Outside of Control Limits.

GC/MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP13404-MB	3G27443.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387

The QC reported here applies to the following samples: **Method:** SW846 8270C BY SIM

D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	4.3	2.1	ug/kg	
120-12-7	Anthracene	ND	4.3	2.1	ug/kg	
56-55-3	Benzo(a)anthracene	ND	4.3	2.1	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	4.3	2.1	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	4.3	2.1	ug/kg	
50-32-8	Benzo(a)pyrene	ND	4.3	2.1	ug/kg	
218-01-9	Chrysene	ND	4.3	2.1	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	4.3	2.1	ug/kg	
206-44-0	Fluoranthene	ND	4.3	2.1	ug/kg	
86-73-7	Fluorene	ND	4.3	2.1	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	4.3	3.3	ug/kg	
91-20-3	Naphthalene	ND	4.3	2.6	ug/kg	
129-00-0	Pyrene	ND	4.3	2.1	ug/kg	

CAS No.	Surrogate Recoveries		Limits
4165-60-0	Nitrobenzene-d5	84%	11-164%
321-60-8	2-Fluorobiphenyl	113%	14-138%
1718-51-0	Terphenyl-d14	98%	35-139%

Blank Spike Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP13404-BS	3G27444.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387

The QC reported here applies to the following samples: **Method:** SW846 8270C BY SIM

D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	83.3	70.1	84	42-130
120-12-7	Anthracene	83.3	83.3	100	45-130
56-55-3	Benzo(a)anthracene	83.3	90.4	108	49-137
205-99-2	Benzo(b)fluoranthene	83.3	84.6	102	43-146
207-08-9	Benzo(k)fluoranthene	83.3	80.0	96	27-146
50-32-8	Benzo(a)pyrene	83.3	90.6	109	53-130
218-01-9	Chrysene	83.3	78.9	95	61-130
53-70-3	Dibenzo(a,h)anthracene	83.3	81.5	98	59-130
206-44-0	Fluoranthene	83.3	83.4	100	48-130
86-73-7	Fluorene	83.3	68.6	82	44-130
193-39-5	Indeno(1,2,3-cd)pyrene	83.3	81.6	98	58-130
91-20-3	Naphthalene	83.3	71.3	86	56-130
129-00-0	Pyrene	83.3	83.5	100	53-130

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	63%	11-164%
321-60-8	2-Fluorobiphenyl	67%	14-138%
1718-51-0	Terphenyl-d14	83%	35-139%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP13404-MS	3G27446.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387
OP13404-MSD	3G27447.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387
D81711-2	3G27445.D	1	04/14/16	DC	04/14/16	OP13404	E3G1387

The QC reported here applies to the following samples: **Method:** SW846 8270C BY SIM

D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	D81711-2 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		105	100	95	105	111	106	10	10-167/30
120-12-7	Anthracene	ND		105	119	113	105	130	124	9	10-200/30
56-55-3	Benzo(a)anthracene	ND		105	125	119	105	130	124	4	10-161/30
205-99-2	Benzo(b)fluoranthene	2.6	J	105	115	107	105	119	111	3	10-166/30
207-08-9	Benzo(k)fluoranthene	ND		105	106	101	105	110	105	4	10-152/30
50-32-8	Benzo(a)pyrene	ND		105	123	117	105	128	122	4	10-149/30
218-01-9	Chrysene	ND		105	105	100	105	109	104	4	10-156/30
53-70-3	Dibenzo(a,h)anthracene	ND		105	109	104	105	113	108	4	11-149/30
206-44-0	Fluoranthene	ND		105	109	104	105	130	124	18	10-175/30
86-73-7	Fluorene	ND		105	114	108	105	124	118	8	10-280/30
193-39-5	Indeno(1,2,3-cd)pyrene	ND		105	113	107	105	117	112	3	10-151/30
91-20-3	Naphthalene	ND		105	96.2	91	105	110	105	13	10-230/30
129-00-0	Pyrene	ND		105	120	114	105	126	120	5	10-160/30

CAS No.	Surrogate Recoveries	MS	MSD	D81711-2	Limits
4165-60-0	Nitrobenzene-d5	68%	79%	72%	11-164%
321-60-8	2-Fluorobiphenyl	73%	85%	75%	14-138%
1718-51-0	Terphenyl-d14	84%	90%	85%	35-139%

* = Outside of Control Limits.

GC Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB1815-MB	GB35180.D	1	04/14/16	AK	n/a	n/a	GGB1815

The QC reported here applies to the following samples: **Method:** SW846 8015B

D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	10	5.0	mg/kg	

CAS No.	Surrogate Recoveries		Limits
120-82-1	1,2,4-Trichlorobenzene	97%	60-140%

Blank Spike Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB1815-BS	GB35178A.D	1	04/14/16	AK	n/a	n/a	GGB1815

The QC reported here applies to the following samples: **Method:** SW846 8015B

D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (C6-C10)	110	125	114	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	110%	60-140%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D81558-7MS	GB35182.D	1	04/14/16	AK	n/a	n/a	GGB1815
D81558-7MSD	GB35183.D	1	04/14/16	AK	n/a	n/a	GGB1815
D81558-7	GB35181.D	1	04/14/16	AK	n/a	n/a	GGB1815

The QC reported here applies to the following samples: **Method:** SW846 8015B

D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	D81558-7 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	Spike mg/kg	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	ND		152	180	119	152	181	119	1	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D81558-7	Limits
120-82-1	1,2,4-Trichlorobenzene	105%	113%	101%	60-140%

* = Outside of Control Limits.

GC Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP13405-MB	FI36754.D	1	04/15/16	GN	04/14/16	OP13405	GFI1708

The QC reported here applies to the following samples: **Method:** SW846-8015B

D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	10	9.5	mg/kg	

CAS No.	Surrogate Recoveries		Limits
84-15-1	o-Terphenyl	106%	20-130%

Blank Spike Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP13405-BS	FI36756.D	1	04/15/16	GN	04/14/16	OP13405	GFI1708

The QC reported here applies to the following samples: **Method:** SW846-8015B

D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	250	192	77	32-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	108%	20-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D81711
Account: MARATCOP Marathon Oil Company
Project: 19C Flowline Release

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP13405-MS	FI36758.D	1	04/15/16	GN	04/14/16	OP13405	GFI1708
OP13405-MSD	FI36760.D	1	04/15/16	GN	04/14/16	OP13405	GFI1708
D81711-2	FI36762.D	1	04/15/16	GN	04/14/16	OP13405	GFI1708

The QC reported here applies to the following samples: **Method:** SW846-8015B

D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

CAS No.	Compound	D81711-2 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	Spike mg/kg	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	ND		314	241	77	316	201	64	18	20-152/54

CAS No.	Surrogate Recoveries	MS	MSD	D81711-2	Limits
84-15-1	o-Terphenyl	103%	93%	92%	20-130%

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18465 Methods: SW846 7471B
Matrix Type: SOLID Units: mg/kg

Prep Date: 04/14/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.10	.0011	.008	0.00086	<0.10

Associated samples MP18465: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18465
Matrix Type: SOLID

Methods: SW846 7471B
Units: mg/kg

Prep Date: 04/14/16

Metal	D81617-1 Original	MS	Spikelot HGWSR1	% Rec	QC Limits
Mercury	0.13	0.39	0.308	84.5	75-125

Associated samples MP18465: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18465 Methods: SW846 7471B
Matrix Type: SOLID Units: mg/kg

Prep Date: 04/14/16

Metal	D81617-1 Original	MSD	Spikelot HGWSR1	% Rec	MSD RPD	QC Limit
Mercury	0.13	0.40	0.317	85.1	2.5	20

Associated samples MP18465: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18465
Matrix Type: SOLID

Methods: SW846 7471B
Units: mg/kg

Prep Date: 04/14/16

Metal	BSP Result	Spikelot HGWSR1	% Rec	QC Limits
Mercury	0.34	0.4	85.0	80-120

Associated samples MP18465: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 04/15/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	10	.86	1.7		
Antimony	3.0	.32	.82		
Arsenic	2.5	.52	2.1		
Barium	1.0	.14	.03	0.060	<1.0
Beryllium	1.0	.08	.16		
Boron	5.0	.67	.29	-0.10	<5.0
Cadmium	1.0	.04	.1	-0.040	<1.0
Calcium	40	.22	9.6		
Chromium	1.0	.04	.07	-0.010	<1.0
Cobalt	0.50	.04	.12		
Copper	1.0	.12	.48	0.050	<1.0
Iron	7.0	.22	.69		
Lead	5.0	.36	.6	0.46	<5.0
Lithium	0.50	.19	.07		
Magnesium	20	1.4	3.9		
Manganese	0.50	.001	.07		
Molybdenum	1.0	.08	.36		
Nickel	3.0	.09	.24	0.080	<3.0
Phosphorus	10	1.5	4.3		
Potassium	200	13	6		
Selenium	5.0	.88	1	1.2	<5.0
Silicon	5.0	.52	.91		
Silver	3.0	.04	.05	-0.020	<3.0
Sodium	40	.49	1.5		
Strontium	5.0	.001	.03		
Thallium	1.0	.29	.86		
Tin	5.0	1.3	1.2		
Titanium	1.0	.015	.27		
Uranium	5.0	.37	.44		
Vanadium	1.0	.04	.07		
Zinc	3.0	.06	.35	0.20	<3.0

Associated samples MP18480: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 04/15/16

Metal	RL	IDL	MDL	MB raw	final

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 04/15/16

Metal	D81711-1 Original	MS	Spikelot ICPALL2	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic	anr				
Barium	453	570	239	49.0N(a)	75-125
Beryllium					
Boron	1.1	113	119	93.8	75-125
Cadmium	0.0	58.3	59.7	97.7	75-125
Calcium					
Chromium	49.4	100	59.7	84.8	75-125
Cobalt					
Copper	8.9	69.3	59.7	101.2	75-125
Iron					
Lead	17.1	121	119	87.0	75-125
Lithium					
Magnesium					
Manganese	anr				
Molybdenum	anr				
Nickel	24.9	76.3	59.7	86.1	75-125
Phosphorus	anr				
Potassium	anr				
Selenium	5.7	119	119	94.9	75-125
Silicon					
Silver	4.6	27.4	23.9	95.5	75-125
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc	45.1	97.7	59.7	88.1	75-125

Associated samples MP18480: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 04/15/16

Metal	D81711-1 Original MS	Spikelot ICPALL2	% Rec	QC Limits

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 04/15/16

Metal	D81711-1 Original	MSD	Spikelot ICPALL2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	anr					
Barium	453	654	237	85.0	13.7	20
Beryllium						
Boron	1.1	115	118	96.3	1.8	20
Cadmium	0.0	58.6	59.1	99.1	0.5	20
Calcium						
Chromium	49.4	105	59.1	94.0	4.9	20
Cobalt						
Copper	8.9	71.6	59.1	106.0	3.3	20
Iron						
Lead	17.1	122	118	88.7	0.8	20
Lithium						
Magnesium						
Manganese	anr					
Molybdenum	anr					
Nickel	24.9	77.1	59.1	88.3	1.0	20
Phosphorus	anr					
Potassium	anr					
Selenium	5.7	118	118	95.0	0.8	20
Silicon						
Silver	4.6	27.8	23.7	98.1	1.4	20
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	45.1	100	59.1	92.9	2.3	20

Associated samples MP18480: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480 Methods: SW846 6010C
Matrix Type: SOLID Units: mg/kg

Prep Date: 04/15/16

Metal	D81711-1 Original MSD	Spikelot ICPALL2 % Rec	MSD RPD	QC Limit

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 04/15/16

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	184	189	97.5	80-120
Beryllium				
Boron	97.2	94.3	103.0	80-120
Cadmium	49.7	47.2	105.4	80-120
Calcium				
Chromium	48.1	47.2	102.0	80-120
Cobalt				
Copper	49.9	47.2	105.8	80-120
Iron				
Lead	96.2	94.3	102.0	80-120
Lithium				
Magnesium				
Manganese	anr			
Molybdenum	anr			
Nickel	47.4	47.2	100.5	80-120
Phosphorus	anr			
Potassium	anr			
Selenium	100	94.3	106.0	80-120
Silicon				
Silver	19.4	18.9	102.8	80-120
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	50.4	47.2	106.8	80-120

Associated samples MP18480: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 04/15/16

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480 Methods: SW846 6010C
Matrix Type: SOLID Units: ug/l

Prep Date: 04/15/16

Metal	D81711-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	3370	4230	10.4*(a)	0-10
Beryllium				
Boron	63.5	0.00	100.0(b)	0-10
Cadmium	0.00	0.00	NC	0-10
Calcium				
Chromium	418	489	16.9*(a)	0-10
Cobalt				
Copper	66.7	73.5	2.1	0-10
Iron				
Lead	126	169	16.6 (b)	0-10
Lithium				
Magnesium				
Manganese	anr			
Molybdenum	anr			
Nickel	211	251	19.1*(a)	0-10
Phosphorus	anr			
Potassium	anr			
Selenium	0.00	91.5	89.8 (b)	0-10
Silicon				
Silver	0.00	44.5	13.2*(a)	0-10
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	311	514	34.8*(a)	0-10

Associated samples MP18480: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SERIAL DILUTION RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18480 Methods: SW846 6010C
Matrix Type: SOLID Units: ug/l

Prep Date: 04/15/16

	D81711-1		QC
Metal	Original	SDL 1:5 %DIF	Limits

(anr) Analyte not requested
(a) Serial dilution indicates possible matrix interference.
(b) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18481
Matrix Type: SOLID

Methods: SW846 6020A
Units: mg/kg

Prep Date: 04/15/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	25	.55	.75		
Antimony	0.20	.0011	.029		
Arsenic	0.10	.0085	.024	0.012	<0.10
Barium	1.0	.008	.16		
Beryllium	0.10	.008	.049		
Boron	20	.25	.07		
Cadmium	0.050	.018	.038		
Calcium	200	2.8	13		
Chromium	1.0	.027	.11		
Cobalt	0.10	.0025	.0085		
Copper	1.0	.03	.1		
Iron	5.0	1.8	1.8		
Lead	0.25	.004	.0075		
Magnesium	50	.65	.65		
Manganese	0.50	.06	.07		
Molybdenum	0.50	.025	.046		
Nickel	1.0	.0044	.17		
Phosphorus	30	1.3	4.9		
Potassium	100	1.5	2.5		
Selenium	0.20	.03	.13		
Silver	0.050	.00095	.01		
Sodium	250	2.5	5.5		
Strontium	10	.005	.027		
Thallium	0.10	.0012	.0075		
Tin	5.0	.032	2.3		
Titanium	1.0	.03	.085		
Uranium	0.25	.00085	.0015		
Vanadium	2.0	.019	.11		
Zinc	5.0	.11	1.4		

Associated samples MP18481: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18481 Methods: SW846 6020A
Matrix Type: SOLID Units: mg/kg

Prep Date: 04/15/16

Metal	D81711-1 Original	MS	Spikelot ICPALL2	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic	5.9	126	119	100.6	75-125
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP18481: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18481 Methods: SW846 6020A
Matrix Type: SOLID Units: mg/kg

Prep Date: 04/15/16

Metal	D81711-1 Original	MSD	Spikelot ICPALL2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	5.9	129	118	104.1	2.4	20
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP18481: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18481
Matrix Type: SOLID

Methods: SW846 6020A
Units: mg/kg

Prep Date: 04/15/16

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	101	94.3	107.1	80-120
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP18481: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18481 Methods: SW846 6020A
Matrix Type: SOLID Units: ug/l

Prep Date: 04/15/16

Metal	D81711-1 Original	SDL 5:25	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	49.5	48.9	1.2	0-10
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP18481: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	43	65		
Antimony	150	16	44		
Arsenic	130	26	60		
Barium	50	7	2		
Beryllium	50	4	8		
Boron	250	34	18		
Cadmium	50	2	4		
Calcium	2000	11	50	53.0	<2000
Chromium	50	2	3.5		
Cobalt	25	2	6		
Copper	50	6	19		
Iron	350	11	35		
Lead	250	18	25		
Lithium	25	9.5	3.5		
Magnesium	1000	70	200	25.5	<1000
Manganese	25	.05	4.5		
Molybdenum	50	4	18		
Nickel	150	4.5	14		
Phosphorus	500	75	170		
Potassium	5000	650	360		
Selenium	250	44	50		
Silicon	250	26	42		
Silver	150	2	3		
Sodium	2000	25	70	56.5	<2000
Strontium	25	.05	1.5		
Thallium	50	15	40		
Tin	250	65	60		
Titanium	50	.75	14		
Uranium	250	19	22		
Vanadium	50	2	3		
Zinc	150	3	18		

Associated samples MP18482: D81711-1A, D81711-2A, D81711-3A, D81711-4A, D81711-5A, D81711-6A, D81711-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

Metal	RL	IDL	MDL	MB raw	final

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

Metal	D81711-2A Original	MS	Spikelot ICPALL2	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	15000	157000	125000	113.6	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	2980	132000	125000	103.2	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	20800	147000	125000	101.0	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP18482: D81711-1A, D81711-2A, D81711-3A, D81711-4A, D81711-5A, D81711-6A, D81711-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

Metal	D81711-2A Original MS	Spikelot ICPALL2	% Rec	QC Limits

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

Metal	D81711-2A Original	MSD	Spikelot ICPALL2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron						
Cadmium						
Calcium	15000	154000	125000	111.2	1.9	20
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Lithium						
Magnesium	2980	131000	125000	102.4	0.8	20
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silicon						
Silver						
Sodium	20800	146000	125000	100.2	0.7	20
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP18482: D81711-1A, D81711-2A, D81711-3A, D81711-4A, D81711-5A, D81711-6A, D81711-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

Metal	D81711-2A Original MSD	Spikelot ICPALL2	% Rec	MSD RPD	QC Limit

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	138000	125000	110.4	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	130000	125000	104.0	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	125000	125000	100.0	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP18482: D81711-1A, D81711-2A, D81711-3A, D81711-4A, D81711-5A, D81711-6A, D81711-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

Metal	D81711-2A Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	3000	3060	2.1	0-10
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	595	563	5.5	0-10
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	4160	3990	4.3	0-10
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP18482: D81711-1A, D81711-2A, D81711-3A, D81711-4A, D81711-5A, D81711-6A, D81711-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SERIAL DILUTION RESULTS SUMMARY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

QC Batch ID: MP18482
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 04/15/16

	D81711-2A		QC
Metal	Original SDL 1:5	%DIF	Limits

(anr) Analyte not requested

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Chromium, Hexavalent	GP17678/GN34147	1.0	0.0	mg/kg	94.7	95.1	97.7	80-120%
Specific Conductivity	GP17665/GN34132			umhos/cm	9989	9790	98.0	90-110%
pH	GN34155			su	8.00	7.96	99.5	99.1-100.9%

Associated Samples:
Batch GN34155: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7
Batch GP17665: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7
Batch GP17678: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Chromium, Hexavalent	GP17678/GN34147	D81711-1	mg/kg	0.0	0.0	0.0	0-20%
Redox Potential Vs H2	GN34151	D81711-1	mv	462	465	6.5	0-20%

Associated Samples:
Batch GN34151: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7
Batch GP17678: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Chromium, Hexavalent	GP17678/GN34147	D81711-1	mg/kg	0.0	40	40.8	102.0	75-125%

Associated Samples:
Batch GP17678: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits

MATRIX SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D81711
Account: MARATCOP - Marathon Oil Company
Project: 19C Flowline Release

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MSD Result	RPD	QC Limit
Chromium, Hexavalent	GP17678/GN34147	D81711-1	mg/kg	0.0	40	38.6	5.5	20%

Associated Samples:
Batch GP17678: D81711-1, D81711-2, D81711-3, D81711-4, D81711-5, D81711-6, D81711-7
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits