



March 8, 2019

Mr. Gregory Hamilton
Senior Staff HSE Representative
Kerr-McGee Oil & Gas Onshore LP
1099 18th Street, Suite 1800
Denver, Colorado 80202

**Re: Sump Closure Summary Letter Report
Brewer Pooling Unit #2 FP Production Facility
API: 05-123-10915
Facility ID: 445465
Legal: SESE Sec 36-T3N-R67W
Remediation Project # 12507**

Dear Mr. Hamilton:

On behalf of Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee), Tasman Geosciences, Inc. (Tasman) has prepared this Sump Closure Summary Letter Report (Report) to document sampling activities and the results of environmental testing at the above-referenced site (Site). This Report is being submitted under Form 27 Site Investigation and Remediation Workplan Remediation # 12507. Tasman provided environmental services at the site that included collection of confirmation samples from the excavation, documentation of field activities, and review of analytical data as described below.

Site Assessment Activities

The field activities described herein were performed with the purpose of assessing potential hydrocarbon impacts at the Site related to the closure of the produced water sump. Soil and groundwater sampling activities, laboratory analytical results, and conclusions are presented below.

Excavation activities were initiated on September 29, 2017 following removal of the produced water sump. The final extent of the excavation measured approximately 10 feet by 10 feet with an approximate depth of 5 feet below ground surface (bgs). Excavation material was not removed from the site during excavation and closure activities. A liner was present at the location. Groundwater was encountered in the excavation area approximately 5 feet (bgs).

Four soil samples were collected from the sidewalls of the final lateral extent of the sump excavation area at approximately 4 feet bgs. The soil samples were field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Based on the field screening results, the northern soil sidewall sample (N01@4') was submitted to Origins Laboratory in Denver, Colorado, for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by United States

Environmental Protection Agency (USEPA) Method 8260C, TPH – diesel range and oil range organics (DRO and ORO) by USEPA Method 8015, electrical conductivity (EC), and pH. The remaining soil samples were placed on hold pending the northern sidewall sample results. One (1) groundwater sample (GW01) was collected from the excavation area and submitted for analysis of BTEX by USEPA Method 8260C.

The general Site layout, sample locations and approximate final extent of the excavation are illustrated on Figure 1.

Results

Soil analytical results for northern sidewall sample N01@4' indicated that constituent concentrations were in full compliance with State standards. Based on these results, the remaining soil samples were not analyzed. Groundwater analytical results for sample GW01 indicated that constituent concentrations were in full compliance with State standards. Soil analytical data are provided in Table 1 and groundwater analytical data are provided in Table 2. The laboratory analytical report is provided as Attachment A.

Conclusions

Analytical results described herein confirm that BTEX and TPH impacts are not present at concentrations above applicable regulatory standards at the former produced water sump location. Therefore, no further site assessment or remedial activity is recommended at this time. Following Site assessment activities, the produced water sump was removed and the excavation area was backfilled and contoured to match pre-existing conditions.

Please contact me at (303) 487-1228 if you have any questions regarding this report or require additional information.

Sincerely,

A handwritten signature in black ink, appearing to read 'MJahn', is positioned above the typed name.

Mike Jahn, PG
Senior Geologist

Attachments:

- Table 1 – Soil Sample Results Summary Table
- Table 2 – Groundwater Sample Results Summary Table
- Figure 1 – Sample Location Map
- Attachment A – Laboratory Analytical Report

Tables

TABLE 1
BREWER POOLING UNIT #2 FP PRODUCTION FACILITY
SOIL SAMPLE RESULTS SUMMARY TABLE
KERR-McGEE OIL AND GAS ONSHORE LP

Sample Location	Date	Depth (ft. bgs)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TVPH-GRO (mg/kg)	TEPH-DRO (mg/kg)	TEPH-ORO (mg/kg)	EC (mmhos/cm)	pH (units)
COGCC standards for soil (mg/kg) ⁽¹⁾			0.17	85	100	175	500			4 mmhos/cm or 2x BG	6-9
N01@4'	09/29/17	4	<0.002	<0.002	<0.002	<0.002	<0.200	<25.0	<100	0.0387	8.78*

Notes:

(1) Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective January 30, 2015.

COGCC = Colorado Oil and Gas Conservation Commission

(<) = Analytical result is less than the indicated laboratory reporting limit.

TVPH - GRO = Total volatile petroleum hydrocarbons - gasoline range organics

TEPH - DRO = Total extractable petroleum hydrocarbons - diesel range organics

TEPH - ORO = Total extractable petroleum hydrocarbons - oil range organics

EC = Electrical conductivity

mmhos/cm = Millimhos per centimeter

mg/kg = Milligrams per kilogram.

ft. bgs = Feet below ground surface.

BOLD = Analytical result is in exceedance of COGCC Table 910-1 soil standards.

* pH sample was collected below the designated root zone (>3' bgs)

TABLE 2
BREWER POOLING UNIT #2 FP PRODUCTION FACILITY
GROUNDWATER SAMPLE RESULTS SUMMARY TABLE
KERR-McGEE OIL AND GAS ONSHORE LP

Sample Location	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth To Water (ft. bgs.)
COGCC Standards for groundwater (µg/L) ⁽¹⁾		5	560	700	1,400	
GW01	09/29/17	<4.00	<4.00	<4.00	<4.00	5

Notes:

(1) Standards for groundwater are taken from 2 CCR 404-1, Table 910-1, effective January 30, 2015.

COGCC = Colorado Oil and Gas Conservation Commission

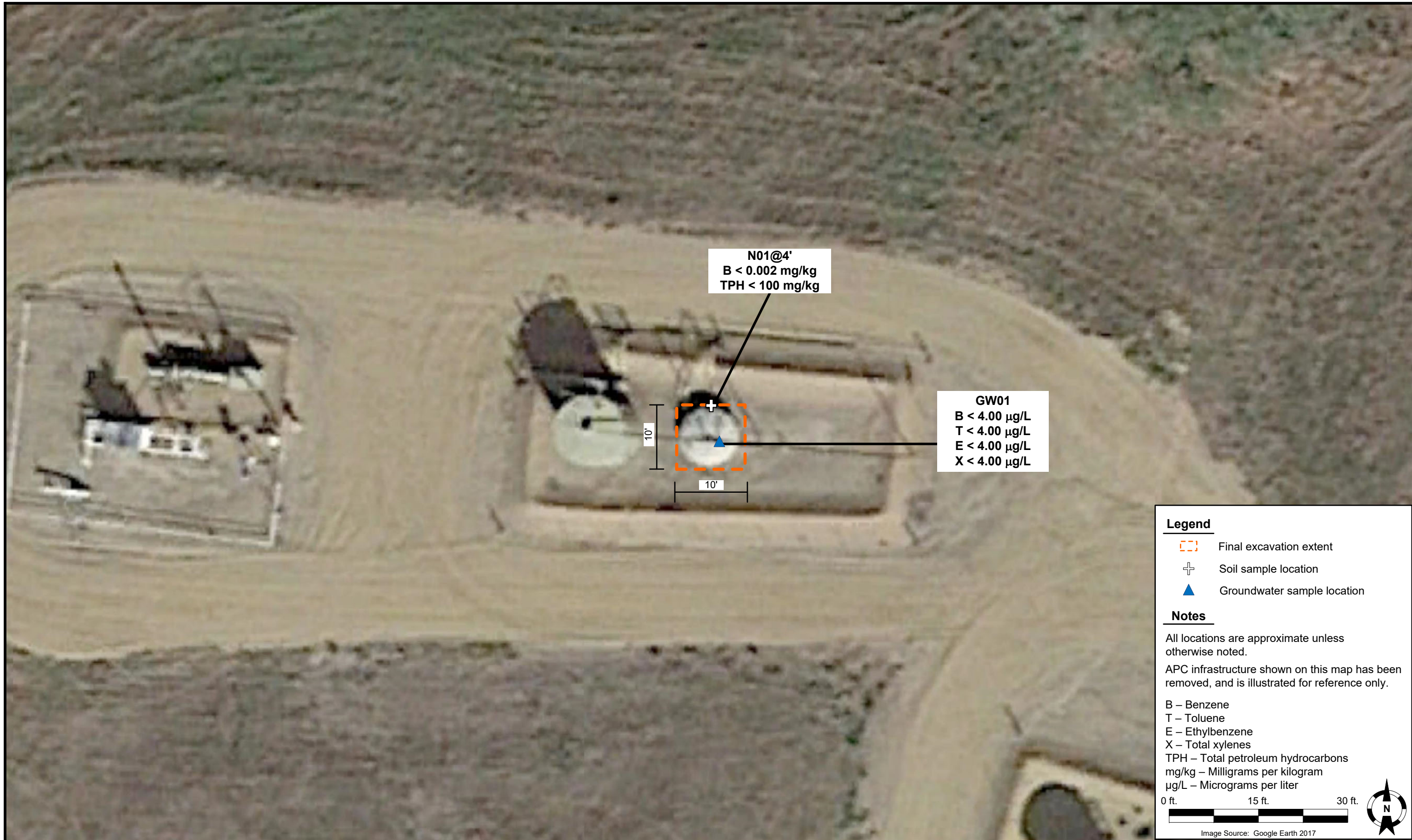
(<) = Analytical result is less than the indicated laboratory reporting limit.

µg/L = Micrograms per liter.

ft bgs = Feet below ground surface

BOLD = Analytical result is in exceedance of COGCC Table 910-1 groundwater standards.

Figure



DATE: July 9, 2018

DESIGNED BY: E. Siegel

DRAWN BY: M. Petersen



Kerr-McGee Oil and Gas Onshore LP
BREWER POOLING UNIT #2 FP PRODUCTION FACILITY
 SESE Sec. 36-T3N-R67W
 Weld County, Colorado

Sample Location Map

FIGURE 1

Attachment A

October 02, 2017

Tasman Geosciences

Bob Cornez

6899 Pecos Street, Unit C

Denver CO 80211

Project Name - KMG - Brewer Pooling Unit #2 FP Project Number - [none]

Attached are your analytical results for KMG - Brewer Pooling Unit #2 FP received by Origins Laboratory, Inc. September 29, 2017. This project is associated with Origins project number Y709414-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com



Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Brewer Pooling Unit #2 FP

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
N01@4'	Y709414-01	Soil	September 29, 2017 14:45	09/29/2017 17:30
GW01	Y709414-06	Water	September 29, 2017 15:10	09/29/2017 17:30

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Origins Laboratory

F-012207-01-R1
 Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: 4709414

Client: Tasman

Client Project ID: KMG - Brewer Pooling Unit #2 FP

Checklist Completed by: Pa Lu

Shipped Via: HD
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 9-29-17 1739

Airbill #: WA

Matrix(s) Received: (Check all that apply): Soil/Solid Water Other: _____

Cooler Number/Temperature: 1 11.7 °C 1 °C 1 °C (Describe) 1 °C

Thermometer ID: 203

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?		<input checked="" type="checkbox"/>		Sampled same day
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input checked="" type="checkbox"/>			pH
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO3, HCL, H2SO4) / (pH >10 for samples preserved with NaAsO2+NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
Additional Comments (if any):				

⁽¹⁾If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager) [Signature]

Date/Time Reviewed 9-29-17 1740

Origins Laboratory, Inc.

Jefe Pellegrini

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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

N01@4'
9/29/2017 2:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y709414-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B712902	09/29/2017	09/29/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl 78.4 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B712901	"	09/29/2017	U
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4 91.9 % 70-130 " " "
Surrogate: Toluene-d8 96.1 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 97.9 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.78		pH Units	1	B712903	09/29/2017	09/29/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0387		mmhos/cm	"	B712904	09/29/2017	"	
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 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

GW01
9/29/2017 3:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y709414-06 (Water)

BTEX by EPA 8260C

Benzene	ND	4.00	ug/L	4	B712707	09/29/2017	09/29/2017	U
Toluene	ND	4.00	"	"	"	"	"	U
Ethylbenzene	ND	4.00	"	"	"	"	"	U
Xylenes, total	ND	4.00	"	"	"	"	"	U
Surrogate: 1,2-Dichloroethane-d4	92.1 %	84-121			"	"	"	
Surrogate: Toluene-d8	100 %	85-115			"	"	"	
Surrogate: 4-Bromofluorobenzene	104 %	84-114			"	"	"	

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 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712707 - EPA 5030B (Water)

Blank (B712707-BLK1)

Prepared: 09/27/2017 Analyzed: 09/29/2017

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	58		"	62.5	92.5		84-121			
Surrogate: Toluene-d8	64		"	62.5	102		85-115			
Surrogate: 4-Bromofluorobenzene	68		"	62.5	109		84-114			

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 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712707 - EPA 5030B (Water)

Blank (B712707-BLK2)

Prepared: 09/27/2017 Analyzed: 09/29/2017

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	57		"	62.5		91.1	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	84-114			

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 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712707 - EPA 5030B (Water)

LCS (B712707-BS1)

Prepared: 09/27/2017 Analyzed: 09/29/2017

Benzene	44.4	1.00	ug/L	50.0		88.8	73.3-129			
Toluene	42.8	1.00	"	50.0		85.7	76.2-123			
Ethylbenzene	42.2	1.00	"	50.0		84.5	73.6-130			
m,p-Xylene	80.1	2.00	"	100		80.1	76.1-126			
o-Xylene	41.7	1.00	"	50.0		83.4	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	54		"	62.5		86.5	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	84-114			

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 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712707 - EPA 5030B (Water)

LCS (B712707-BS2)

Prepared: 09/27/2017 Analyzed: 09/29/2017

Benzene	45.2	1.00	ug/L	50.0		90.3	73.3-129			
Toluene	42.4	1.00	"	50.0		84.8	76.2-123			
Ethylbenzene	41.0	1.00	"	50.0		82.0	73.6-130			
m,p-Xylene	79.8	2.00	"	100		79.8	76.1-126			
o-Xylene	41.6	1.00	"	50.0		83.1	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	54		"	62.5		86.5	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	84-114			

Origins Laboratory, Inc.



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Tasman Geosciences
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 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712707 - EPA 5030B (Water)

Matrix Spike (B712707-MS1)	Source: Y709341-05			Prepared: 09/27/2017 Analyzed: 09/29/2017						
Benzene	285	1.00	ug/L	50.0	218	133	74-130			QM-02
Toluene	54.9	1.00	"	50.0	0.340	109	73-131			
Ethylbenzene	67.6	1.00	"	50.0	9.97	115	76-132			
m,p-Xylene	113	2.00	"	100	9.54	103	69-139			
o-Xylene	51.8	1.00	"	50.0	ND	104	74-131			
Surrogate: 1,2-Dichloroethane-d4	55		"	62.5		88.8	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	84-114			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712707 - EPA 5030B (Water)

Matrix Spike (B712707-MS2)	Source: Y709341-06			Prepared: 09/27/2017 Analyzed: 09/29/2017						
Benzene	57.1	1.00	ug/L	50.0	ND	114	74-130			
Toluene	56.3	1.00	"	50.0	ND	113	73-131			
Ethylbenzene	56.5	1.00	"	50.0	ND	113	76-132			
m,p-Xylene	108	2.00	"	100	ND	108	69-139			
o-Xylene	53.5	1.00	"	50.0	ND	107	74-131			
Surrogate: 1,2-Dichloroethane-d4	54		"	62.5		87.2	84-121			
Surrogate: Toluene-d8	65		"	62.5		103	85-115			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		105	84-114			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712707 - EPA 5030B (Water)

Matrix Spike Dup (B712707-MSD1)	Source: Y709341-05			Prepared: 09/27/2017 Analyzed: 09/29/2017						
Benzene	277	1.00	ug/L	50.0	218	117	74-130	2.88	20	
Toluene	54.7	1.00	"	50.0	0.340	109	73-131	0.255	20	
Ethylbenzene	66.3	1.00	"	50.0	9.97	113	76-132	1.93	20	
m,p-Xylene	114	2.00	"	100	9.54	104	69-139	0.574	20	
o-Xylene	52.2	1.00	"	50.0	ND	104	74-131	0.923	20	
Surrogate: 1,2-Dichloroethane-d4	56		"	62.5		89.4	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	84-114			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712707 - EPA 5030B (Water)

Matrix Spike Dup (B712707-MSD2)	Source: Y709341-06			Prepared: 09/27/2017 Analyzed: 09/29/2017						
Benzene	62.4	1.00	ug/L	50.0	ND	125	74-130	8.81	20	
Toluene	60.7	1.00	"	50.0	ND	121	73-131	7.43	20	
Ethylbenzene	60.0	1.00	"	50.0	ND	120	76-132	5.96	20	
m,p-Xylene	115	2.00	"	100	ND	115	69-139	5.95	20	
o-Xylene	58.2	1.00	"	50.0	ND	116	74-131	8.39	20	
Surrogate: 1,2-Dichloroethane-d4	55		"	62.5		87.3	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	84-114			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B712901 - EPA 5030 (soil)										
Blank (B712901-BLK1)										
Prepared: 09/29/2017 Analyzed: 09/29/2017										
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		90.8	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.4	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.9	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712901 - EPA 5030 (soil)

LCS (B712901-BS1)

Prepared: 09/29/2017 Analyzed: 09/29/2017

Benzene	0.111	0.002	mg/kg	0.100		111	77.1-124			
Toluene	0.099	0.002	"	0.100		99.2	74.5-128			
Ethylbenzene	0.090	0.002	"	0.100		90.0	66.4-127			
m,p-Xylene	0.170	0.004	"	0.200		85.2	76.6-124			
o-Xylene	0.085	0.002	"	0.100		85.0	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	53		ug/kg	62.5		85.2	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.8	70-130			
Surrogate: 4-Bromofluorobenzene	59		"	62.5		94.8	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712901 - EPA 5030 (soil)

Matrix Spike (B712901-MS1)	Source: Y709404-01			Prepared: 09/29/2017 Analyzed: 09/29/2017						
Benzene	0.116	0.002	mg/kg	0.100	ND	116	71.8-126			
Toluene	0.105	0.002	"	0.100	ND	105	65.1-130			
Ethylbenzene	0.096	0.002	"	0.100	ND	96.4	62.2-130			
m,p-Xylene	0.184	0.004	"	0.200	ND	91.9	46.5-137			
o-Xylene	0.091	0.002	"	0.100	ND	90.6	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	54		ug/kg	62.5		86.4	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.6	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		98.1	70-130			

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 Project: KMG - Brewer Pooling Unit #2 FP

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712901 - EPA 5030 (soil)

Matrix Spike Dup (B712901-MSD1)	Source: Y709404-01			Prepared: 09/29/2017 Analyzed: 09/29/2017						
Benzene	0.110	0.002	mg/kg	0.100	ND	110	71.8-126	5.49	11.3	
Toluene	0.099	0.002	"	0.100	ND	98.7	65.1-130	6.53	15.4	
Ethylbenzene	0.093	0.002	"	0.100	ND	92.8	62.2-130	3.81	19.6	
m,p-Xylene	0.176	0.004	"	0.200	ND	87.9	46.5-137	4.47	19.2	
o-Xylene	0.087	0.002	"	0.100	ND	87.4	54.2-134	3.60	17.9	
Surrogate: 1,2-Dichloroethane-d4	54		ug/kg	62.5		85.7	70-130			
Surrogate: Toluene-d8	60		"	62.5		95.6	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.5	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B712902 - EPA 3550B

Blank (B712902-BLK1)

Prepared: 09/29/2017 Analyzed: 09/29/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	54		"	50.0		107	59-131			

LCS (B712902-BS1)

Prepared: 09/29/2017 Analyzed: 09/29/2017

Diesel (C10-C28)	1140	50.0	mg/kg	1000		114	64-121			
Residual Range Organics (C28-C40)	1220	200	"	1000		122	58-124			
Surrogate: o-Terphenyl	55		"	50.0		110	59-131			

Matrix Spike (B712902-MS1)

Source: Y709404-01

Prepared: 09/29/2017 Analyzed: 09/29/2017

Diesel (C10-C28)	960	50.0	mg/kg	1000	ND	96.0	53-125			
Residual Range Organics (C28-C40)	994	200	"	1000	13.0	98.1	47-133			
Surrogate: o-Terphenyl	46		"	50.0		91.8	59-131			

Matrix Spike Dup (B712902-MSD1)

Source: Y709404-01

Prepared: 09/29/2017 Analyzed: 09/29/2017

Diesel (C10-C28)	938	50.0	mg/kg	1000	ND	93.8	53-125	2.35	20	
Residual Range Organics (C28-C40)	987	200	"	1000	13.0	97.4	47-133	0.785	20	
Surrogate: o-Terphenyl	43		"	50.0		85.9	59-131			

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Bob Cornez
 Project Number: [none]
 Project: KMG - Brewer Pooling Unit #2 FP

Classical Chemistry Parameters - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B712903 - NO PREP										
Duplicate (B712903-DUP1)		Source: Y709404-01			Prepared: 09/29/2017 Analyzed: 09/29/2017					
pH	6.86		pH Units		7.19			4.70	25	
Batch B712904 - NO PREP										
Blank (B712904-BLK1)		Prepared: 09/29/2017 Analyzed: 09/29/2017								
Specific Conductance (EC)	0.00250		mmhos/cm							
Duplicate (B712904-DUP1)		Source: Y709404-01			Prepared: 09/29/2017 Analyzed: 09/29/2017					
Specific Conductance (EC)	0.0277		mmhos/cm		0.0246			11.9	25	

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6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Brewer Pooling Unit #2 FP

Notes and Definitions

U Sample is Non-Detect.

QM-02 The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

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