

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303) 894-2100 Fax 894-2109



FOR OGCC USE ONLY

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☒ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☐ Site/Facility Closure ☐ Other (describe): _____

GENERAL INFORMATION

OGCC Operator Number: 47120 Name of Operator: Kerr-McGee Oil and Gas Onshore, LP Address: 1099 18th Street, Suite 1800 City: Denver State: CO Zip: 80202		Contact Name and Telephone Name: Phillip Hamlin No: 970-336-3500 Fax: 970-336-3656	
API/Facility No: 336310 Facility Name: Sarchet Unit Well Name: Morning Fresh Location (Qtr, Sec, Twp, Rng, Meridian): SENW S22 3N 66W		County: Weld Facility Number: 63N66W22SENW Well Number: 21-22 Latitude: 40.21376 Longitude: -104.76762	

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): Condensate / Produced Water

Site Conditions: Is location within a sensitive area (according to Rule 901e)? ☒ Y ☐ N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Non-crop land

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Silty clay

Potential receptors (water wells within 1/4 mi, surface waters, etc.): The nearest water well is located approximately 1260' north of the release area.

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):	Extent of Impact:	How Determined:
<input checked="" type="checkbox"/> Soils	43' (E-W) x 50' (N-S) x 6' bgs	Excavation, soil sampling, and laboratory analysis
<input type="checkbox"/> Vegetation		
<input checked="" type="checkbox"/> Groundwater	See attached data	Groundwater sampling and laboratory analysis
<input type="checkbox"/> Surface water		

REMEDIALATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

On July 27, 2015, excavation activities were initiated following the discovery of surface staining at the Sarchet Unit-63N66W22SENW production facility. The facility was shut in, associated underground infrastructure removed, and excavation activities commenced. Groundwater was encountered in the excavation at approximately 6 feet below ground surface (bgs). An Initial/Supplemental Form 19 was submitted to the COGCC on July 30, 2015. The COGCC has issued Spill Tracking number 442684 for this release.

Describe how source is to be removed:

On July 27, 2015, excavation activities commenced and approximately 650 cubic yards of impacted material were excavated and transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado for disposal. Excavation activities were guided in the field using a photoionization detector (PID) to measure volatile organic compound (VOC) concentrations in soil. Soil samples were collected from the sidewalls of the final extent of the excavation area at approximately 5 feet bgs. Soil samples were 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 USEPA Method 8260, TPH - diesel range organics and oil range organics (DRO and ORO) by USEPA Method 8015, electrical conductivity (EC), and pH. Laboratory results indicated that constituent concentrations in the soil samples collected from the final lateral extent of the excavation area were below the applicable COGCC Table 910-1 standards. Soils were excavated into the phreatic zone to address potential hydrocarbon impacts that may have been present below the current groundwater table due to seasonal fluctuations. Groundwater was encountered in the excavation at approximately 6 feet bgs. A groundwater sample (GW01) was collected and submitted for laboratory analysis of BTEX. Analytical results received on July 28, 2015, indicated that benzene and total xylenes concentrations in sample GW01 were above the applicable COGCC Table 910-1 groundwater standards. A vacuum truck was used to remove approximately 130 barrels of impacted groundwater from the excavation, which were transported to a licensed injection facility for disposal. A second groundwater sample (GW02) was subsequently collected and submitted for analysis of BTEX. Analytical results received on July 29, 2015, indicated that the benzene concentration in sample GW02 remained above the applicable COGCC Table 910-1 groundwater standard. Soil analytical results are summarized in Table 1 and groundwater analytical results are summarized in Table 2. Soil and excavation groundwater sample locations are illustrated on Figure 1 and laboratory analytical reports are included as Attachment A.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

Impacted soil was excavated and transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado. Impacted groundwater was removed by a vacuum truck and transported to a licensed injection facility for disposal. Prior to backfilling the excavation, 264 pounds of activated carbon were added to the groundwater table to mitigate remaining hydrocarbon impacts. Additional proposed groundwater remediation measures are described on the following page. The produced water sump was replaced during assessment and remediation activities.

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado
(303) 894-2100 Fax 894-2109



Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: _____
Well Name & No: _____
Facility Name & No.: _____

REMEDATION WORKPLAN (CONT.)

OGCC Employee: _____

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):
Temporary groundwater monitoring and/or remediation wells will be installed at the site to further assess the extent of groundwater impacts. These wells will be sampled on a quarterly basis and submitted for laboratory analysis of BTEX until concentrations remain below COGCC groundwater standards for four consecutive quarters.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.
The excavation has been backfilled with clean soil and graded to match the adjacent topography. Kerr-McGee's tank battery remains at the site. Reclamation activities at the site will be compliant with COGCC regulations.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.
Is further site investigation required? ☒ Y ☐ N If yes, describe:
Data indicate that impacted soil has been delineated and removed from the site. Temporary monitoring/remediation wells will be installed to further assess the extent of groundwater impacts. Soil and groundwater analytical results are summarized in Tables 1 and 2, respectively. The analytical laboratory reports are included as Attachment A.

Final disposition of E&P waste (land treated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):
Impacted soil was transported to the Buffalo Ridge Landfill in Keensburg, Colorado for disposal. Impacted groundwater was transported to a licensed injection facility for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 7/27/2015	Date Site Investigation Completed: _____	Remediation Plan Submitted: _____
Remediation Start Date: 7/27/2015	Anticipated Completion Date: 1/27/2017	Actual Completion Date: _____

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Phillip Hamlin

Signed: _____

Title: Senior HSE Representative

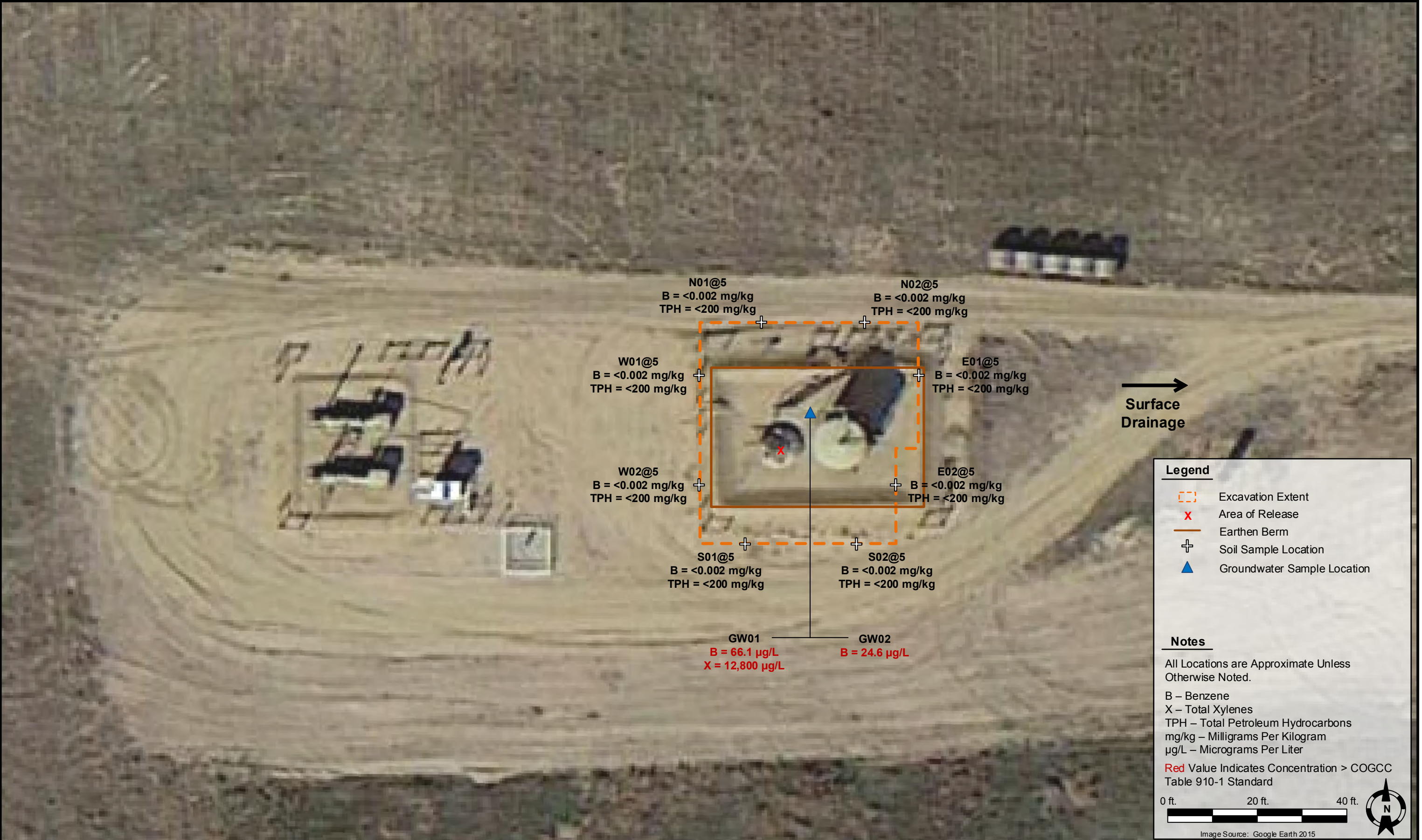
Date: 10/28/15

OGCC Approved: _____

Title: _____

Date: _____

FIGURE



DATE:	October 13, 2015
DESIGNED BY:	D. Wade
DRAWN BY:	D. Wade



Kerr-McGee Oil and Gas Onshore, LP
Sarchet Unit – 63N66W22SEnw
SEnw, Section 22, Township 3 North, Range 66 West
Weld County, Colorado

Sample Location
Map

FIGURE
1

TABLES

TABLE 1
SARCHET UNIT - 63N66W22SENW
SOIL SAMPLE RESULTS SUMMARY TABLE
KERR-McGEE OIL AND GAS ONSHORE LP

Sample ID	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 or 2x BG	6-9
N01@5	07/27/15	5.0	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0752	8.39
N02@5	07/27/15	5.0	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0332	8.04
W01@5	07/27/15	5.0	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0582	8.48
W02@5	07/27/15	5.0	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0299	7.96
S01@5	07/27/15	5.0	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0315	8.16
S02@5	07/27/15	5.0	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0560	8.80
E01@5	07/27/15	5.0	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0532	8.47
E02@5	07/27/15	5.0	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0557	7.97

Notes:

1. Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective February 1, 2014.

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

BG = Background

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.

TABLE 2
SARCHET UNIT - 63N66W22SE NW
GROUNDWATER RESULTS SUMMARY TABLE
KERR-McGEE OIL AND GAS ONSHORE LP

Sample ID	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	07/27/15	66.1	263	591	12,800	~6
GW02	07/28/15	24.6	17.8	12.4	526	~6

Notes:

1. Standards for groundwater are taken from 2 CCR 404-1, Table 910-1, effective February 1, 2014.

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.

ATTACHMENT A
LABORATORY ANALYTICAL DATA



July 30, 2015

Tasman Geosciences

Bob Cornez

6899 Pecos Street, Unit C

Denver

CO 80211

**Project Name - KMG - Sarchet
Unit-63N66W22SENW**

Project Number - [none]

Attached are your analytical results for KMG - Sarchet Unit-63N66W22SENW received by Origins Laboratory, Inc. July 27, 2015. This project is associated with Origins project number X507362-01.

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



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
N01 @ 5	X507362-01	Soil	July 27, 2015 13:30	07/27/2015 18:10
N02 @ 5	X507362-02	Soil	July 27, 2015 13:35	07/27/2015 18:10
W01 @ 5	X507362-03	Soil	July 27, 2015 13:45	07/27/2015 18:10
W02 @ 5	X507362-04	Soil	July 27, 2015 13:50	07/27/2015 18:10
S01 @ 5	X507362-05	Soil	July 27, 2015 13:55	07/27/2015 18:10
S02 @ 5	X507362-06	Soil	July 27, 2015 14:00	07/27/2015 18:10
E01 @ 5	X507362-07	Soil	July 27, 2015 14:10	07/27/2015 18:10
E02 @ 5	X507362-08	Soil	July 27, 2015 14:20	07/27/2015 18:10
GW01	X507362-09	Water	July 27, 2015 14:30	07/27/2015 18:10

Brock changed the project name to KMG-Sarchet Unit-63N66W22SENW on 07/30/15.

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 - Sarchet Unit-63N66W22SENW



ORIGINS

X507362

page 1 of 1

Client: Tasman
Address:
Telephone Number:
Email Address: rcornez@tasmangeo.com

Project Manager: Bob Cornez
Project Name: Morning Fresh 21-22
Project Number:
Samples Collected by: Matt Johnson

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions:
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Sum. #		
N0105	7/27/15	1330	1	X					X		BTEx (820) EC TPH 815 6BTEx (820)	1
N0205		1335	1	X					X		X X X	2
N0105		1345	1	X					X		X X X	3
N0205		1350	1	X					X		X X X	4
S0105		1355	1	X					X		X X X	5
S0205		1400	1	X					X		X X X	6
E0105		1410	1	X					X		X X X	7
E0205		1420	1	X					X		X X X	8
GW01	✓	1430	3	✓					X		X NO HCL	9
												10
Relinquished By: 	Date: 7/27/15	Time: 10:10	Received By: 	Date: 7/27/15	Time: 1800	Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input type="checkbox"/>	34					
Relinquished By:	Date:	Time:	Received By:	Date:	Time:							

Origins Laboratory, Inc.

Jefe Pellegrini

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 - Sarchet Unit-63N66W22SENW

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: XS07362

Client: Tasman

Client Project ID: Morning Fresh 21-22

Checklist Completed by: Jeff Smith

Shipped Via: H/D

(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 7/27/13

Airbill #: N/A

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

Cooler Number/Temperature: 1 / 13.8 °C 1 / _____ °C 1 / _____ °C (Describe)

Thermometer ID: 1003

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"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water — is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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 HNO ₃ , HCL, H ₂ SO ₄) / (pH > 10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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.

Jeff Smith
Reviewed by (Project Manager)

7/27/13
Date/Time Reviewed

Origins Laboratory, Inc.

Jen Pellegrini

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 - Sarchet Unit-63N66W22SEW

N01 @ 5
7/27/2015 1:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507362-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5G27006	07/27/2015	07/28/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl 81.5 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5G27005	07/27/2015	07/27/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4 112 % 70-130 " " "
Surrogate: Toluene-d8 102 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 104 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.39		pH Units	1	5G27007	07/27/2015	07/27/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0752		mmhos/cm	"	5G27008	07/27/2015	07/27/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

N02 @ 5
7/27/2015 1:35:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507362-02 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5G27006	07/27/2015	07/28/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

<i>Surrogate: o-Terphenyl</i>	74.1 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5G27005	07/27/2015	07/27/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

<i>Surrogate: 1,2-Dichloroethane-d4</i>	114 %	70-130			"	"	"
<i>Surrogate: Toluene-d8</i>	101 %	70-130			"	"	"
<i>Surrogate: 4-Bromofluorobenzene</i>	104 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	8.04		pH Units	1	5G27007	07/27/2015	07/27/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0332		mmhos/cm	"	5G27008	07/27/2015	07/27/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

W01 @ 5
7/27/2015 1:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507362-03 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5G27006	07/27/2015	07/28/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl 76.0 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5G27005	07/27/2015	07/27/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4 111 % 70-130 " " "
Surrogate: Toluene-d8 100 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 101 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.48		pH Units	1	5G27007	07/27/2015	07/27/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0582		mmhos/cm	"	5G27008	07/27/2015	07/27/2015
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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 - Sarchet Unit-63N66W22SENW

W02 @ 5
7/27/2015 1:50:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507362-04 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5G27006	07/27/2015	07/28/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	78.7 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5G27005	07/27/2015	07/27/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	109 %	70-130			"	"	"
Surrogate: Toluene-d8	98.8 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	105 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	7.96		pH Units	1	5G27007	07/27/2015	07/27/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0299		mmhos/cm	"	5G27008	07/27/2015	07/27/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SEW

S01 @ 5
7/27/2015 1:55:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507362-05 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5G27006	07/27/2015	07/28/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	74.5 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5G27005	07/27/2015	07/27/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	113 %	70-130			"	"	"
Surrogate: Toluene-d8	102 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	106 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	8.16		pH Units	1	5G27007	07/27/2015	07/27/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0315		mmhos/cm	"	5G27008	07/27/2015	07/27/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

S02 @ 5
7/27/2015 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507362-06 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5G27006	07/27/2015	07/28/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl 78.1 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5G27005	07/27/2015	07/27/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4 111 % 70-130 " " "
Surrogate: Toluene-d8 100 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 102 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.80		pH Units	1	5G27007	07/27/2015	07/27/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0560		mmhos/cm	"	5G27008	07/27/2015	07/27/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SEnw

E01 @ 5
7/27/2015 2:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507362-07 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5G27006	07/27/2015	07/28/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	81.3 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5G27005	07/27/2015	07/27/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	110 %	70-130			"	"	"
Surrogate: Toluene-d8	97.3 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	104 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	8.47		pH Units	1	5G27007	07/27/2015	07/27/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0532		mmhos/cm	"	5G27008	07/27/2015	07/27/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SEW

E02 @ 5
7/27/2015 2:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507362-08 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5G27006	07/27/2015	07/28/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl 78.3 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5G27005	07/27/2015	07/27/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4 111 % 70-130 " " "
Surrogate: Toluene-d8 99.3 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 103 % 70-130 " " "

pH in Soil by EPA 9045D

pH	7.97		pH Units	1	5G27007	07/27/2015	07/27/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0557		mmhos/cm	"	5G27008	07/27/2015	07/27/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

GW01

7/27/2015 2:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc. X507362-09 (Water)

BTEX by EPA 8260C

Benzene	66.1	4.0	ug/L	4	5G27010	07/27/2015	07/28/2015
Toluene	263	4.0	"	"	"	"	"
Ethylbenzene	591	4.0	"	"	"	"	"
Xylenes, total	12800	100	"	100	"	"	07/28/2015

Surrogate: 1,2-Dichloroethane-d4	108 %	87.3-113			"	"	"
Surrogate: Toluene-d8	98.0 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	92.5 %	88.6-111			"	"	"

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

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 5G27005 - EPA 5030 (soil)

Blank (5G27005-BLK1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							
Benzene	ND	0.002	"							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	70.8		ug/kg	62.5		113	70-130			
Surrogate: Toluene-d8	63.0		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	63.2		"	62.5		101	70-130			

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President

Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

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 5G27005 - EPA 5030 (soil)

LCS (5G27005-BS1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Benzene	0.096	0.002	mg/kg	0.100		96.1	77.1-124			
Toluene	0.102	0.002	"	0.100		102	74.5-128			
Ethylbenzene	0.098	0.002	"	0.100		98.2	66.4-127			
m,p-Xylene	0.204	0.004	"	0.200		102	76.6-124			
o-Xylene	0.104	0.002	"	0.100		104	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	72.3		ug/kg	62.5		116	70-130			
Surrogate: Toluene-d8	64.4		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	62.7		"	62.5		100	70-130			

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President

Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

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 5G27005 - EPA 5030 (soil)

Matrix Spike (5G27005-MS1)		Source: X507351-01			Prepared: 07/27/2015 Analyzed: 07/27/2015					
Benzene	0.085	0.002	mg/kg	0.100	ND	85.3	71.8-126			
Toluene	0.090	0.002	"	0.100	0.002	87.8	65.1-130			
Ethylbenzene	0.084	0.002	"	0.100	ND	84.5	62.2-130			
m,p-Xylene	0.163	0.004	"	0.200	0.002	80.6	46.5-137			
o-Xylene	0.085	0.002	"	0.100	0.0004	84.3	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	75.6		ug/kg	62.5		121	70-130			
Surrogate: Toluene-d8	64.5		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	65.1		"	62.5		104	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 - Sarchet Unit-63N66W22SENW

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 5G27005 - EPA 5030 (soil)

Matrix Spike Dup (5G27005-MSD1)		Source: X507351-01			Prepared: 07/27/2015 Analyzed: 07/27/2015					
Benzene	0.099	0.002	mg/kg	0.100	ND	99.0	71.8-126	14.9	11.3	QR-02
Toluene	0.101	0.002	"	0.100	0.002	99.5	65.1-130	12.2	15.4	
Ethylbenzene	0.091	0.002	"	0.100	ND	91.4	62.2-130	7.87	19.6	
m,p-Xylene	0.190	0.004	"	0.200	0.002	94.5	46.5-137	15.7	19.2	
o-Xylene	0.096	0.002	"	0.100	0.0004	95.6	54.2-134	12.5	17.9	
Surrogate: 1,2-Dichloroethane-d4	77.0		ug/kg	62.5		123	70-130			
Surrogate: Toluene-d8	62.7		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	62.4		"	62.5		99.9	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 - Sarchet Unit-63N66W22SEnw

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 5G27010 - EPA 5030B (Water)

Blank (5G27010-BLK1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	66		"	62.5	105		87.3-113			
Surrogate: Toluene-d8	63		"	62.5	101		90.9-108			
Surrogate: 4-Bromofluorobenzene	59		"	62.5	94.0		88.6-111			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

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 5G27010 - EPA 5030B (Water)

LCS (5G27010-BS1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Benzene	46.6	1.0	ug/L	50.0		93.2	75-126			
Toluene	44.5	1.0	"	50.0		89.1	78.7-126			
Ethylbenzene	48.1	1.0	"	50.0		96.2	80-130			
m,p-Xylene	98.2	2.0	"	100		98.2	77.2-133			
o-Xylene	46.5	1.0	"	50.0		93.1	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	66		"	62.5		105	87.3-113			
Surrogate: Toluene-d8	63		"	62.5		101	90.9-108			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.0	88.6-111			

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 - Sarchet Unit-63N66W22SENW

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 5G27010 - EPA 5030B (Water)

Matrix Spike (5G27010-MS1)		Source: X507319-02			Prepared: 07/27/2015 Analyzed: 07/27/2015					
Benzene	56.4	1.0	ug/L	50.0	ND	113	74-130			
Toluene	55.3	1.0	"	50.0	ND	111	73-131			
Ethylbenzene	56.5	1.0	"	50.0	ND	113	76-132			
m,p-Xylene	116	2.0	"	100	ND	116	69-139			
o-Xylene	53.8	1.0	"	50.0	ND	108	74-131			
Surrogate: 1,2-Dichloroethane-d4	65		"	62.5		103	87.3-113			
Surrogate: Toluene-d8	61		"	62.5		98.1	90.9-108			
Surrogate: 4-Bromofluorobenzene	60		"	62.5		96.8	88.6-111			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

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 5G27010 - EPA 5030B (Water)

Matrix Spike Dup (5G27010-MSD1)		Source: X507319-02			Prepared: 07/27/2015 Analyzed: 07/27/2015					
Benzene	53.6	1.0	ug/L	50.0	ND	107	74-130	5.11	20	
Toluene	50.5	1.0	"	50.0	ND	101	73-131	9.05	20	
Ethylbenzene	53.9	1.0	"	50.0	ND	108	76-132	4.78	20	
m,p-Xylene	111	2.0	"	100	ND	111	69-139	3.97	20	
o-Xylene	52.9	1.0	"	50.0	ND	106	74-131	1.69	20	
Surrogate: 1,2-Dichloroethane-d4	67		"	62.5		108	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		99.7	90.9-108			
Surrogate: 4-Bromofluorobenzene	57		"	62.5		91.7	88.6-111			

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 - Sarchet Unit-63N66W22SENW

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 5G27006 - EPA 3580

Blank (5G27006-BLK1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Diesel (C10-C28)	ND	50	mg/kg							
Residual Range Organics (C28-C36)	ND	200	"							
Surrogate: o-Terphenyl	44		"	50.0		87.7	59-131			

LCS (5G27006-BS1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Diesel (C10-C28)	850	50	mg/kg				64-121			
Residual Range Organics (C28-C36)	990	200	"	1000		99.3	58-124			
Surrogate: o-Terphenyl	48		"	50.0		95.1	59-131			

Matrix Spike (5G27006-MS1)

Source: X507351-01

Prepared: 07/27/2015 Analyzed: 07/27/2015

Diesel (C10-C28)	780	50	mg/kg		21		53-125			
Residual Range Organics (C28-C36)	900	200	"	1000	ND	90.1	47-133			
Surrogate: o-Terphenyl	44		"	50.0		88.8	59-131			

Matrix Spike Dup (5G27006-MSD1)

Source: X507351-01

Prepared: 07/27/2015 Analyzed: 07/27/2015

Diesel (C10-C28)	830	50	mg/kg		21		53-125	7.06	20	
Residual Range Organics (C28-C36)	950	200	"	1000	ND	94.8	47-133	5.09	20	
Surrogate: o-Terphenyl	47		"	50.0		93.0	59-131			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SEnw

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 5G27007 - NO PREP										
Duplicate (5G27007-DUP1)		Source: X507321-01			Prepared: 07/27/2015 Analyzed: 07/27/2015					
pH	7.98		pH Units		7.96			0.251	25	
Batch 5G27008 - NO PREP										
Blank (5G27008-BLK1)		Prepared: 07/27/2015 Analyzed: 07/27/2015								
Specific Conductance (EC)	0.00360		mmhos/cm							
Duplicate (5G27008-DUP1)		Source: X507321-01			Prepared: 07/27/2015 Analyzed: 07/27/2015					
Specific Conductance (EC)	0.171		mmhos/cm		0.180			4.84	25	

Origins Laboratory, Inc.



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Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Bob Cornez

Project Number: [none]

Project: KMG - Sarchet Unit-63N66W22SEnw

Notes and Definitions

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President



July 29, 2015

Tasman Geosciences

Bob Cornez

6899 Pecos Street, Unit C

Denver

CO 80211

**Project Name - KMG - Sarchet
Unit-63N66W22SENW**

Project Number - [none]

Attached are your analytical results for KMG - Sarchet Unit-63N66W22SENW received by Origins Laboratory, Inc. July 28, 2015. This project is associated with Origins project number X507378-01.

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



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Bob Cornez

Project Number: [none]

Project: KMG - Sarchet Unit-63N66W22SEnw

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW02	X507378-01	Water	July 28, 2015 10:30	07/28/2015 16:38

Brock changed the project name to Sarchet Unit-63N66W22SEnw on 07/29/15.

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

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page 1 of 1

Project Manager: Bob Cornez Sarchet Unit
Project Name: Morning Fresh 21-02 63N66W22SENW
Project Number: qp 7-19-15

Client: Tasman
Address: _____
Telephone Number: _____
Email Address: cornez@tasman-geo.com

Samples Collected By: Matt Peterson

Temp Received: 5.9° Date Results Needed: _____

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa Canister #			Other
6W02	7/28/15	1030	3						X				1
													2
													3
													4
													5
													6
													7
													8
													9
													10

Relinquished By: [Signature] Date: 7/28/15 Time: 1615

Received By: [Signature] Date: 7/28/15 Time: 1638

Turnaround Time: ☒ Same Day ☐ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Standard

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 - Sarchet Unit-63N66W22SENW

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: XS07378

Client: Tasman

Client Project ID: Mining Earth 2+22

Sarchet Unit
7/29

Checklist Completed by: Jeff Smith

Shipped Via: 01/23/12 Pick Up
(UPS, FedEx, Hand Delivered! Pick-up, etc.)

Date/time completed: 7/23/12

Airbill #: NA

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

Cooler Number/Temperature: 1 / 5.9 °C 1 °C 1 °C (Describe) 1 °C

Thermometer ID: T003

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"/>			
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"/>		
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 HNO ₃ , HCL, H ₂ SO ₄) / (pH > 10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)	<input checked="" type="checkbox"/>			HCL
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.

Jeff Smith
Reviewed by (Project Manager)

7/23/12
Date/Time Reviewed

Origins Laboratory, Inc.

Jen Pellegrini

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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

GW02

7/28/2015 10:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507378-01 (Water)

BTEX by EPA 8260C

Benzene	24.6	1.0	ug/L	1	5G28004	07/28/2015	07/28/2015
Toluene	17.8	1.0	"	"	"	"	"
Ethylbenzene	12.4	1.0	"	"	"	"	"
Xylenes, total	526	10.0	"	10	"	"	07/28/2015
Surrogate: 1,2-Dichloroethane-d4	109 %	87.3-113			"	"	07/28/2015
Surrogate: Toluene-d8	105 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	93.6 %	88.6-111			"	"	"

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

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 5G28004 - EPA 5030B (Water)

Blank (5G28004-BLK2)

Prepared: 07/28/2015 Analyzed: 07/28/2015

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	67		"	62.5	108		87.3-113			
Surrogate: Toluene-d8	62		"	62.5	99.4		90.9-108			
Surrogate: 4-Bromofluorobenzene	59		"	62.5	94.6		88.6-111			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

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 5G28004 - EPA 5030B (Water)

LCS (5G28004-BS2)

Prepared: 07/28/2015 Analyzed: 07/28/2015

Benzene	47.9	1.0	ug/L	50.0	95.8	75-126
Toluene	45.6	1.0	"	50.0	91.3	78.7-126
Ethylbenzene	52.6	1.0	"	50.0	105	80-130
m,p-Xylene	107	2.0	"	100	107	77.2-133
o-Xylene	51.0	1.0	"	50.0	102	77.9-126
Surrogate: 1,2-Dichloroethane-d4	67		"	62.5	107	87.3-113
Surrogate: Toluene-d8	62		"	62.5	99.4	90.9-108
Surrogate: 4-Bromofluorobenzene	59		"	62.5	94.3	88.6-111

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SEnw

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 5G28004 - EPA 5030B (Water)

Matrix Spike (5G28004-MS1)		Source: X507370-01			Prepared: 07/28/2015 Analyzed: 07/28/2015					
Benzene	46.8	1.0	ug/L	50.0	ND	93.5	74-130			
Toluene	44.7	1.0	"	50.0	ND	89.3	73-131			
Ethylbenzene	48.6	1.0	"	50.0	ND	97.1	76-132			
m,p-Xylene	98.6	2.0	"	100	ND	98.6	69-139			
o-Xylene	49.2	1.0	"	50.0	ND	98.4	74-131			
Surrogate: 1,2-Dichloroethane-d4	64		"	62.5		102	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		99.6	90.9-108			
Surrogate: 4-Bromofluorobenzene	58		"	62.5		92.7	88.6-111			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SEnw

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 5G28004 - EPA 5030B (Water)

Matrix Spike (5G28004-MS2)		Source: X507370-02			Prepared: 07/28/2015 Analyzed: 07/28/2015					
Benzene	51.8	1.0	ug/L	50.0	ND	104	74-130			
Toluene	49.7	1.0	"	50.0	ND	99.3	73-131			
Ethylbenzene	51.0	1.0	"	50.0	ND	102	76-132			
m,p-Xylene	103	2.0	"	100	ND	103	69-139			
o-Xylene	50.8	1.0	"	50.0	ND	102	74-131			
Surrogate: 1,2-Dichloroethane-d4	70		"	62.5		113	87.3-113			
Surrogate: Toluene-d8	64		"	62.5		102	90.9-108			
Surrogate: 4-Bromofluorobenzene	59		"	62.5		95.1	88.6-111			

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Bob Cornez
Project Number: [none]
Project: KMG - Sarchet Unit-63N66W22SENW

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 5G28004 - EPA 5030B (Water)

Matrix Spike Dup (5G28004-MSD1)		Source: X507370-01			Prepared: 07/28/2015 Analyzed: 07/28/2015					
Benzene	52.6	1.0	ug/L	50.0	ND	105	74-130	11.8	20	
Toluene	50.1	1.0	"	50.0	ND	100	73-131	11.5	20	
Ethylbenzene	53.3	1.0	"	50.0	ND	107	76-132	9.38	20	
m,p-Xylene	110	2.0	"	100	ND	110	69-139	11.2	20	
o-Xylene	52.7	1.0	"	50.0	ND	105	74-131	6.77	20	
Surrogate: 1,2-Dichloroethane-d4	67		"	62.5		108	87.3-113			
Surrogate: Toluene-d8	61		"	62.5		98.0	90.9-108			
Surrogate: 4-Bromofluorobenzene	56		"	62.5		90.4	88.6-111			

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 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Sarchet Unit-63N66W22SENW

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 5G28004 - EPA 5030B (Water)

Matrix Spike Dup (5G28004-MSD2)		Source: X507370-02			Prepared: 07/28/2015 Analyzed: 07/28/2015					
Benzene	52.3	1.0	ug/L	50.0	ND	105	74-130	0.980	20	
Toluene	49.3	1.0	"	50.0	ND	98.6	73-131	0.728	20	
Ethylbenzene	51.1	1.0	"	50.0	ND	102	76-132	0.255	20	
m,p-Xylene	107	2.0	"	100	ND	107	69-139	3.95	20	
o-Xylene	53.5	1.0	"	50.0	ND	107	74-131	5.24	20	
Surrogate: 1,2-Dichloroethane-d4	68		"	62.5		109	87.3-113			
Surrogate: Toluene-d8	63		"	62.5		101	90.9-108			
Surrogate: 4-Bromofluorobenzene	58		"	62.5		93.1	88.6-111			

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Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Bob Cornez

Project Number: [none]

Project: KMG - Sarchet Unit-63N66W22SEnw

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President