

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.

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

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		Contact Name and Telephone	
Name of Operator: Kerr-McGee Oil and Gas Onshore, LP		Name: Phillip Hamlin	
Address: 1099 18th Street, Suite 1800		No: 970-336-3500	
City: Denver State: CO Zip: 80202		Fax: 970-336-3656	
API/Facility No: 05-123-10111		County: Weld	
Facility Name:		Facility Number:	
Well Name: Saint Vrain Assoc.		Well Number: 1	
Location (QtrQtr, Sec, Twp, Rng, Meridian): NWSW S3 T3N R67W		Latitude: 40.251580 Longitude: -104.881540	

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): Crude Oil and Produced Water	
Site Conditions: Is location within a sensitive area (according to Rule 901e)? <input checked="" type="checkbox"/> Y <input type="checkbox"/> 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: Sandy Clay	
Potential receptors (water wells within 1/4 mi, surface waters, etc.): The nearest surface water is located approximately 250' southwest of the site. No water wells are located within 1/4 mile of the release area.	
Description of Impact (if previously provided, refer to that form or document):	
Impacted Media (check):	Extent of Impact:
<input checked="" type="checkbox"/> Soils	18' (E-W) x 28' (N-S) x 4' bgs
<input type="checkbox"/> Vegetation	
<input checked="" type="checkbox"/> Groundwater	See attached data
<input type="checkbox"/> Surface water	
How Determined:	
Excavation, soil sampling, and laboratory analysis	
Groundwater sampling and laboratory analysis	

REMEDIATION WORKPLAN

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

On September 1, 2015, surficial staining was discovered around the Saint Vrain Association #1 wellhead during a routine inspection. The volume of released material is unknown. The wellhead was shut in and excavation activities commenced. Groundwater was encountered in the excavation at approximately 4 feet below ground surface (bgs). An Initial Form 19 was submitted to the COGCC on September 4, 2015 (COGCC Document No. 400895730), and a Supplemental Form 19 was submitted on September 11, 2015 (COGCC Document No. 400898383). The COGCC has issued Spill Tracking number 443143 for this release.

Describe how source is to be removed:

On September 1, 2015, excavation activities commenced and approximately 80 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 3 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 4 feet bgs. A groundwater sample (GW01) was collected and submitted for laboratory analysis of BTEX. Analytical results received on September 2, 2015, indicated that the benzene concentration in sample GW01 was 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. 110 pounds of activated carbon were added to the groundwater in the excavation prior to backfilling to mitigate remaining dissolved phase hydrocarbon impacts. Additional proposed groundwater remediation measures are described on the following page.

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.: _____

REMEDIAL 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 wellhead 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 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 Kerr-McGee Land Treatment Facility in Weld County, Colorado for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 9/1/2015	Date Site Investigation Completed: TBD	Remediation Plan Submitted: _____
Remediation Start Date: 9/1/2015	Anticipated Completion Date: 12/15/2016	Actual Completion Date: _____

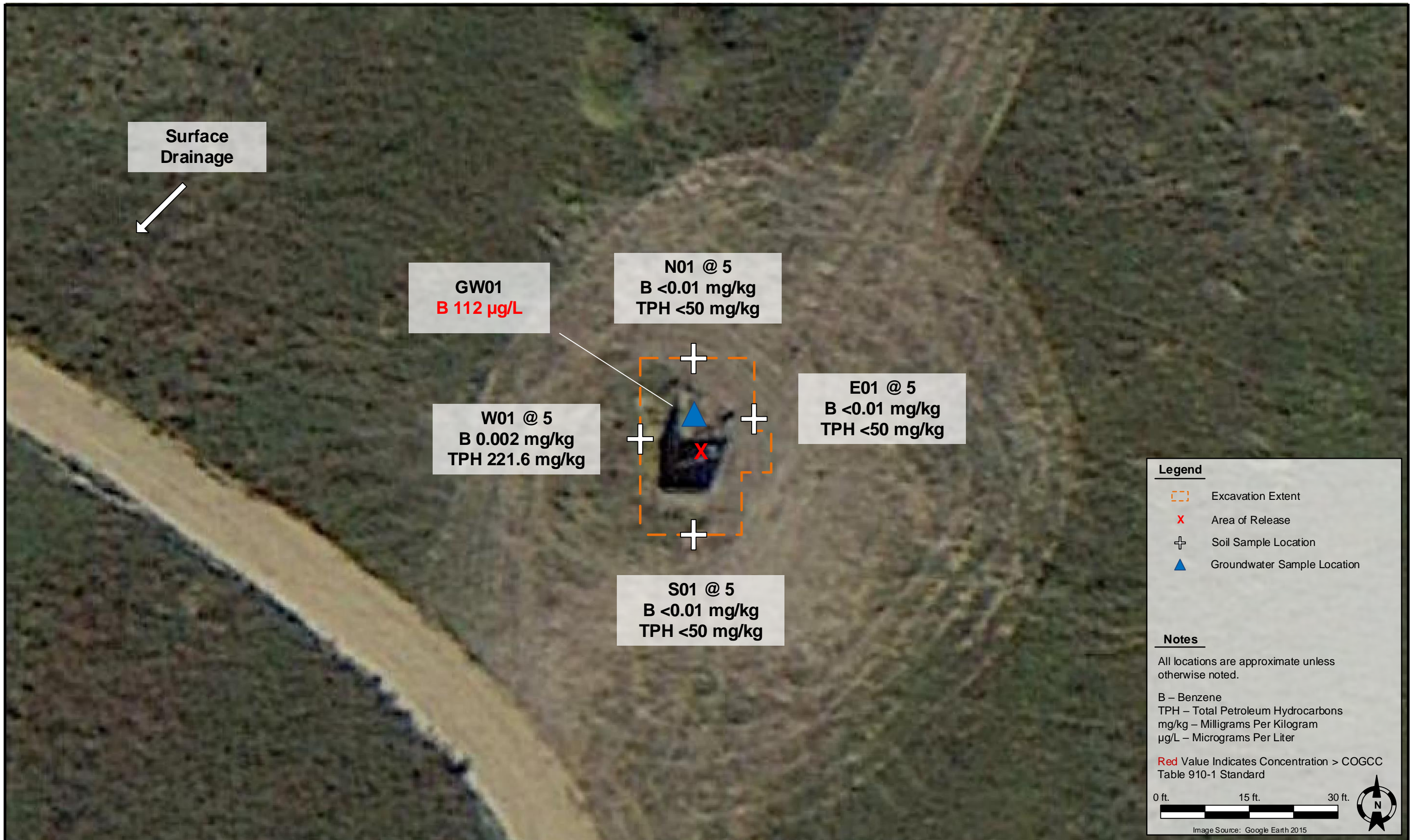
I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Phillip Hamlin

Signed: Title: Senior HSE Representative Date: 12/11/15

OGCC Approved: _____ Title: _____ Date: _____

FIGURE



DATE: November 24, 2015		Kerr-McGee Oil and Gas Onshore, LP SAINT VRAIN ASSOC. 1 NWSW, Section 3, Township 3 North, Range 67 West Weld County, Colorado	Sample Location Map	FIGURE 1
DESIGNED BY: R. Bruner				
DRAWN BY: R. Bruner				

ANALYTICAL TABLES

TABLE 1
SAINT VRAIN ASSOC. 1
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
W01@3	09/01/15	3	0.002	<0.002	0.037	0.433	11.6	210	<200	0.260	8.03
E01@3	09/01/15	3	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.268	7.78
N01@3	09/01/15	3	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.172	7.81
S01@3	09/01/15	3	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.185	8.03

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
SAINT VRain ASSOC. 1
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	09/01/15	112	19.0	10.0	285	~4

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 REPORTS**

September 02, 2015

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver

CO 80211

Project Name - KMG - St. Vrain Association #1

Project Number - [none]

Attached are your analytical results for KMG - St. Vrain Association #1 received by Origins Laboratory, Inc. September 01, 2015. This project is associated with Origins project number X509013-01.

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

Christine Wasko

Project Number: [none]

Project: KMG - St. Vrain Association #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
W01 @ 3'	X509013-01	Soil	September 1, 2015 12:56	09/01/2015 15:40
E01 @ 3'	X509013-02	Soil	September 1, 2015 12:58	09/01/2015 15:40
N01 @ 3'	X509013-03	Soil	September 1, 2015 13:00	09/01/2015 15:40
GW01	X509013-04	Water	September 1, 2015 12:51	09/01/2015 15:40

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

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

www.originslaboratory.com



page ☐ of ☐

ORIGINS
LABORATORY, INC

X509013

Client: Tasman Geosciences
Address: [blank]
Telephone Number: (352) 262-9910
Email Address: cwasko@tasman-geo.com

Project Manager: Christine Wasko
Project Name: St. Vrain Association #1
Project Number: [blank]
Samples Collected By: Kate Forsmark

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix				Analysis	Sample Instructions
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	As Sampled	Other		
W0123	9/1/15	1256	2	X				X			GIBTEX 8260 TPH-DK1020 8015 PH, EC, SAR (H ₂ PO ₄ > 4.0)	1	
E0123	↓	1258	2	X				X				2	
N0123	↓	1300	2	X				X				3	
E1001	↓	1251	3	X				X			BTEX 8260	4	
												5	
												6	
												7	
												8	
												9	
												10	
Relinquished By: 	Date: 9/1/15	Time: 1540						Received By: 	Date: 9/1/15	Time: 1540	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"/> 7.1		

Date Results Needed

Origins Laboratory, Inc.

Jefe Pellegrini

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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X509013

Client: Tasman

Client Project ID: St. Vrain Association #1

Checklist Completed by: Jeff Smith

Shipped Via: H/D

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

Date/time completed: 9/1/13

Airbill #: N/A

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

Cooler Number/Temperature: 1 / 7 °C _____ °C _____ °C (Describe)

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"/>		<u>Sampled Same Day</u>
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"/>			<u>PH</u>
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"/>	<input checked="" type="checkbox"/>		<u>9/1/13</u>
Additional Comments (if any): <u>Sample Containers for GW01 are marked as preserved with HCL</u>				

⁽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)

9/1/13
Date/Time Reviewed

Origins Laboratory, Inc.

Jeff Pellegrini

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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

W01 @ 3'
9/1/2015 12:56:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X509013-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	210	50	mg/kg	1	5101014	09/01/2015	09/02/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	100 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	11.6	0.200	mg/kg	1	5101013	09/01/2015	09/01/2015
Benzene	0.002	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	0.037	0.002	"	"	"	"	"
Xylenes, total	0.433	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	118 %	70-130			"	"	"
Surrogate: Toluene-d8	107 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	110 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	8.03		pH Units	1	5101015	09/01/2015	09/01/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.260		mmhos/cm	"	5101016	09/01/2015	09/01/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

E01 @ 3'
9/1/2015 12:58:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X509013-02 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5101014	09/01/2015	09/02/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl 104 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5101013	09/01/2015	09/01/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4 116 % 70-130 " " "
Surrogate: Toluene-d8 97.0 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 107 % 70-130 " " "

pH in Soil by EPA 9045D

pH	7.78		pH Units	1	5101015	09/01/2015	09/01/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.268		mmhos/cm	"	5101016	09/01/2015	09/01/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

N01 @ 3'
9/1/2015 1:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X509013-03 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5101014	09/01/2015	09/02/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl 136 % 59-131 " " " S-07

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5101013	09/01/2015	09/01/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4 115 % 70-130 " " "

Surrogate: Toluene-d8 97.7 % 70-130 " " "

Surrogate: 4-Bromofluorobenzene 102 % 70-130 " " "

pH in Soil by EPA 9045D

pH	7.81		pH Units	1	5101015	09/01/2015	09/01/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.172		mmhos/cm	"	5101016	09/01/2015	09/01/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

GW01
9/1/2015 12:51:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X509013-04 (Water)

BTEX by EPA 8260C

Benzene	112	4.0	ug/L	4	5101012	09/01/2015	09/01/2015
Toluene	19.0	4.0	"	"	"	"	"
Ethylbenzene	10.0	4.0	"	"	"	"	"
Xylenes, total	285	4.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	99.0 %	84-121			"	"	"
Surrogate: Toluene-d8	99.5 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	102 %	84-114			"	"	"

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5101012 - EPA 5030B (Water)

Blank (5101012-BLK1)

Prepared: 09/01/2015 Analyzed: 09/01/2015

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	62		"	62.5		99.4	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.2	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.0	84-114			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5101012 - EPA 5030B (Water)

LCS (5101012-BS1)

Prepared: 09/01/2015 Analyzed: 09/01/2015

Benzene	52.7	1.0	ug/L	50.0		105	75-126			
Toluene	51.1	1.0	"	50.0		102	78.7-126			
Ethylbenzene	51.1	1.0	"	50.0		102	80-130			
m,p-Xylene	102	2.0	"	100		102	77.2-133			
o-Xylene	52.8	1.0	"	50.0		106	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.0	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.1	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	84-114			

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

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5101012 - EPA 5030B (Water)

Matrix Spike (5101012-MS1)		Source: X508364-01			Prepared: 09/01/2015 Analyzed: 09/01/2015					
Benzene	79.4	1.0	ug/L	50.0	32.1	94.6	74-130			
Toluene	41.4	1.0	"	50.0	0.8	81.3	73-131			
Ethylbenzene	46.0	1.0	"	50.0	4.1	83.8	76-132			
m,p-Xylene	84.8	2.0	"	100	1.9	82.9	69-139			
o-Xylene	41.9	1.0	"	50.0	ND	83.8	74-131			
Surrogate: 1,2-Dichloroethane-d4	65		"	62.5		104	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.1	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	84-114			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5101012 - EPA 5030B (Water)

Matrix Spike Dup (5101012-MSD1)		Source: X508364-01			Prepared: 09/01/2015 Analyzed: 09/01/2015					
Benzene	78.6	1.0	ug/L	50.0	32.1	93.0	74-130	1.06	20	
Toluene	41.7	1.0	"	50.0	0.8	81.9	73-131	0.794	20	
Ethylbenzene	47.7	1.0	"	50.0	4.1	87.1	76-132	3.52	20	
m,p-Xylene	87.3	2.0	"	100	1.9	85.4	69-139	2.88	20	
o-Xylene	43.8	1.0	"	50.0	ND	87.7	74-131	4.57	20	
Surrogate: 1,2-Dichloroethane-d4	62		"	62.5		99.7	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

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5101013 - EPA 5030 (soil)

Blank (5101013-BLK1)

Prepared: 09/01/2015 Analyzed: 09/01/2015

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	71.1		ug/kg	62.5		114	70-130			
Surrogate: Toluene-d8	62.1		"	62.5		99.3	70-130			
Surrogate: 4-Bromofluorobenzene	65.4		"	62.5		105	70-130			

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.

Jen Pellegrini For Noelle Doyle Mathis, President

Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5101013 - EPA 5030 (soil)										
LCS (5101013-BS1)					Prepared: 09/01/2015 Analyzed: 09/01/2015					
Benzene	0.107	0.002	mg/kg	0.100		107	77.1-124			
Toluene	0.106	0.002	"	0.100		106	74.5-128			
Ethylbenzene	0.100	0.002	"	0.100		99.7	66.4-127			
m,p-Xylene	0.199	0.004	"	0.200		99.5	76.6-124			
o-Xylene	0.102	0.002	"	0.100		102	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	69.9		ug/kg	62.5		112	70-130			
Surrogate: Toluene-d8	62.6		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	64.0		"	62.5		102	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5101013 - EPA 5030 (soil)

Matrix Spike (5101013-MS1)		Source: X509005-01			Prepared: 09/01/2015 Analyzed: 09/01/2015					
Benzene	0.091	0.002	mg/kg	0.100	ND	91.4	71.8-126			
Toluene	0.086	0.002	"	0.100	ND	86.5	65.1-130			
Ethylbenzene	0.081	0.002	"	0.100	ND	81.5	62.2-130			
m,p-Xylene	0.164	0.004	"	0.200	ND	81.8	46.5-137			
o-Xylene	0.081	0.002	"	0.100	ND	81.2	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	76.2		ug/kg	62.5		122	70-130			
Surrogate: Toluene-d8	63.4		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	62.5		"	62.5		100	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5101013 - EPA 5030 (soil)										
Matrix Spike Dup (5101013-MSD1)										
					Source: X509005-01					
										Prepared: 09/01/2015 Analyzed: 09/01/2015
Benzene	0.086	0.002	mg/kg	0.100	ND	86.2	71.8-126	5.85	11.3	
Toluene	0.081	0.002	"	0.100	ND	81.0	65.1-130	6.54	15.4	
Ethylbenzene	0.079	0.002	"	0.100	ND	79.1	62.2-130	2.96	19.6	
m,p-Xylene	0.155	0.004	"	0.200	ND	77.3	46.5-137	5.67	19.2	
o-Xylene	0.078	0.002	"	0.100	ND	78.4	54.2-134	3.53	17.9	
Surrogate: 1,2-Dichloroethane-d4	74.1		ug/kg	62.5		118	70-130			
Surrogate: Toluene-d8	61.8		"	62.5		98.8	70-130			
Surrogate: 4-Bromofluorobenzene	63.9		"	62.5		102	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5101014 - EPA 3580

Blank (5101014-BLK1)

Prepared: 09/01/2015 Analyzed: 09/01/2015

Diesel (C10-C28)	ND	50	mg/kg							
Residual Range Organics (C28-C36)	ND	200	"							
Surrogate: o-Terphenyl	63		"	50.0		125	59-131			

LCS (5101014-BS1)

Prepared: 09/01/2015 Analyzed: 09/01/2015

Diesel (C10-C28)	1100	50	mg/kg				64-121			
Residual Range Organics (C28-C36)	880	200	"	1000		87.8	58-124			
Surrogate: o-Terphenyl	60		"	50.0		119	59-131			

Matrix Spike (5101014-MS1)

Source: X509005-01

Prepared: 09/01/2015 Analyzed: 09/01/2015

Diesel (C10-C28)	910	50	mg/kg		36		53-125			
Residual Range Organics (C28-C36)	770	200	"	1000	81	68.7	47-133			
Surrogate: o-Terphenyl	49		"	50.0		98.9	59-131			

Matrix Spike Dup (5101014-MSD1)

Source: X509005-01

Prepared: 09/01/2015 Analyzed: 09/01/2015

Diesel (C10-C28)	860	50	mg/kg		36		53-125	5.24	20	
Residual Range Organics (C28-C36)	720	200	"	1000	81	63.9	47-133	6.46	20	
Surrogate: o-Terphenyl	44		"	50.0		89.0	59-131			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5I01015 - NO PREP										
Duplicate (5I01015-DUP1)		Source: X509012-01			Prepared: 09/01/2015 Analyzed: 09/01/2015					
pH	7.92		pH Units		8.00			1.01	25	
Batch 5I01016 - NO PREP										
Blank (5I01016-BLK1)		Prepared: 09/01/2015 Analyzed: 09/01/2015								
Specific Conductance (EC)	0.00260		mmhos/cm							
Duplicate (5I01016-DUP1)		Source: X509012-01			Prepared: 09/01/2015 Analyzed: 09/01/2015					
Specific Conductance (EC)	0.393		mmhos/cm		0.412			4.72	25	

Origins Laboratory, Inc.



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Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Christine Wasko

Project Number: [none]

Project: KMG - St. Vrain Association #1

Notes and Definitions

S-07 High surrogate in sample, however sample is non-detect. High surrogate indicates result values are biased high.

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.



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.

Jen Pellegrini For Noelle Doyle Mathis, President

September 11, 2015

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver

CO 80211

Project Name - KMG - St. Vrain Association #1

Project Number - [none]

Attached are your analytical results for KMG - St. Vrain Association #1 received by Origins Laboratory, Inc. September 10, 2015. This project is associated with Origins project number X509134-01.

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

Christine Wasko

Project Number: [none]

Project: KMG - St. Vrain Association #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S01@3'	X509134-01	Soil	September 10, 2015 12:58	09/10/2015 17:29

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.

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

ORIGINS

LABORATORY, INC.

4509134

www.originslab.com

Client:

Tasman Geosciences

Address:

Project Manager:

Christine Wasko

Address:

Project Name:

St. Virgin Association #

Project Number:

Telephone Number:

(352) 262-9910



Email Address:

twasko@tasman-lab.com

Samples Collected By:

Kate Falsmark

page 1 of 1

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix				Analysis	Sample Instructions
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	As Sampled	Container #		
S0123	9/10/15	1258	2	X						X		GSTEX 8260 TPH-D82080 8015 PH, EC, SAR (F EC > 4.0)	1
													2
													3
													4
													5
													6
													7
													8
													9
													10
Relinquished By: 	Date: 9/10/15	Time: 1729											Turnaround Time: Some Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr
Relinquished By: 	Date: 9/10/15	Time: 1729											Standard <input type="checkbox"/> 5h

Origins Laboratory, Inc.

Jeff Pellgrini

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

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: 1509134

Client: Tasman

Client Project ID: St. Vrain Association #1

Checklist Completed by: J. Pellegrini

Shipped Via: HD

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

Date/time completed: 9/10/15

Airbill #: NA

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

Cooler Number/Temperature: 1 150 °C 1 °C 1 °C 1 °C

Thermometer ID: J803

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

J. Pellegrini
Reviewed by (Project Manager)

9/10/15
Date/Time Reviewed

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

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

S01@3'

9/10/2015 12:58:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X509134-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5110006	09/10/2015	09/11/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	93.8 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5110005	09/10/2015	09/10/2015
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	95.8 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	104 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	8.03		pH Units	1	5110015	09/10/2015	09/10/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.185		mmhos/cm	"	5110014	09/10/2015	09/10/2015
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Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5I10005 - EPA 5030 (soil)

Blank (5I10005-BLK1)

Prepared: 09/10/2015 Analyzed: 09/10/2015

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	64.1		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	61.3		"	62.5		98.1	70-130			
Surrogate: 4-Bromofluorobenzene	65.9		"	62.5		105	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5110005 - EPA 5030 (soil)										
LCS (5110005-BS1)					Prepared: 09/10/2015 Analyzed: 09/10/2015					
Benzene	0.090	0.002	mg/kg	0.100		90.0	77.1-124			
Toluene	0.088	0.002	"	0.100		87.9	74.5-128			
Ethylbenzene	0.095	0.002	"	0.100		94.5	66.4-127			
m,p-Xylene	0.188	0.004	"	0.200		94.1	76.6-124			
o-Xylene	0.094	0.002	"	0.100		94.3	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	60.9		ug/kg	62.5		97.4	70-130			
Surrogate: Toluene-d8	61.7		"	62.5		98.7	70-130			
Surrogate: 4-Bromofluorobenzene	64.0		"	62.5		102	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5I10005 - EPA 5030 (soil)										
Matrix Spike (5I10005-MS1)		Source: X509105-03			Prepared: 09/10/2015 Analyzed: 09/10/2015					
Benzene	0.101	0.002	mg/kg	0.100	ND	101	71.8-126			
Toluene	0.103	0.002	"	0.100	ND	103	65.1-130			
Ethylbenzene	0.137	0.002	"	0.100	ND	137	62.2-130			QM-07
m,p-Xylene	0.255	0.004	"	0.200	ND	127	46.5-137			
o-Xylene	0.122	0.002	"	0.100	ND	122	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	63.8		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	66.9		"	62.5		107	70-130			
Surrogate: 4-Bromofluorobenzene	76.9		"	62.5		123	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5I10005 - EPA 5030 (soil)										
Matrix Spike Dup (5I10005-MSD1)		Source: X509105-03			Prepared: 09/10/2015 Analyzed: 09/10/2015					
Benzene	0.082	0.002	mg/kg	0.100	ND	82.1	71.8-126	20.7	11.3	QR-03
Toluene	0.072	0.002	"	0.100	ND	72.4	65.1-130	35.0	15.4	QR-03
Ethylbenzene	0.088	0.002	"	0.100	ND	87.8	62.2-130	43.9	19.6	QR-03
m,p-Xylene	0.154	0.004	"	0.200	ND	76.9	46.5-137	49.3	19.2	QR-03
o-Xylene	0.072	0.002	"	0.100	ND	71.7	54.2-134	52.2	17.9	QR-03
Surrogate: 1,2-Dichloroethane-d4	62.4		ug/kg	62.5		99.9	70-130			
Surrogate: Toluene-d8	65.0		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	78.0		"	62.5		125	70-130			

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Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5I10006 - EPA 3580

Blank (5I10006-BLK1)

Prepared: 09/10/2015 Analyzed: 09/10/2015

Diesel (C10-C28)	ND	50	mg/kg							
Residual Range Organics (C28-C36)	ND	200	"							
Surrogate: o-Terphenyl	47		"	50.0		93.5	59-131			

LCS (5I10006-BS1)

Prepared: 09/10/2015 Analyzed: 09/10/2015

Diesel (C10-C28)	850	50	mg/kg				64-121			
Residual Range Organics (C28-C36)	880	200	"	1000		87.7	58-124			
Surrogate: o-Terphenyl	46		"	50.0		92.6	59-131			

Matrix Spike (5I10006-MS1)

Source: X509105-03

Prepared: 09/10/2015 Analyzed: 09/10/2015

Diesel (C10-C28)	930	50	mg/kg		ND		53-125			
Residual Range Organics (C28-C36)	990	200	"	1000	41	95.3	47-133			
Surrogate: o-Terphenyl	50		"	50.0		100	59-131			

Matrix Spike Dup (5I10006-MSD1)

Source: X509105-03

Prepared: 09/10/2015 Analyzed: 09/10/2015

Diesel (C10-C28)	840	50	mg/kg		ND		53-125	10.2	20	
Residual Range Organics (C28-C36)	900	200	"	1000	41	85.9	47-133	9.92	20	
Surrogate: o-Terphenyl	46		"	50.0		91.6	59-131			

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Christine Wasko
Project Number: [none]
Project: KMG - St. Vrain Association #1

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 5I10014 - NO PREP										
Blank (5I10014-BLK1)					Prepared: 09/10/2015 Analyzed: 09/10/2015					
Specific Conductance (EC)	0.00470		mmhos/cm							
Duplicate (5I10014-DUP1)					Source: X509124-01 Prepared: 09/10/2015 Analyzed: 09/10/2015					
Specific Conductance (EC)	0.102		mmhos/cm		0.109			5.97	25	
Batch 5I10015 - NO PREP										
Duplicate (5I10015-DUP1)					Source: X509126-01 Prepared: 09/10/2015 Analyzed: 09/10/2015					
pH	8.01		pH Units		7.97			0.501	25	

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Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Christine Wasko

Project Number: [none]

Project: KMG - St. Vrain Association #1

Notes and Definitions

QR-03 The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

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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