

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): NFA

OGCC Employee:

☐ Spill ☐ Complaint☐ Inspection ☐ NOAV

Tracking No:

## GENERAL INFORMATION

<b>OGCC Operator Number:</b> 47120		<b>Contact Name and Telephone</b>	
<b>Name of Operator:</b> Kerr-McGee Oil and Gas Onshore, LP		<b>Name:</b> Phillip Hamlin	
<b>Address:</b> 1099 18th Street, Suite 1800		<b>No:</b> 970-336-3500	
<b>City:</b> Denver <b>State:</b> CO <b>Zip:</b> 80202		<b>Fax:</b> 970-336-3656	
<b>API/Facility No:</b> 05-123-08232		<b>County:</b> Weld	
<b>Facility Name:</b> UPRR 42 Pan Am Gas Unit X		<b>Facility Number:</b> 63N66W31SWNE	
<b>Well Name:</b> UPRR 42 Pan Am Gas Unit X		<b>Well Number:</b> 1	
<b>Location (Qtr, Sec, Twp, Rng, Meridian):</b> SWNE S31 T3N R66W		<b>Latitude:</b> 40.184270 <b>Longitude:</b> -104.815320	

## TECHNICAL CONDITIONS

<b>Type of Waste Causing Impact (crude oil, condensate, produced water, etc.):</b> Condensate and Produced Water	
<b>Site Conditions:</b> Is location within a sensitive area (according to Rule 901e)? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N If yes, attach evaluation.	
<b>Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.):</b> Non-Crop Land	
<b>Soil type, if not previously identified on Form 2A or Federal Surface Use Plan:</b> Fine Sand	
<b>Potential receptors (water wells within 1/4 mi, surface waters, etc.):</b> The nearest surface water is located approximately 125' west of the site. The nearest water well is located approximately 1100' north of the release area.	
<b>Description of Impact (if previously provided, refer to that form or document):</b>	
<b>Impacted Media (check):</b>	<b>Extent of Impact:</b>
<input checked="" type="checkbox"/> Soils	60' (E-W) x 55' (N-S) x 4' bgs
<input type="checkbox"/> Vegetation	
<input checked="" type="checkbox"/> Groundwater	See attached data
<input type="checkbox"/> Surface water	
<b>How Determined:</b>	
Excavation, soil sampling, and laboratory analysis	
Groundwater sampling and laboratory analysis	

## REMEDIALATION WORKPLAN

<b>Describe initial action taken (if previously provided, refer to that form or document):</b> <p>On October 2, 2014, a flowline release was discovered during maintenance activities at the UPRR 42 Pan Am Gas Unit X 1 production facility. The volume of released material is unknown. The well was shut in, associated underground infrastructure repaired, and excavation activities commenced. Groundwater was encountered in the excavation at approximately 4 feet below ground surface (bgs). An Initial / Supplemental Form 19 was submitted on October 10, 2014. The COGCC has issued Spill Tracking number 439297 for this release.</p>
<b>Describe how source is to be removed:</b> <p>On October 2, 2014, excavation activities commenced and approximately 180 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 2 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. 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 October 2, 2014, indicated that the benzene concentration in sample GW01 was above the applicable COGCC Table 910-1 groundwater standard. Approximately 10 barrels of impacted groundwater were removed via vacuum truck and transported to a licensed injection facility for disposal. A second groundwater sample (GW02) was subsequently collected from the excavation area and submitted for laboratory analysis of BTEX. Analytical results received on October 6, 2014, indicated that constituent concentrations in sample GW02 were below applicable COGCC Table 910-1 groundwater standards. 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.</p>
<b>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.:</b> <p>Impacted soil was excavated and transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado. Impacted groundwater was removed via a vacuum truck and transported to a licensed injection facility for disposal. Prior to backfilling the excavation, 260 pounds of activated carbon were added to the groundwater table to mitigate remaining hydrocarbon impacts. Additional groundwater monitoring and remediation measures are described on the following page.</p> <p>Submit Page 2 with Page 1.</p>



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.):

On May 27, 2015, three temporary groundwater monitoring/remediation wells (BH01-BH03) were installed at the site to further assess the extent of groundwater impacts. Groundwater samples were collected from the temporary monitoring wells on May 29, 2015. Samples were submitted to Origins Laboratory in Denver, Colorado for analysis of BTEX by USEPA Method 8260. Temporary monitoring/remediation well locations and groundwater analytical results are illustrated on Figure 2, and a groundwater contour map is presented on Figure 3. Groundwater analytical results are summarized in Table 2 and the groundwater laboratory analytical reports and well completion diagrams are included as Attachments A and B, respectively. Based on these data, Kerr-McGee is requesting a no further action (NFA) determination for this release.

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 have been installed to further assess groundwater impacts; groundwater points of compliance have been achieved. Soil and groundwater analytical results are summarized in Tables 1 and 2, respectively. The analytical laboratory reports are included as Attachment A. Based on the soil and groundwater analytical data, Kerr-McGee is requesting an NFA determination for this release.

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. Impacted groundwater was transported to a licensed injection facility for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began:	10/2/2014	Date Site Investigation Completed:	5/27/2015	Remediation Plan Submitted:	
Remediation Start Date:	10/2/2014	Anticipated Completion Date:		Actual Completion Date:	5/29/15

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

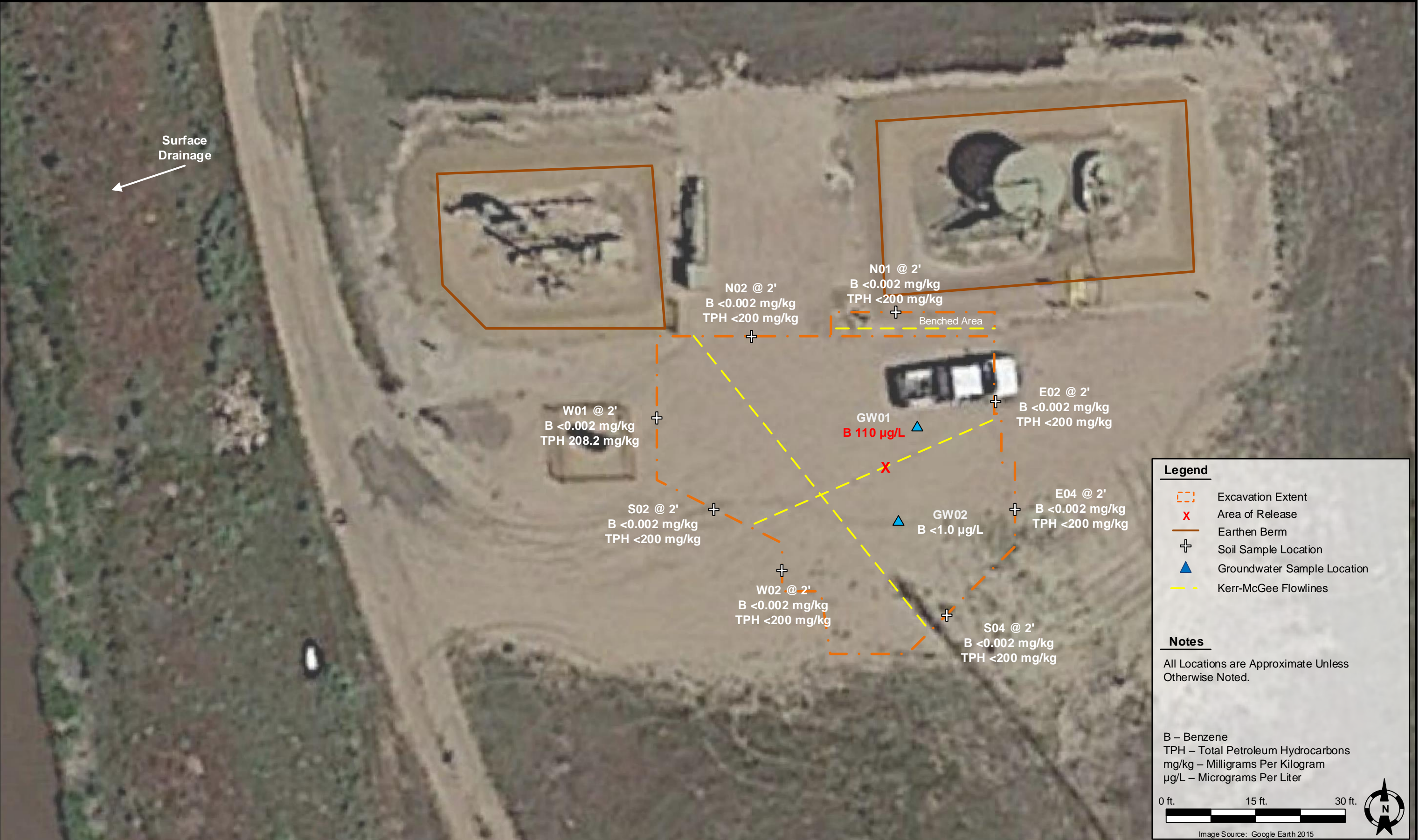
Print Name: Phillip Hamlin

Signed: [Signature] Title: Senior HSE Representative Date: 11/6/15

OGCC Approved: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

## **FIGURES**





DATE:	October 19, 2015
DESIGNED BY:	R. Bruner
DRAWN BY:	R. Bruner

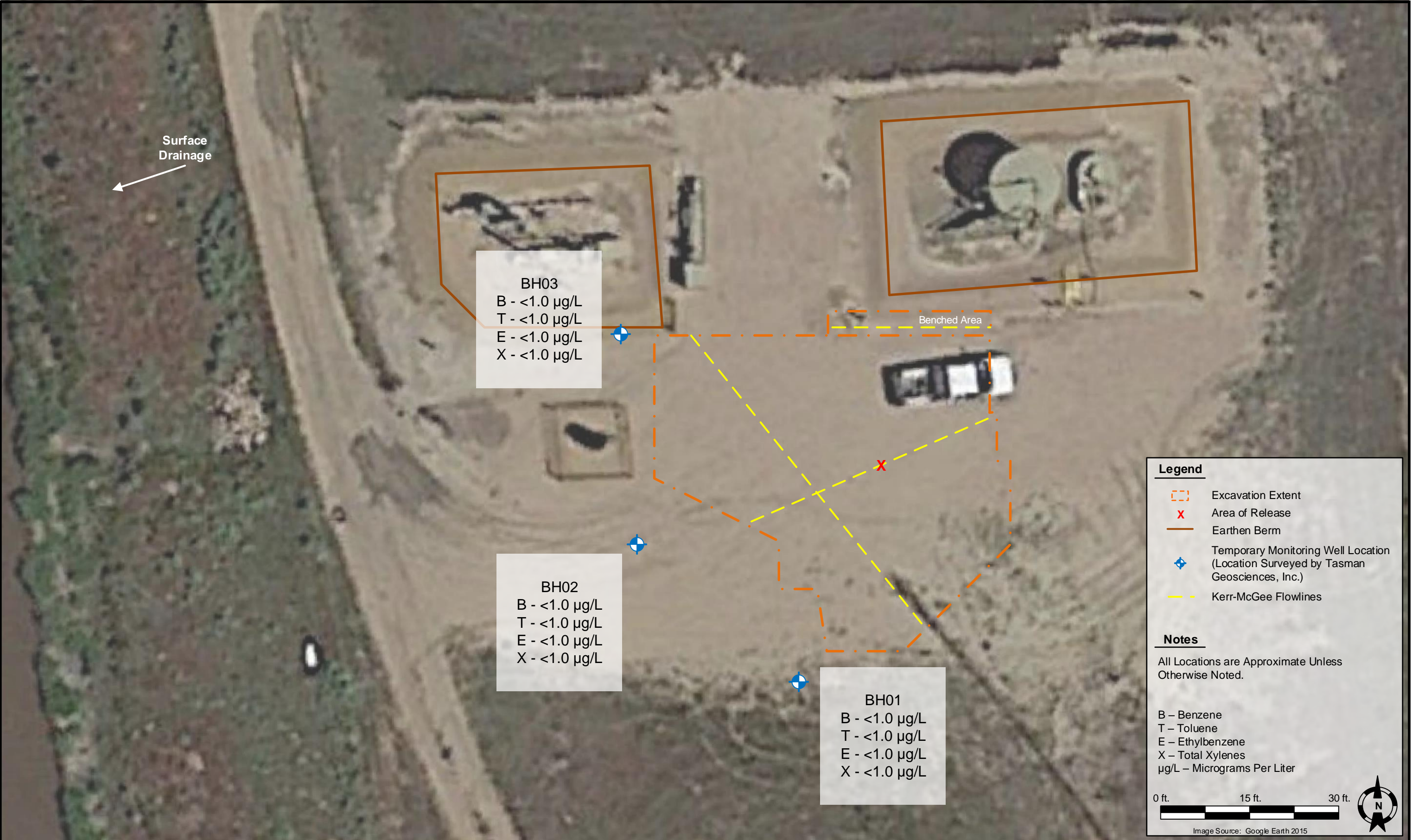


**Kerr-McGee Oil and Gas Onshore, LP**  
**UPRR 42 PAN AM GAS UNIT X 1**  
SWNE, Section 31, Township 3 North, Range 66 West  
Weld County, Colorado

Sample Location  
Map

FIGURE  
1





DATE:	October 19, 2015
DESIGNED BY:	R. Bruner
DRAWN BY:	R. Bruner



**Kerr-McGee Oil and Gas Onshore, LP**  
**UPRR 42 PAN AM GAS UNIT X 1**  
SWNE, Section 31, Township 3 North, Range 66 West  
Weld County, Colorado

Groundwater Sample Results  
Map (05/29/15)

FIGURE  
2





**Legend**

- Excavation Extent
- Area of Release
- Earthen Berm
- Temporary Monitoring Well Location (Location Surveyed by Tasman Geosciences, Inc.)
- Groundwater Elevation Contour (Dashed Where Inferred)
- Groundwater Elevation (ft. AMSL)
- Groundwater Flow Direction

**Notes**

All Locations are Approximate Unless Otherwise Noted.

Ft. AMSL – Feet Above Mean Sea Level

0 ft. 15 ft. 30 ft.

Image Source: Google Earth 2015

## **ANALYTICAL TABLES**

**TABLE 1**  
**UPRR 42 PAN AM GAS UNIT X 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)
<b>COGCC standards for soil (mg/kg) <sup>(1)</sup></b>			<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>500</b>		
N01 @ 2'	10/01/14	2	<0.0020	<0.0020	<0.0020	<0.0020	<0.200	<50	<200
W01 @ 2'	10/01/14	2	<0.0020	<0.0020	0.246	0.468	48.2	160	<200
E02 @ 2'	10/02/14	2	<0.002	<0.002	0.004	0.01	<50	<50	<200
S02 @ 2'	10/02/14	2	<0.002	<0.002	<0.002	<0.002	<50	<50	<200
N02 @ 2'	10/02/14	2	<0.002	<0.002	<0.002	<0.002	<50	<50	<200
W02 @ 2'	10/02/14	2	<0.002	<0.002	<0.002	<0.002	<50	<50	<200
S04 @ 2	10/03/14	2	<0.002	<0.002	0.03	0.01	<50	<50	<200
E04 @ 2	10/03/14	2	<0.002	<0.002	0.004	0.01	<50	<50	<200

**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

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**  
**UPRR 42 PAN AM GAS UNIT X 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)
<b>COGCC Standards for groundwater (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	
GW01	10/01/14	<b>110</b>	74.0	24.6	320	~4
GW02	10/06/14	<1.0	<1.0	1.4	27.3	~4
BH01	05/29/15	<1.0	<1.0	<1.0	<1.0	12.11
BH02	05/29/15	<1.0	<1.0	<1.0	<1.0	11.96
BH03	05/29/15	<1.0	<1.0	<1.0	<1.0	10.35

**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**



October 02, 2014

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver

CO 80211

**Project Name - KMG - UPRR 42 Pan Am X #1****Project Number - [none]**

Attached are your analytical results for KMG - UPRR 42 Pan Am X #1 received by Origins Laboratory, Inc. October 01, 2014. This project is associated with Origins project number X410016-01.

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 - UPRR 42 Pan Am X #1

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW01	X410016-01	Water	October 1, 2014 11:45	10/01/2014 17:30
N01 @ 2'	X410016-02	Soil	October 1, 2014 12:10	10/01/2014 17:30
W01 @ 2'	X410016-03	Soil	October 1, 2014 12:15	10/01/2014 17:30

Origins Laboratory, Inc.



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

Ross S Hutto For Noelle Doyle Mathis, President



Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #1



www.originslaboratory.com

X410014

ORIGINS  
LABORATORY, INC

Client: Tasman Geosciences  
Address: 6899 Pecos Street, Unit C, Denver, CO 80211  
Telephone Number: 303.265.9645  
Email Address: Christine.Wasko@tasman-geo.com

Project Manager: Christine Wasko  
Project Name: UPRR 42 Pan Am X #1  
Project Number:   
Samples Collected By: C. Wasko

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative					Matrix			Analysis	Sample Instructions
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Sampling Container	Other		
GWD1	10/1/14	1145	3	X	X			X				BTEX only	1
N01 Q2	10/1/14	1210	1	X				X				BTEX 8260 X 8260 8260 8260	2
W01 Q2	10/1/14	1215	1	X				X					3
													4
													5
													6
													7
													8
													9
<div style="text-align: right;"> <b>DEPARTING 5:30 PLEASE</b> </div>													
Requisitioned By: 	Date: 10/1/14	Time: 12:30											
Requisitioned By: 	Date: 10/1/14	Time: 17:30											

Unpreserved ☐ 40 Hr ☐ 72 Hr ☐ 2.0

Same Day ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ 2.0

Unpreserved ☐ 40 Hr ☐ 72 Hr ☐ 2.0

Date Results Needed

Origins Laboratory, Inc.

*[Signature]*

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 - UPRR 42 Pan Am X #1

Origins Laboratory

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

## Sample Receipt Checklist

Original Work Order: XU10016

Client: Tasman

Client Project ID: UPRR 42 Pan Am X #1

Checklist Completed by: Jan Bellaguardi

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

Date/time completed: 10-1-14

Airbill #: 1112

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

Cooler Number/Temperature: 1 / 20 °C 1 °C 1 °C (Describe) 1 °C

Thermometer ID: T002

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?	<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 <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> 1/4 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 <sup>(1)</sup> ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample's integrity) pH < 2 for samples preserved with HNO <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ; / / pH > 10 for samples preserved with Na <sub>2</sub> CO <sub>3</sub> +NaOH, ZnAc+NaOH)	<input checked="" type="checkbox"/>			HCL
Additional Comments (if any):				

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

Reviewed by (Project Manager): [Signature]

Date/Time Reviewed: 10/1/14

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 - UPRR 42 Pan Am X #1

## GW01

10/1/2014 11:45:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	-------

## Origins Laboratory, Inc. X410016-01 (Water)

### BTEX by EPA 8260C

Benzene	110	1.0	ug/L	1	4130014	10/01/2014	10/02/2014
Toluene	74.0	1.0	"	"	"	"	"
Ethylbenzene	24.6	1.0	"	"	"	"	"
Xylenes, total	320	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	87.3-113			"	"	"
Surrogate: Toluene-d8	101 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	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

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #1

N01 @ 2'

10/1/2014 12:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

**Origins Laboratory, Inc.**  
**X410016-02 (Soil)**

**DRO/RRO by EPA8015C**

Diesel (C10-C28)	ND	50	mg/kg	1	4J01012	10/01/2014	10/02/2014
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	75.1 %	59-131			"	"	"
------------------------	--------	--------	--	--	---	---	---

**GBTEX by EPA 8260C**

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	4J01011	10/01/2014	10/01/2014
Benzene	ND	0.0020	"	"	"	"	"
Toluene	ND	0.0020	"	"	"	"	"
Ethylbenzene	ND	0.0020	"	"	"	"	"
Xylenes, total	ND	0.0020	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	90.8 %	70-130			"	"	"
Surrogate: Toluene-d8	98.6 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	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.

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #1

W01 @ 2'  
10/1/2014 12:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X410016-03 (Soil)

### DRO/RRO by EPA8015C

Diesel (C10-C28)	160	50	mg/kg	1	4J01012	10/01/2014	10/02/2014
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	72.4 %	59-131			"	"	"
------------------------	--------	--------	--	--	---	---	---

### GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	48.2	10.0	mg/kg	50	4J01011	10/01/2014	10/02/2014
Benzene	ND	0.0020	"	1	"	"	"
Toluene	ND	0.0020	"	"	"	"	"
Ethylbenzene	0.246	0.100	"	50	"	"	"
Xylenes, total	0.468	0.100	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	100 %	70-130			"	"	"
Surrogate: Toluene-d8	97.1 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	106 %	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.

Ross S Hutto For Noelle Doyle Mathis, President



Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4130014 - EPA 5030B (Water)**

**Blank (4130014-BLK1)**

Prepared: 09/30/2014 Analyzed: 10/01/2014

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	65		"	62.5	105		87.3-113			
Surrogate: Toluene-d8	61		"	62.5	98.3		90.9-108			
Surrogate: 4-Bromofluorobenzene	64		"	62.5	102		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

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4I30014 - EPA 5030B (Water)**

**LCS (4I30014-BS1)**

Prepared: 09/30/2014 Analyzed: 10/01/2014

Benzene	43.5	1.0	ug/L	50.0		87.0	75-126			
Toluene	43.7	1.0	"	50.0		87.5	78.7-126			
Ethylbenzene	44.9	1.0	"	50.0		89.8	81-130			
m,p-Xylene	89.8	2.0	"	100		89.8	77.2-133			
o-Xylene	43.9	1.0	"	50.0		87.7	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.0	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		98.5	90.9-108			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	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

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4130014 - EPA 5030B (Water)**

Matrix Spike (4130014-MS1)		Source: X409307-02			Prepared: 09/30/2014 Analyzed: 10/01/2014					
Benzene	49.0	1.0	ug/L	50.0	ND	97.9	74-130			
Toluene	49.4	1.0	"	50.0	0.2	98.5	73-131			
Ethylbenzene	50.8	1.0	"	50.0	ND	102	76-132			
m,p-Xylene	101	2.0	"	100	ND	101	69-139			
o-Xylene	49.6	1.0	"	50.0	ND	99.2	74-131			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.3	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		99.0	90.9-108			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	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

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4130014 - EPA 5030B (Water)**

Matrix Spike Dup (4130014-MSD1)		Source: X409307-02			Prepared: 09/30/2014 Analyzed: 10/01/2014					
Benzene	47.0	1.0	ug/L	50.0	ND	93.9	74-130	4.17	20	
Toluene	47.9	1.0	"	50.0	0.2	95.4	73-131	3.19	20	
Ethylbenzene	48.4	1.0	"	50.0	ND	96.7	76-132	4.92	20	
m,p-Xylene	95.8	2.0	"	100	ND	95.8	69-139	5.64	20	
o-Xylene	47.9	1.0	"	50.0	ND	95.7	74-131	3.53	20	
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.4	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		99.2	90.9-108			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	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

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J01011 - EPA 5030 (soil)**

**Blank (4J01011-BLK1)**

Prepared: 10/01/2014 Analyzed: 10/01/2014

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							
Benzene	ND	0.0020	"							
Toluene	ND	0.0020	"							
Ethylbenzene	ND	0.0020	"							
Xylenes, total	ND	0.0020	"							
Surrogate: 1,2-Dichloroethane-d4	65.8		ug/kg	62.5		105	70-130			
Surrogate: Toluene-d8	62.1		"	62.5		99.3	70-130			
Surrogate: 4-Bromofluorobenzene	62.7		"	62.5		100	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.*

Ross S Hutto For Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J01011 - EPA 5030 (soil)

**LCS (4J01011-BS1)**

Prepared: 10/01/2014 Analyzed: 10/01/2014

Benzene	0.105	0.0020	mg/kg	0.100		105	77.1-124			
Toluene	0.0947	0.0020	"	0.100		94.7	74.5-128			
Ethylbenzene	0.0969	0.0020	"	0.100		96.9	66.4-127			
m,p-Xylene	0.193	0.0040	"	0.200		96.5	76.6-124			
o-Xylene	0.102	0.0020	"	0.100		102	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	65.6		ug/kg	62.5		105	70-130			
Surrogate: Toluene-d8	61.1		"	62.5		97.8	70-130			
Surrogate: 4-Bromofluorobenzene	60.3		"	62.5		96.5	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.*



Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J01011 - EPA 5030 (soil)

Matrix Spike (4J01011-MS1)		Source: X409335-05			Prepared: 10/01/2014 Analyzed: 10/01/2014			QM-07		
Benzene	0.124	0.0020	mg/kg	0.100	0.0733	50.7	71.8-126			
Toluene	0.278	0.0020	"	0.100	0.278	0.440	65.1-130			
Ethylbenzene	ND	0.0020	"	0.100	ND		62.2-130			
m,p-Xylene	ND	0.0040	"	0.200	ND		46.5-137			
o-Xylene	ND	0.0020	"	0.100	ND		54.2-134			
Surrogate: 1,2-Dichloroethane-d4	52.4		ug/kg	62.5		83.9	70-130			
Surrogate: Toluene-d8	63.1		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	64.8		"	62.5		104	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.

Ross S Hutto For Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J01011 - EPA 5030 (soil)

Matrix Spike Dup (4J01011-MSD1)		Source: X409335-05			Prepared: 10/01/2014 Analyzed: 10/01/2014				QM-07	
Benzene	0.143	0.0020	mg/kg	0.100	0.0733	70.2	71.8-126	14.5	11.3	
Toluene	0.268	0.0020	"	0.100	0.278	NR	65.1-130	3.66	15.4	
Ethylbenzene	ND	0.0020	"	0.100	ND		62.2-130		19.6	
m,p-Xylene	ND	0.0040	"	0.200	ND		46.5-137		19.2	
o-Xylene	ND	0.0020	"	0.100	ND		54.2-134		17.9	
Surrogate: 1,2-Dichloroethane-d4	56.4		ug/kg	62.5		90.2	70-130			
Surrogate: Toluene-d8	63.7		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	48.2		"	62.5		77.1	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.

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Extractable Petroleum Hydrocarbons by 8015M - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch 4J01012 - EPA 3580**

**Blank (4J01012-BLK1)**

Prepared: 10/01/2014 Analyzed: 10/01/2014

Diesel (C10-C28)	ND	50	mg/kg							
Residual Range Organics (C28-C36)	ND	200	"							
Surrogate: o-Terphenyl	52		g	50.0		104	59-131			

**LCS (4J01012-BS1)**

Prepared: 10/01/2014 Analyzed: 10/01/2014

Diesel (C10-C28)	1100	50	mg/kg	1000		110	64-121			
Residual Range Organics (C28-C36)	1100	200	"	1000		110	58-124			
Surrogate: o-Terphenyl	56		g	50.0		111	59-131			

**LCS Dup (4J01012-BSD1)**

Prepared: 10/01/2014 Analyzed: 10/01/2014

Diesel (C10-C28)	990	50	mg/kg	1000		99.4	64-121	10.3	20	
Residual Range Organics (C28-C36)	1000	200	"	1000		99.7	58-124	9.70	20	
Surrogate: o-Terphenyl	51		g	50.0		102	59-131			

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 - UPRR 42 Pan Am X #1

### Notes and Definitions

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

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.*

Ross S Hutto For Noelle Doyle Mathis, President



October 03, 2014

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver

CO 80211

Project Name - KMG - UPRR 42 Pan Am X #1

Project Number - [none]

Attached are your analytical results for KMG - UPRR 42 Pan Am X #1 received by Origins Laboratory, Inc. October 02, 2014. This project is associated with Origins project number X410028-01.

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

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #1

### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
E02 @ 2'	X410028-01	Soil	October 2, 2014 11:50	10/02/2014 16:45
S02 @ 2'	X410028-02	Soil	October 2, 2014 12:00	10/02/2014 16:45
N02 @ 2'	X410028-03	Soil	October 2, 2014 11:55	10/02/2014 16:45
W02 @ 2'	X410028-04	Soil	October 2, 2014 14:00	10/02/2014 16:45

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.*

Noelle Doyle Mathis, President



Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #1

www.originslaboratory.com

X410028

ORIGINS  
LABORATORY, INC

page 1 of 1

Client: Tasman Geosciences Project Manager/Send Report To: Christine Wasko  
Address: 6899 Pecos Street, Unit C, Denver, CO 80211 Email Address: CWasko@tasman-geo.com  
Telephone Number: 912 230 2807 Project Name/Number: UPRR 42 Pan Am X #1  
Samples Collected By: Noelle Nelson

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis/Method	Sample Instructions
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air/Summit		
E0202	10/2/14	1150	2	X					X		STEX/TPH	1
S0202	10/2/14	1200	2	X					X			2
N0202	10/2/14	1155	2	X					X			3
W0202	10/2/14	1400	2	X					X			4
												5
												6
												7
												8
												9
												10
Relinquished By: <u>[Signature]</u>	Date: <u>10/2/14</u>	Time: <u>11:45 AM</u>	Received By: <u>[Signature]</u>	Date: <u>10-2-14</u>	Time: <u>10:45</u>	Turnaround Time: <input checked="" type="checkbox"/> Same Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr	Standard <input type="checkbox"/> 4.4					

Comments:

Date Results Needed:

Origins Laboratory, Inc.

[Signature]

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 - UPRR 42 Pan Am X #1

Origins Laboratory

F-012207-01-R1  
Effective Date: 01/08/12

## Sample Receipt Checklist

Origins Work Order: X410028

Client: Tasman  
Client Project ID: KMG - UPRR 42 Pan Am X #1

Checklist Completed by: Sen Pellegrini  
Date/time completed: 10-2-14

Shipped Via: Pick Up  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)  
Airbill #: N/A

Matrix(s) Received: (Check all that apply): ☒ Soil/Solid ☐ Water ☐ Other: \_\_\_\_\_  
Cooler Number/Temperature: 1 / 4.4 °C \_\_\_\_\_ °C \_\_\_\_\_ °C (Describe) \_\_\_\_\_ °C  
Thermometer ID: T002

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?	<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 <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly requisitioned by the client with date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace (> ½ inch bubble) present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (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 <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> / ( pH > 10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Additional Comments (if any):				

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

Reviewed by (Project Manager) [Signature] 10-02-14 1753  
Date/Time Reviewed

Origins Laboratory, Inc.

[Signature]

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 - UPRR 42 Pan Am X #1

E02 @ 2'

10/2/2014 11:50:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X410028-01 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	4J02017	10/02/2014	10/02/2014
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	0.004	0.002	"	"	"	"	"
Xylenes, total	0.01	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	94.0 %	70-130			"	"	"
Surrogate: Toluene-d8	104 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	114 %	70-130			"	"	"

## TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	4J02018	10/02/2014	10/03/2014
Diesel (C10-C28)	ND	50.0	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	81.7 %	65-146			"	"	"
------------------------	--------	--------	--	--	---	---	---

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 - UPRR 42 Pan Am X #1

S02 @ 2'

10/2/2014 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X410028-02 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	4J02017	10/02/2014	10/02/2014
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	87.4 %	70-130			"	"	"
Surrogate: Toluene-d8	102 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	103 %	70-130			"	"	"

## TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	4J02018	10/02/2014	10/03/2014
Diesel (C10-C28)	ND	50.0	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	90.2 %	65-146			"	"	"
------------------------	--------	--------	--	--	---	---	---

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 - UPRR 42 Pan Am X #1

N02 @ 2'

10/2/2014 11:55:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X410028-03 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	4J02017	10/02/2014	10/02/2014
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	110 %	70-130			"	"	"
Surrogate: Toluene-d8	94.0 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	103 %	70-130			"	"	"

## TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	4J02018	10/02/2014	10/03/2014
Diesel (C10-C28)	ND	50.0	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	87.1 %	65-146			"	"	"
------------------------	--------	--------	--	--	---	---	---

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 - UPRR 42 Pan Am X #1

W02 @ 2'  
10/2/2014 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X410028-04 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	4J02017	10/02/2014	10/03/2014
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	95.6 %	70-130			"	"	"
Surrogate: Toluene-d8	98.1 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	135 %	70-130			"	"	" S-GC

## TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	4J02018	10/02/2014	10/03/2014
Diesel (C10-C28)	ND	50.0	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	87.3 %	65-146			"	"	"
------------------------	--------	--------	--	--	---	---	---

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 - UPRR 42 Pan Am X #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 4J02017 - EPA 5030 (soil)

Blank (4J02017-BLK1)

Prepared: 10/02/2014 Analyzed: 10/02/2014

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5	102	70-130				
Surrogate: Toluene-d8	62		"	62.5	98.8	70-130				
Surrogate: 4-Bromofluorobenzene	65		"	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.*

Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J02017 - EPA 5030 (soil)

**LCS (4J02017-BS1)**

Prepared: 10/02/2014 Analyzed: 10/02/2014

Benzene	0.09	0.002	mg/kg	0.100		93.7	77.1-124			
Toluene	0.08	0.002	"	0.100		81.8	74.5-128			
Ethylbenzene	0.08	0.002	"	0.100		82.4	66.4-127			
m,p-Xylene	0.21	0.004	"	0.200		106	76.6-124			
o-Xylene	0.09	0.002	"	0.100		87.3	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.2	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.2	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.*

Noelle Doyle Mathis, President



Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J02017 - EPA 5030 (soil)

Matrix Spike (4J02017-MS1)		Source: X410026-02			Prepared: 10/02/2014 Analyzed: 10/02/2014					
Benzene	0.10	0.002	mg/kg	0.100	ND	99.2	71.8-126			
Toluene	0.09	0.002	"	0.100	0.004	87.1	65.1-130			
Ethylbenzene	0.08	0.002	"	0.100	0.004	80.1	62.2-130			
m,p-Xylene	0.21	0.004	"	0.200	0.005	105	46.5-137			
o-Xylene	0.09	0.002	"	0.100	0.005	86.0	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	62		ug/kg	62.5		98.9	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.3	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	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.

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J02017 - EPA 5030 (soil)

Matrix Spike Dup (4J02017-MSD1)		Source: X410026-02			Prepared: 10/02/2014 Analyzed: 10/02/2014					
Benzene	0.10	0.002	mg/kg	0.100	ND	97.5	71.8-126	1.71	11.3	
Toluene	0.09	0.002	"	0.100	0.004	91.0	65.1-130	4.28	15.4	
Ethylbenzene	0.09	0.002	"	0.100	0.004	82.2	62.2-130	2.43	19.6	
m,p-Xylene	0.22	0.004	"	0.200	0.005	107	46.5-137	2.04	19.2	
o-Xylene	0.08	0.002	"	0.100	0.005	77.1	54.2-134	10.3	17.9	
Surrogate: 1,2-Dichloroethane-d4	58		ug/kg	62.5		92.6	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	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.*

Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Extractable Petroleum Hydrocarbons by 8015M - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch 4J02018 - EPA 3580**

**Blank (4J02018-BLK1)**

Prepared: 10/02/2014 Analyzed: 10/03/2014

Gasoline (C6-C10)	ND	50.0	mg/kg
Diesel (C10-C28)	ND	50.0	"
Residual Range Organics (C28-C36)	ND	200	"
TPH - Carbon Chain Total	ND	50.0	"

*Surrogate: o-Terphenyl* 38 g 50.0 75.2 65-146

**LCS (4J02018-BS1)**

Prepared: 10/02/2014 Analyzed: 10/02/2014

Gasoline (C6-C10)	978	50.0	mg/kg	1000	97.8	66.7-119
Diesel (C10-C28)	1050	50.0	"	1000	105	70.1-127
Residual Range Organics (C28-C36)	1080	200	"	1000	108	54.5-139

*Surrogate: o-Terphenyl* 46 g 50.0 91.4 65-146

**Matrix Spike (4J02018-MS1)**

Source: X410026-03

Prepared: 10/02/2014 Analyzed: 10/02/2014

Gasoline (C6-C10)	1080	50.0	mg/kg	1000	ND	108	56.4-132
Diesel (C10-C28)	1130	50.0	"	1000	185	94.4	57.4-138
Residual Range Organics (C28-C36)	1090	200	"	1000	ND	109	47.7-129

*Surrogate: o-Terphenyl* 38 g 50.0 77.0 65-146

**Matrix Spike Dup (4J02018-MSD1)**

Source: X410026-03

Prepared: 10/02/2014 Analyzed: 10/02/2014

Gasoline (C6-C10)	1060	50.0	mg/kg	1000	ND	106	56.4-132	2.35	22
Diesel (C10-C28)	1100	50.0	"	1000	185	91.5	57.4-138	2.60	18.3
Residual Range Organics (C28-C36)	994	200	"	1000	ND	99.4	47.7-129	8.93	30.1

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 - UPRR 42 Pan Am X #1

Extractable Petroleum Hydrocarbons by 8015M - Quality Control  
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 4J02018 - EPA 3580

Matrix Spike Dup (4J02018-MSD1)

Source: X410026-03

Prepared: 10/02/2014 Analyzed: 10/02/2014

Surrogate: o-Terphenyl	40		g	50.0	80.8	65-146				
------------------------	----	--	---	------	------	--------	--	--	--	--

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.*

Noelle Doyle Mathis, President



Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Christine Wasko

Project Number: [none]

Project: KMG - UPRR 42 Pan Am X #1

### Notes and Definitions

S-GC Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

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.*

Noelle Doyle Mathis, President



October 05, 2014

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver

CO 80211

Project Name - KMG - UPRR 42 Pan Am X #1

Project Number - [none]

Attached are your analytical results for KMG - UPRR 42 Pan Am X #1 received by Origins Laboratory, Inc. October 03, 2014. This project is associated with Origins project number X410039-01.

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

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #1

---

**CROSS REFERENCE REPORT**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S04 @ 2	X410039-01	Soil	October 3, 2014 13:57	10/03/2014 16:00
E04 @ 2	X410039-02	Soil	October 3, 2014 14:00	10/03/2014 16:00

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.*

---

Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #1

www.originslaboratory.com

page \_\_\_\_ of \_\_\_\_

**ORIGINS**  
LABORATORY, INC

Client: Tasman Geo Project Manager/Send Report To: Christine Wasko  
Address: \_\_\_\_\_ Email Address: 665.ks@tasman-geo.com  
Telephone Number: 916.230.2817 Project Name/Number: UPRR 42 Pan Am X #1  
Samples Collected By: Jack Nelson

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix		Analysis/Method	Sample Instructions
				HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air/Sediment		
S0402	10/3	1357	1	X				X		BTEX TPH ↓	1
E0402	↓	1400	1	X				X			2
											3
											4
											5
											6
											7
											8
											9
											10
Relinquished By: _____	Date: <u>10/3</u>	Time: <u>1100</u>	Received By: _____	Date: <u>10-3-14</u>	Time: <u>1600</u>	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"/> 10-2					
Relinquished By: _____	Date: _____	Time: _____	Received By: _____	Date: _____	Time: _____						

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 - UPRR 42 Pan Am X #1

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: X410039

Client: Tasman  
Client Project ID: UPRR 42 Pan Am X #1

Checklist Completed by: Jon Pellegrini

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

Date/time completed: 10-3-14

Airbill #: N/A

Matrix(s) Received: (Check all that apply): ☒ Soil/Solid

☐ Water ☐ Other:

Cooler Number/Temperature: 1 / 10.2 °C / °C / °C (Describe) °C

Thermometer ID: T002

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?		<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 <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<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"/>	<u>Soil</u>
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (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 <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH > 10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)			<input checked="" type="checkbox"/>	<u>Soil</u>
Additional Comments (if any):				

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

Reviewed by (Project Manager): [Signature]

10/3/14 / [Signature]  
Date/Time Reviewed

Origins Laboratory, Inc.

[Signature]

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 - UPRR 42 Pan Am X #1

S04 @ 2  
10/3/2014 1:57:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X410039-01 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	4J03002	10/03/2014	10/03/2014
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	0.03	0.002	"	"	"	"	"
Xylenes, total	0.01	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	93.4 %	70-130			"	"	"
Surrogate: Toluene-d8	104 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	97.2 %	70-130			"	"	"

## TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	4J03009	10/03/2014	10/03/2014
Diesel (C10-C28)	ND	50.0	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	66.5 %	65-146			"	"	"
------------------------	--------	--------	--	--	---	---	---

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 - UPRR 42 Pan Am X #1

E04 @ 2  
10/3/2014 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X410039-02 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	4J03002	10/03/2014	10/03/2014
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	0.004	0.002	"	"	"	"	"
Xylenes, total	0.01	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	88.9 %	70-130			"	"	"
Surrogate: Toluene-d8	105 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	111 %	70-130			"	"	"

## TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	4J03009	10/03/2014	10/03/2014
Diesel (C10-C28)	ND	50.0	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	65.0 %	65-146			"	"	"
------------------------	--------	--------	--	--	---	---	---

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 - UPRR 42 Pan Am X #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 4J03002 - EPA 5030 (soil)

Blank (4J03002-BLK1)

Prepared: 10/03/2014 Analyzed: 10/05/2014

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	61		ug/kg	62.5		97.7	70-130			
Surrogate: Toluene-d8	61		"	62.5		98.2	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	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.*

Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J03002 - EPA 5030 (soil)

**LCS (4J03002-BS1)**

Prepared: 10/03/2014 Analyzed: 10/03/2014

Benzene	0.09	0.002	mg/kg	0.100		94.8	77.1-124			
Toluene	0.09	0.002	"	0.100		87.0	74.5-128			
Ethylbenzene	0.08	0.002	"	0.100		81.5	66.4-127			
m,p-Xylene	0.16	0.004	"	0.200		82.1	76.6-124			
o-Xylene	0.09	0.002	"	0.100		86.9	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	60		ug/kg	62.5		95.4	70-130			
Surrogate: Toluene-d8	62		"	62.5		98.9	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	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.*

Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J03002 - EPA 5030 (soil)

Matrix Spike (4J03002-MS1)		Source: X410022-01			Prepared: 10/03/2014 Analyzed: 10/03/2014					
Benzene	0.10	0.002	mg/kg	0.100	ND	101	71.8-126			
Toluene	0.10	0.002	"	0.100	ND	102	65.1-130			
Ethylbenzene	0.10	0.002	"	0.100	0.004	93.6	62.2-130			
m,p-Xylene	0.19	0.004	"	0.200	0.008	90.5	46.5-137			
o-Xylene	0.09	0.002	"	0.100	0.004	87.5	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	48		ug/kg	62.5		77.5	70-130			
Surrogate: Toluene-d8	65		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	67		"	62.5		106	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.*

Noelle Doyle Mathis, President



Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J03002 - EPA 5030 (soil)

Matrix Spike Dup (4J03002-MSD1)		Source: X410022-01			Prepared: 10/03/2014 Analyzed: 10/03/2014					
Benzene	0.10	0.002	mg/kg	0.100	ND	98.1	71.8-126	3.03	11.3	
Toluene	0.09	0.002	"	0.100	ND	94.9	65.1-130	7.66	15.4	
Ethylbenzene	0.09	0.002	"	0.100	0.004	82.9	62.2-130	11.6	19.6	
m,p-Xylene	0.17	0.004	"	0.200	0.008	82.7	46.5-137	8.62	19.2	
o-Xylene	0.08	0.002	"	0.100	0.004	79.9	54.2-134	8.60	17.9	
Surrogate: 1,2-Dichloroethane-d4	55		ug/kg	62.5		87.9	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	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.*

Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Extractable Petroleum Hydrocarbons by 8015M - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch 4J03009 - EPA 3580**

**Blank (4J03009-BLK1)**

Prepared: 10/03/2014 Analyzed: 10/03/2014

Gasoline (C6-C10)	ND	50.0	mg/kg
Diesel (C10-C28)	ND	50.0	"
Residual Range Organics (C28-C36)	ND	200	"
TPH - Carbon Chain Total	ND	50.0	"

*Surrogate: o-Terphenyl* 35 g 50.0 70.3 65-146

**LCS (4J03009-BS1)**

Prepared: 10/03/2014 Analyzed: 10/03/2014

Gasoline (C6-C10)	893	50.0	mg/kg	1000	89.3	66.7-119
Diesel (C10-C28)	948	50.0	"	1000	94.8	70.1-127
Residual Range Organics (C28-C36)	917	200	"	1000	91.7	54.5-139

*Surrogate: o-Terphenyl* 36 g 50.0 76.3 65-146

**Matrix Spike (4J03009-MS1)**

Source: X410033-01

Prepared: 10/03/2014 Analyzed: 10/05/2014

Gasoline (C6-C10)	976	50.0	mg/kg	1000	ND	97.6	56.4-132
Diesel (C10-C28)	929	50.0	"	1000	ND	92.9	57.4-138
Residual Range Organics (C28-C36)	925	200	"	1000	ND	92.5	47.7-129

*Surrogate: o-Terphenyl* 45 g 50.0 90.1 65-146

**Matrix Spike Dup (4J03009-MSD1)**

Source: X410033-01

Prepared: 10/03/2014 Analyzed: 10/05/2014

Gasoline (C6-C10)	890	50.0	mg/kg	1000	ND	89.0	56.4-132	9.31	22
Diesel (C10-C28)	824	50.0	"	1000	ND	82.4	57.4-138	12.1	18.3
Residual Range Organics (C28-C36)	922	200	"	1000	ND	92.2	47.7-129	0.366	30.1

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 - UPRR 42 Pan Am X #1

Extractable Petroleum Hydrocarbons by 8015M - Quality Control  
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 4J03009 - EPA 3580

Matrix Spike Dup (4J03009-MSD1)

Source: X410033-01

Prepared: 10/03/2014 Analyzed: 10/05/2014

Surrogate: o-Terphenyl	45		g	50.0	90.1	65-146				
------------------------	----	--	---	------	------	--------	--	--	--	--

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.*

Noelle Doyle Mathis, President

Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Christine Wasko

Project Number: [none]

Project: KMG - UPRR 42 Pan Am X #1

### 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.



*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.*

Noelle Doyle Mathis, President



October 06, 2014

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver

CO 80211

Project Name - KMG - UPRR 42 Pan Am X #1

Project Number - [none]

Attached are your analytical results for KMG - UPRR 42 Pan Am X #1 received by Origins Laboratory, Inc. October 06, 2014. This project is associated with Origins project number X410051-01.

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

Christine Wasko

Project Number: [none]

Project: KMG - UPRR 42 Pan Am X #1

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW02	X410051-01	Water	October 6, 2014 8:45	10/06/2014 14:45

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.*

Noelle Doyle Mathis, President

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #1

[www.originslaboratory.com](http://www.originslaboratory.com)

page \_\_\_\_ of \_\_\_\_

# ORIGINS

LABORATORY, INC  
X410051

Client: Legman, Geo Project Manager/Send Report To: Christine Welske  
Address: \_\_\_\_\_ Email Address: clw@legman-gdc.com  
\_\_\_\_\_  
Telephone Number: 912 230 2807 Project Name/Number: UPRR 42 Pn Am X#1  
Samples Collected by: Brack Nelson

1/25 Ek'ibco | Norway CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

[illegible]

Comments:

Date Results Needed:

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 - UPRR 42 Pan Am X #1

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: X410051

Client: TASMAN

Client Project ID: UPRR 42

Checklist Completed by: Jen Pellegrini

Shipped Via: HTD  
(UPS, FedEx, King Delivered, Pick-up, etc.)

Date/time completed: 10-16-14

Airbill #: N/A

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

Cooler Number/Temperature: 1 16.1 °C \_\_\_\_\_ °C \_\_\_\_\_ °C (Describe) \_\_\_\_\_ °C

Thermometer ID: 1002

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C?		<input checked="" type="checkbox"/>		<u>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?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded?	<input checked="" type="checkbox"/>			
For volatiles in water - is there headspace (> ½ 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? (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 <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH > 10 for samples preserved with Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> +NaOH, ZnAc+NaOH)	<input checked="" type="checkbox"/>			<u>HCL</u>
Additional Comments (if any):				

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

Reviewed by (Project Manager) [Signature]

Date/Time Reviewed 10/16/14 1:15

Origins Laboratory, Inc.

[Signature]

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 - UPRR 42 Pan Am X #1

GW02

10/6/2014 8:45:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X410051-01 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4J06014	10/06/2014	10/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	1.4	1.0	"	"	"	"	"
Xylenes, total	27.3	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	87.3-113			"	"	"
Surrogate: Toluene-d8	101 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	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.*

Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J06014 - EPA 5030B (Water)

Blank (4J06014-BLK1)

Prepared: 10/06/2014 Analyzed: 10/06/2014

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	64		"	62.5	102		87.3-113			
Surrogate: Toluene-d8	61		"	62.5	98.1		90.9-108			
Surrogate: 4-Bromofluorobenzene	62		"	62.5	98.9		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.

Noelle Doyle Mathis, President



Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J06014 - EPA 5030B (Water)

LCS (4J06014-BS1)

Prepared: 10/06/2014 Analyzed: 10/06/2014

Benzene	48.2	1.0	ug/L	50.0		96.3	75-126			
Toluene	47.4	1.0	"	50.0		94.7	78.7-126			
Ethylbenzene	47.7	1.0	"	50.0		95.5	81-130			
m,p-Xylene	96.1	2.0	"	100		96.1	77.2-133			
o-Xylene	48.8	1.0	"	50.0		97.5	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	59		"	62.5		94.9	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		98.9	90.9-108			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		100	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.

Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J06014 - EPA 5030B (Water)

Matrix Spike (4J06014-MS1)		Source: X410042-02			Prepared: 10/06/2014 Analyzed: 10/06/2014					
Benzene	50.1	1.0	ug/L	50.0	0.6	98.9	74-130			
Toluene	48.9	1.0	"	50.0	0.3	97.1	73-131			
Ethylbenzene	246	1.0	"	50.0	198	97.7	76-132			
m,p-Xylene	185	2.0	"	100	84.6	101	69-139			
o-Xylene	54.0	1.0	"	50.0	4.2	99.6	74-131			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.7	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		99.1	90.9-108			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		98.3	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.*

Noelle Doyle Mathis, President

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - UPRR 42 Pan Am X #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 4J06014 - EPA 5030B (Water)

Matrix Spike Dup (4J06014-MSD1)		Source: X410042-02			Prepared: 10/06/2014 Analyzed: 10/06/2014					
Benzene	47.6	1.0	ug/L	50.0	0.6	94.0	74-130	5.03	20	
Toluene	46.4	1.0	"	50.0	0.3	92.2	73-131	5.12	20	
Ethylbenzene	238	1.0	"	50.0	198	81.2	76-132	3.41	20	
m,p-Xylene	176	2.0	"	100	84.6	91.6	69-139	5.05	20	
o-Xylene	51.4	1.0	"	50.0	4.2	94.3	74-131	4.99	20	
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.8	87.3-113			
Surrogate: Toluene-d8	61		"	62.5		98.2	90.9-108			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.0	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

Christine Wasko

Project Number: [none]

Project: KMG - UPRR 42 Pan Am X #1

### 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.



*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.*

Noelle Doyle Mathis, President

June 05, 2015

Tasman Geosciences

Bob Cornez

6899 Pecos Street, Unit C

Denver

CO 80211

**Project Name - KMG - UPRR 42 Pan Am X #1**

**Project Number - [none]**

Attached are your analytical results for KMG - UPRR 42 Pan Am X #1 received by Origins Laboratory, Inc. May 29, 2015. This project is associated with Origins project number X506002-01.

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

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

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

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

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

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



Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Bob Cornez

Project Number: [none]

Project: KMG - UPRR 42 Pan Am X #1

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	X506002-01	Water	May 29, 2015 12:08	05/29/2015 14:45
BH02	X506002-02	Water	May 29, 2015 12:15	05/29/2015 14:45
BH03	X506002-03	Water	May 29, 2015 12:19	05/29/2015 14:45

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 - UPRR 42 Pan Am X #1

www.originslaboratory.com

**XS000002**

**ORIGINS**  
LABORATORY, INC

page 1 of 1

Client: Tasman Geo

Project Manager: Bob Cornez

Address: \_\_\_\_\_

Project Name: UPRR 42 Pan Am X#1

Project Number: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Samples Collected By: Kate Persmark

Email Address: cornez@tasman-geo.com

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa			Other
BH01	5/29/15	1208	3	X				X					1
BH02	↓	1215	↓	X				X					2
BH03	↓	1219	↓	X				X					3
													4
													5
													6
													7
													8
													9
													10

Relinquished By: [Signature]

Date: 5/29/15

Time: 1415

Received By: [Signature]

Date: 5/29/15

Turnaround Time:

Same Day ☐ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Standard ☒

Temp Received 6.3

Date Results Needed \_\_\_\_\_

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

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 - UPRR 42 Pan Am X #1

Origins Laboratory

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

### Sample Receipt Checklist

Origins Work Order: X506002

Client: Tasman

Client Project ID: KMG - UPRR 42 Pan Am

Checklist Completed by: Jen Pellegrini

Shipped Via: #1D

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

Date/time completed: 6/1/15

Airbill #: N/A

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

Cooler Number/Temperature: 1 10.3 °C 1 °C 1 °C (Describe) °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 <sup>(1)</sup> ?	X			
Is there ice present (document if blue ice is used)	X			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		X		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		X		
Were all samples received intact <sup>(1)</sup> ?	X			
Was adequate sample volume provided <sup>(1)</sup> ?	X			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		X		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	X			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	X			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	X			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	X			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.		X		
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (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 <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> / (pH >10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)	X			HCL
Additional Comments (if any):				

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

Reviewed by (Project Manager)

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 - UPRR 42 Pan Am X #1

BH01

5/29/2015 12:08:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	-------

**Origins Laboratory, Inc.**  
**X506002-01 (Water)**

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	5F02010	06/02/2015	06/04/2015
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	101 %	87.3-113			"	"	"
Surrogate: Toluene-d8	100 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	101 %	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 - UPRR 42 Pan Am X #1

BH02

5/29/2015 12:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	-------

**Origins Laboratory, Inc.**  
**X506002-02 (Water)**

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	5F02010	06/02/2015	06/04/2015
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	101 %	87.3-113			"	"	"
Surrogate: Toluene-d8	101 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	101 %	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 - UPRR 42 Pan Am X #1

BH03

5/29/2015 12:19:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	-------

**Origins Laboratory, Inc.**  
**X506002-03 (Water)**

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	5F02010	06/02/2015	06/04/2015
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	101 %	87.3-113			"	"	"
Surrogate: Toluene-d8	101 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	103 %	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 - UPRR 42 Pan Am X #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 5F02010 - EPA 5030B (Water)**

**Blank (5F02010-BLK1)**

Prepared: 06/02/2015 Analyzed: 06/03/2015

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	62		"	62.5	99.5		90.9-108			
Surrogate: 4-Bromofluorobenzene	64		"	62.5	102		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 - UPRR 42 Pan Am X #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 5F02010 - EPA 5030B (Water)**

**LCS (5F02010-BS1)**

Prepared: 06/02/2015 Analyzed: 06/03/2015

Benzene	51.2	1.0	ug/L	50.0		102	75-126			
Toluene	50.5	1.0	"	50.0		101	78.7-126			
Ethylbenzene	51.8	1.0	"	50.0		104	80-130			
m,p-Xylene	103	2.0	"	100		103	77.2-133			
o-Xylene	50.0	1.0	"	50.0		100	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	61		"	62.5		98.2	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		99.6	90.9-108			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	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 - UPRR 42 Pan Am X #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 5F02010 - EPA 5030B (Water)**

Matrix Spike (5F02010-MS1)		Source: X505288-01			Prepared: 06/02/2015 Analyzed: 06/03/2015					
Benzene	52.0	1.0	ug/L	50.0	ND	104	74-130			
Toluene	51.2	1.0	"	50.0	ND	102	73-131			
Ethylbenzene	50.8	1.0	"	50.0	ND	102	76-132			
m,p-Xylene	100	2.0	"	100	ND	100	69-139			
o-Xylene	49.6	1.0	"	50.0	ND	99.3	74-131			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		95.8	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		99.8	90.9-108			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	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 - UPRR 42 Pan Am X #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 5F02010 - EPA 5030B (Water)**

Matrix Spike Dup (5F02010-MSD1)		Source: X505288-01			Prepared: 06/02/2015 Analyzed: 06/03/2015					
Benzene	55.8	1.0	ug/L	50.0	ND	112	74-130	7.10	20	
Toluene	55.6	1.0	"	50.0	ND	111	73-131	8.19	20	
Ethylbenzene	56.0	1.0	"	50.0	ND	112	76-132	9.74	20	
m,p-Xylene	111	2.0	"	100	ND	111	69-139	9.97	20	
o-Xylene	54.3	1.0	"	50.0	ND	109	74-131	8.87	20	
Surrogate: 1,2-Dichloroethane-d4	59		"	62.5		94.4	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		99.0	90.9-108			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	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 - UPRR 42 Pan Am X #1

### 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.



*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

**ATTACHMENT B  
WELL COMPLETION  
LOGS**



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Kerr-McGee Oil and Gas Onshore, LP

LOGGED BY: Brandon LeVasseur

PROJECT MANAGER: Robert Cornez

DRILLING CONTRACTOR: Tasman Geosciences

DRILLING EQUIPMENT: PowerProbe 9300SK

DRILL BIT SIZE (INCHES): 2 3/8"

DATE STARTED - COMPLETED: 5/27/2015

TOTAL WELL DEPTH (FT. BGS): 12.2

DEPTH TO WATER (FT. BGS): 12.11 (5/29/15) ▼

UPRR 42 Pan Am Gas Unit X 1

BORING / WELL ID: BH01

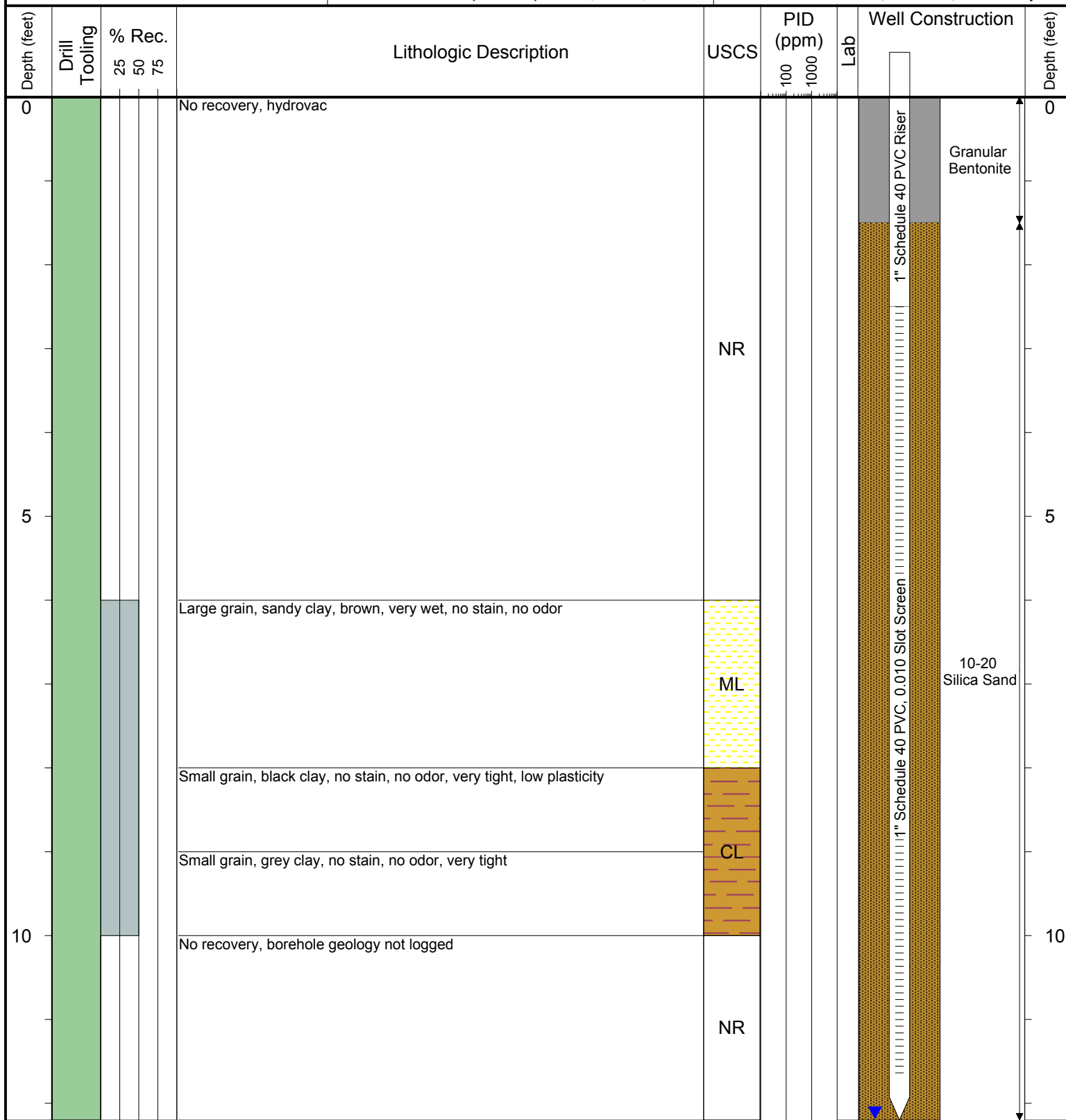
LOCATION: Weld County, Colorado

NORTHING (CO STATE PLANE): 1310786

EASTING (CO STATE PLANE): 3191229

CASING ELEVATION (FT. AMSL): 4847.705

GROUND ELEVATION (FT. AMSL): Not surveyed



Drilling / Sample Method:

Macro-Core

Expendable Well Tip

Perforated Injection Tool

HydroPunch Groundwater Sampler

Laboratory Sample Types:

Geotechnical Lab

Analytical Chemistry Lab

Geotechnical & Analytical Chemistry Lab





6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Kerr-McGee Oil and Gas Onshore, LP

LOGGED BY: Brandon LeVasseur

PROJECT MANAGER: Robert Cornez

DRILLING CONTRACTOR: Tasman Geosciences

DRILLING EQUIPMENT: PowerProbe 9300SK

DRILL BIT SIZE (INCHES): 2 3/8"

DATE STARTED - COMPLETED: 5/27/2015

TOTAL WELL DEPTH (FT. BGS): 12.4

DEPTH TO WATER (FT. BGS): 11.96 (5/29/15) ▼

## UPRR 42 Pan Am Gas Unit X 1

BORING / WELL ID: BH02

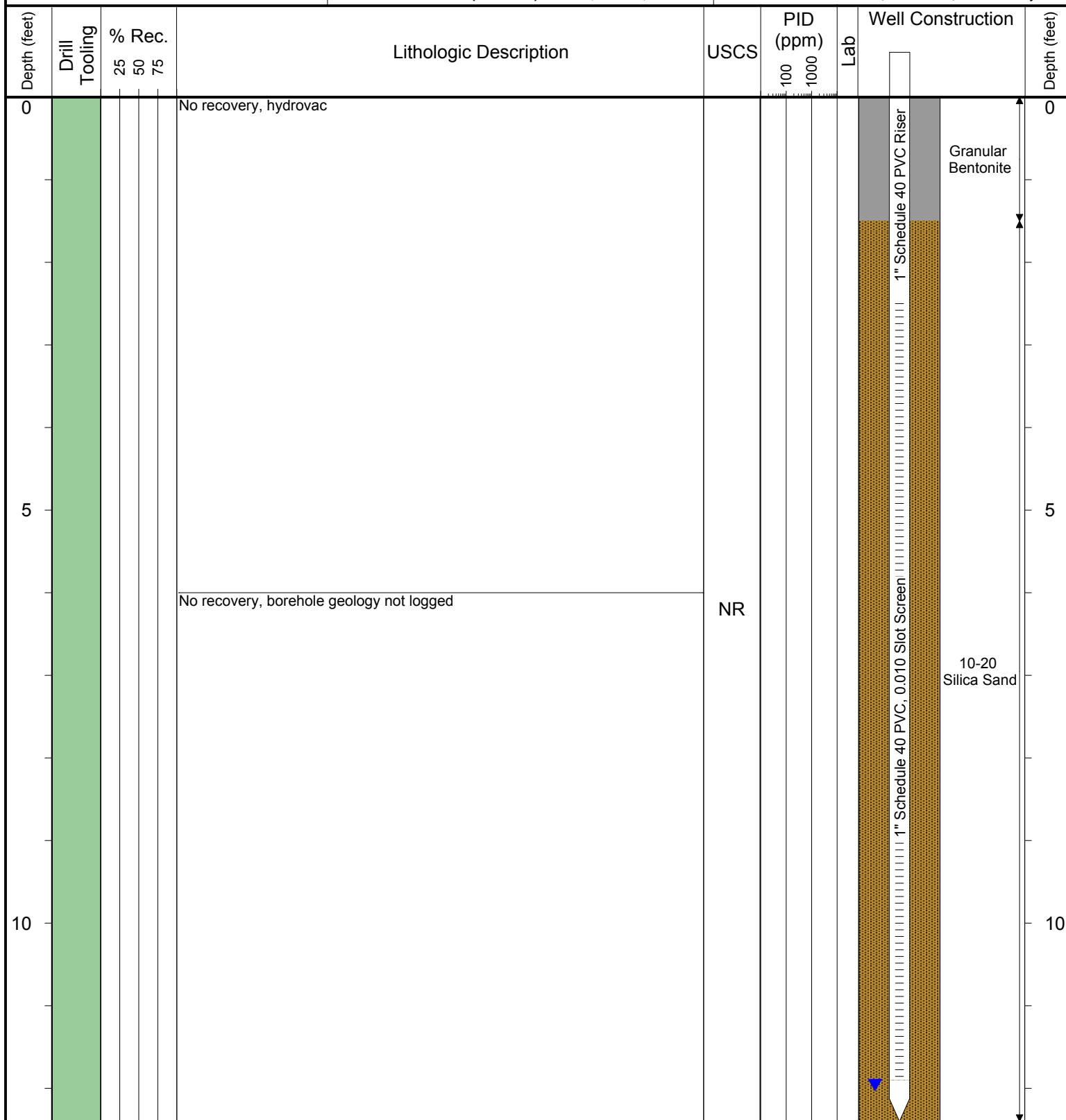
LOCATION: Weld County, Colorado

NORTHING (CO STATE PLANE): 1310809

EASTING (CO STATE PLANE): 3191201

CASING ELEVATION (FT. AMSL): 4846.535

GROUND ELEVATION (FT. AMSL): Not surveyed



### Drilling / Sample Method:

Macro-Core

Expendable Well Tip

Perforated Injection Tool

HydroPunch Groundwater Sampler

### Laboratory Sample Types:

Geotechnical Lab

Analytical Chemistry Lab

Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Kerr-McGee Oil and Gas Onshore, LP

LOGGED BY: Brandon LeVasseur

PROJECT MANAGER: Robert Cornez

DRILLING CONTRACTOR: Tasman Geosciences

DRILLING EQUIPMENT: PowerProbe 9300SK

DRILL BIT SIZE (INCHES): 2 3/8"

DATE STARTED - COMPLETED: 5/27/2015

TOTAL WELL DEPTH (FT. BGS): 10.9

DEPTH TO WATER (FT. BGS): 10.35 (5/29/15)

UPRR 42 Pan Am Gas Unit X 1

BORING / WELL ID: BH03

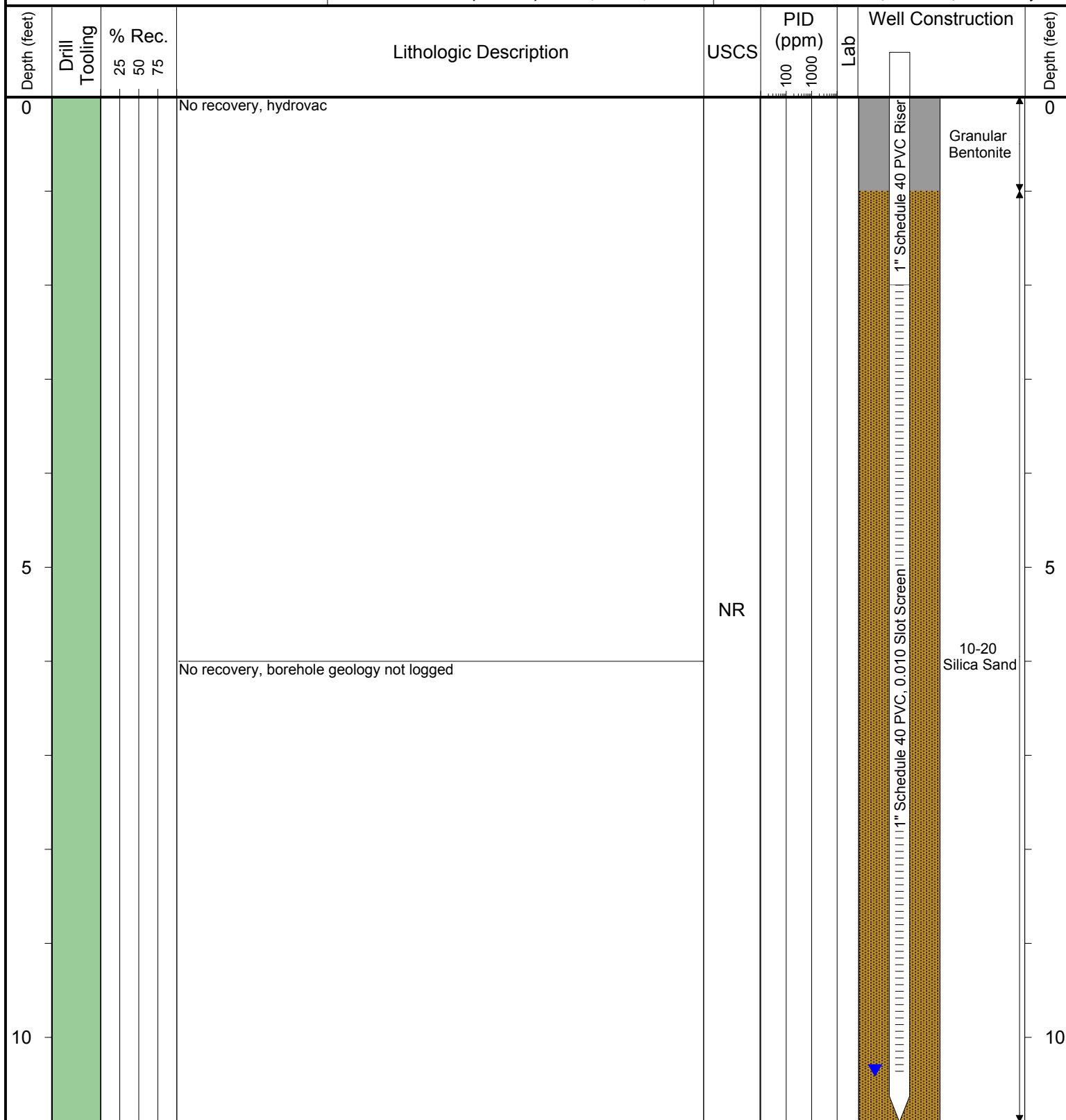
LOCATION: Weld County, Colorado

NORTHING (CO STATE PLANE): 1310845

EASTING (CO STATE PLANE): 3191198

CASING ELEVATION (FT. AMSL): 4847.825

GROUND ELEVATION (FT. AMSL): Not surveyed



Drilling / Sample Method:

Macro-Core

Expendable Well Tip

Perforated Injection Tool

HydroPunch Groundwater Sampler

Laboratory Sample Types:

Geotechnical Lab

Analytical Chemistry Lab

Geotechnical & Analytical Chemistry Lab