

CR13/CR42 Location, Exterior and Sub-Slab Soil Hydrocarbon Vapor Assessment Workplan

Prepared for:



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April 16, 2019

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1. Introduction

Tasman Geosciences (Tasman), on behalf of DCP Operating Company, LP (DCP) proposes to conduct a sub slab and exterior soil vapor air quality assessment at a private residence located at 20008 Colorado Boulevard (County Road 13) in Johnstown, Colorado (the residence). The residence is located alongside (east side of) County Road 13 (CR13), near the intersection of CR13 and County Road 42 (CR42). The residence is located across the road from the DCP CR13/CR42 project (Site [Figure 1]) with associated Spill Release ID number 463819. The purpose of the assessment is to evaluate the potential for petroleum hydrocarbon soil vapor intrusion into the residence for the protection of human health and safety following a raw natural gas materials/condensate liquid pipeline release that occurred at the Site.

2. Site Background

A release of raw natural gas materials/condensate liquid from a DCP gas gathering pipeline was identified on the northwest corner of the intersection of CR42 and CR 13. A Form 19 Initial Report (Document # 401997249) was submitted by DCP to the COGCC. DCP is performing ongoing activities to ascertain the pipeline release location, characterize the impacted soils, and remediate impacted soils associated with the subject pipeline. Additionally, the release of raw natural gas materials/condensate has impacted nearby subsurface soils adjacent to the residence and has subsequently prompted an investigation to assess the potential for intrusion of petroleum hydrocarbon impacted vapors into the building. The sub-Sections below present the field activities that have been performed at the Site regarding the residence investigation.

2.1 Indoor Air Quality Assessment

During field investigation activities and Site assessment, indoor air quality conditions within the breathing zone of the residence were monitored using handheld 4-gas monitoring equipment for the protection of human health and safety. Measurements were collected to evaluate real-time readings of oxygen (O₂), hydrogen sulfide (H₂S), carbon monoxide (CO), and percent of lower explosive limit (LEL). The LEL monitor is a broad-spectrum measurement device that collects data from combustible gases in air including methane, ethane, and propane as well as solvent vapors. Because percent LEL detectors are poor indicators for the presence of many volatile organic compounds (VOC) in air, a handheld photoionization detector was also utilized during indoor air quality screenings. During multiple entries into the residence between April 5 and 10, 2019, real time readings of the compounds described above were performed throughout the main level and basement level of the residence. DCP personnel and Xcel Energy (Xcel) personnel recorded collected measurements which are summarized below:

- Observed readings within the main level of the residence during multiple entries were within acceptable ranges/limits for O₂, H₂S, CO, and LEL regarding human health and safety.
- Observed readings throughout the finished part of the basement were within acceptable ranges/limits for O₂, H₂S, CO, and LEL regarding human health and safety.
- Observed readings within the breathing zone of the unfinished portion of the basement were within acceptable ranges/limits for O₂, H₂S, CO, and LEL regarding human health and safety.

However, when the 4-gas meters (DCP and Xcel) were lowered below the breathing zone into the sub-slab water collection sump located at the south west corner of the unfinished portion of the basement, elevated readings for percent LEL were observed.

- A PID was lowered below the breathing zone and into the sub-slab water collection sump by DCP personnel and a visual reading of 71.1 ppm was recorded within the sump.

The property owner advised that after Xcel Energy assessed air quality in the house and at the basement water collection sump, Xcel Energy cut electric power to the residence and requested the residents to evacuate.

Additionally, to ascertain the presence of petroleum hydrocarbon vapors near the water collection sump below the breathing zone, an evacuated 6-Liter stainless steel canister (Summa canister) was deployed for vapor collection and analysis. The Summa canister outfitted with a 24-hour collection regulator was set on the basement floor near the water collection sump. The regulator was opened to atmosphere and the Summa canister was allowed an approximate 23.5-hour collection period. Upon collection, the regulator was closed prior to reaching an equilibrium pressure of 0 inches of mercury (in-Hg) for quality assurance/quality control (QAQC) leak detection purposes. The Summa canister was submitted to Origins Environmental Laboratory in Denver, CO (Origins) for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX) and total volatile petroleum hydrocarbons (TVPH) using United States Environmental Protection Agency (USEPA) Method TO-15. The laboratory analytical results indicated detected concentrations of TVPH (179,000 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]) and toluene ($10.2 \mu\text{g}/\text{m}^3$). All other constituents including benzene, ethylbenzene, and total xylenes were non-detect. The laboratory analytical report is included in Attachment A.

2.2 Impacted Soil Delineation Activities

Between April 6 and 8, 2019, DCP performed impacted soil delineation activities near the residence by advancing soil borings utilizing hand auger and direct push probe with continuous core sampling drilling methods at the locations illustrated on Figure 2. During the drilling investigation, soils were field screened for physical characteristics and total VOC concentrations using a handheld PID.

During drilling activities, soil samples with the highest PID readings and/or from the base of each borehole were retained for laboratory analysis. Soil samples were submitted to Origins for analysis of BTEX, and total petroleum hydrocarbons (TPH) gasoline range organics (GRO) using USEPA Method 8260B and TPH diesel range organics (DRO) using USEPA Method 8015. The laboratory analytical results for the collected soil samples are illustrated on Figure 2, summarized on Table 1, and the laboratory analytical reports are included in Appendix A.

Based on the presence of petroleum hydrocarbon impacted soils in proximity to the residence, DCP is implementing this sub slab and exterior soil vapor assessment to sample for the presence of vapors containing BTEX and TVPH that might be associated with the CR13/CR42 gathering pipeline release, and certain other hydrocarbons, beneath and adjacent to the residence.

3. Proposed Soil Vapor Sampling

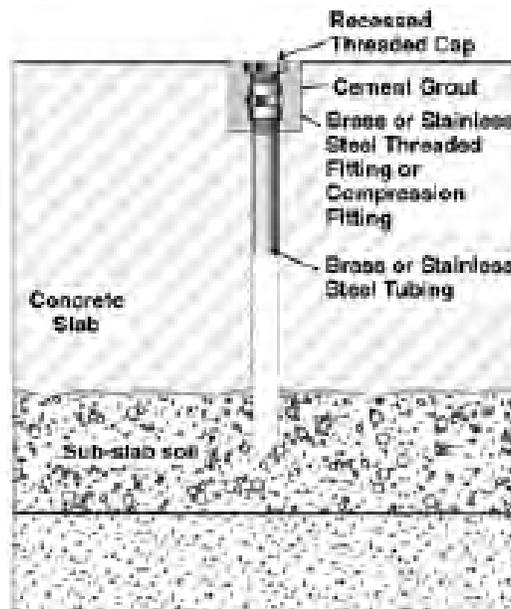
To assess the potential for petroleum hydrocarbon impacted soil vapor intrusion into the residence, Tasman proposes to install sub-slab and exterior vapor sampling points in accordance with USEPA (2015) and Colorado (2007) guidance to evaluate petroleum hydrocarbon vapor concentrations below and adjacent to the residence building foundation, if any. The Sections below describe the proposed sampling plan for each of the subject areas.

3.1 Sub-Slab Soil Vapor and Indoor Air Sampling

Prior to initiating subsurface activities, the location of underground utilities will be reviewed. Two (2) proposed sub-slab vapor sampling points will be installed in 1-inch outer diameter holes, drilled through the concrete foundation slab, using an electrical hammer-drill. Upon completion of drilling, the sub-slab probes will be installed and sealed promptly to minimize any potential air flow into or out of the drilled holes. The sub-slab vapor sampling probes will then be sealed in place, flush with the top of the concrete slab with recessed stainless-steel plugs so as not to interfere with day-to-day use. The images below illustrate examples of how typical sub-slab sampling points are installed.



Example of flush mounted vapor sampling point



Schematic of a sub-slab vapor sampling point

The first proposed sub-slab soil vapor sampling location is in the southwest corner of the basement near the sump, but at least three feet away from the sump and basement walls to avoid short-circuiting of indoor air. The second proposed sub-slab soil vapor sampling location is approximately 10-12 feet north of the first location. The actual sampling locations may differ based on the location of subsurface utilities, wall partitions, equipment and/or furniture within the home, and discussion with the homeowner. The approximate locations of the proposed sub-slab sampling locations are illustrated on Figure 3.

In addition to the indoor sub-slab soil vapor samples, DCP plans to collect three (3) indoor air samples using the same methods described in Section 2.1 above. Two Summa canisters will be deployed at the same location as the initial sample, one on the basement floor near the water collection sump and one within the breathing zone, to compare indoor air concentrations with sub-slab soil vapor concentrations. The third indoor air Summa canister will be deployed at a location in the breathing zone of the main level living area. The exact location of the third Summa canister on the main level will be determined during the indoor air vapor assessment at the time of deployment.

3.2 Exterior Soil Vapor Sampling

In addition to sub-slab soil vapor sampling, Tasman proposes to install up to 15 temporary exterior soil vapor sampling points at the locations illustrated on Figure 3. On April 8, 2019, six soil samples were collected between 10 and 14 feet below ground surface (bgs) from soil bore locations BH07, BH08, and BH09 adjacent to the west wall of the house and the unfinished portion of the basement. The reported laboratory analytical results for these samples indicated non-detect concentrations of BTEX and TPH in soils (see, Figure 2), which would suggest that the potential for soil vapor intrusion would not exist above a separation gradient of six feet. Therefore, the proposed exterior soil vapor samples will be installed within reasonable proximity and as near as practical to the interior sub-slab vapor sample points to achieve a vertical vapor profile between the sample locations for comparison purposes. Additional proposed exterior soil vapor sample locations will be installed for comparison purposes of soil gas concentrations to the soil sample analytical data collected from soil borings illustrated on Figure 2 as well as from the north and east extents of the residence foundation (Figure 3).

Exterior soil vapor samples will be installed and collected using an AMS Gas Vapor Probe Kit (vapor probe) with retractable tip. At each location, the vapor probe will be advanced using standard hammer drill methods to approximately 14 feet bgs where the soil vapor sample will be collected. The exterior soil vapor probes will be allowed 30-minutes to equilibrate before leak testing, field screening, and sampling.

4. Quality Assurance Quality Control Procedures

During sub-slab and exterior soil vapor sampling, vacuum shut-in and helium leak testing will be performed to ensure that no connections exist between the vapor sampling points and ambient air. The purpose of the vacuum shut-in test is to make sure the connections in the sampling train are air tight. A lung box and Tedlar bag will be used to exert a vacuum on the sampling train (80-100 inches of water [in-H₂O]). The sampling train will then be closed, and the vacuum observed for at least 60 seconds to ensure it does not dissipate. If the test indicates a leak, the connections should be disconnected and carefully reconnected one at a time until the leak is fixed. After the vacuum shut-in test, a helium leak check will

be performed using an enclosure (i.e., helium shroud) over the sampling train and lung box. If the concentration of helium in the Tedlar bag is greater than 5% of the concentration in the shroud, the probe seal and fittings should be checked to determine the location of the leak.

Field screening will be performed for each sub-slab and exterior soil vapor sampling point using “4 gas monitoring” to evaluate real-time readings of O₂, H₂S, CO, and percent LEL, a PID to evaluate total VOC concentrations, and a LandTec GEM Landfill gas meter (or similar) to evaluate methane concentrations.

Sub-slab and exterior soil vapor samples will be collected using 6-Liter Summa canisters over a period of approximately 35-minutes. The indoor air samples will be collected using 6-Liter Summa canisters over an approximate 24-hour period. The soil vapor and indoor air samples will be transported to Origins Laboratory in Denver, Colorado, under chain of custody procedures. The 2 basement indoor air samples, the 2 sub-slab samples, and the 15 soil vapor samples (Figure 3) will be submitted for laboratory analysis of the full suite list of analytes obtained by USEPA Method T0-15 analysis. The indoor air sample collected from the main level living area of the residence will be submitted for laboratory analysis using USEPA Method TO-15 of BTEX and TVPH only, as ordinary household cleaners and products may contribute to potential non-petroleum hydrocarbon VOC detections that are unrelated to the project. In addition, soil vapor, sub-slab, and indoor air samples for laboratory analysis of methane and propane using ASTM Method 1945 will be collected from each sampling point using standard polypropylene Tedlar gas sampling bags or clean evacuated 500 milliliter (mL) amber glass collection bottles (“bottle vacs”).

Soil vapor concentration data will be compared to the Risk Based Screening Levels (RBSLs) for Evaluation of the Indoor Air Exposure Pathway for Residential Land Use, per the Oil and Public Safety (OPS) Petroleum Hydrocarbon Vapor Intrusion Guidance Document, dated December 11, 2007. RBSLs for BTEX are summarized in the table below. Additional guidance information will also be considered in evaluating soil vapor results, including Colorado Department of Public Health and the Environment (CDPHE) indoor air screening values (January 15, 2016).

RBSLs for Evaluation of the Indoor Air Exposure Pathway

Media	Units	Land Use	Benzene	Toluene	Ethylbenzene	Xylenes
Soil Vapor	µg/m ³	Residential	2,900	>VP	>VP	>VP

Notes:

>VP denotes than even at a concentration equal to the vapor pressure of the chemical, a hazard quotient of 1 is not exceeded
 µg/m³= Microgram per cubic meter

Evaluation of the data obtained through the procedures described in this Workplan will be reported to the Colorado Oil and Gas Conservation Commission (COGCC) under a separate summary report outlining the results of the vapor intrusion assessment. Additionally, results of continued investigation activities for the release location will be provided to the COGCC in supplemental summary reports.

Tables

**TABLE 1
DCP MIDSTREAM
CR42 AND CR13
SOIL ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Depth (Feet bgs)	PID Readings (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TPH ⁽²⁾ (mg/kg)	Comments
BH01 @ 4'	4/6/2019	4	373	0.452	0.158	<0.0500	0.0500	<50.0	
BH01 @ 10'	4/6/2019	10	298	0.900	0.837	0.0810	0.610	101.0	
BH02 @ 03'	4/6/2019	3	88	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
BH02 @ 10'	4/6/2019	10	58.2	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
BH03 @ 10'	4/6/2019	10	170.4	0.231	0.110	<0.0500	<0.0500	<50.0	
BH04 @ 10'	4/6/2019	10	197	0.510	0.306	<0.0500	<0.0500	<50.0	
BH05 @ 12-14'	4/8/2019	12 - 14	464 - 637	0.0980	0.170	<0.0500	0.177	89.3	
BH06 @ 13-14'	4/8/2019	13 - 14	349	0.528	0.668	0.0650	0.460	94.9	
BH07 @ 11-12'	4/8/2019	11 - 12	42	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
BH07 @ 13-14'	4/8/2019	13 - 14	15.6	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
BH08 @ 10-11'	4/8/2019	10 - 11	28	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
BH08 @ 13-14'	4/8/2019	13 - 14	18.8	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
BH09 @ 11-12'	4/8/2019	11 - 12	79.3	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
BH09 @ 13-14'	4/8/2019	13 - 14	6.8	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
BH10 @ 12-13'	4/8/2019	12 - 13	715	3.04	9.36	1.19	8.47	338	
BH11 @ 7-8'	4/8/2019	7 - 8	71.1	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
BH11 @ 13.5'	4/8/2019	13.5	20.5	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	
COGCC Standards for Soil (mg/kg) ⁽¹⁾				0.17	85	100	175	500	

Notes:

- 1). Standards for Soil are taken from 2 CCR 404-1, Table 910-1, effective February 1, 2014.
 - 2). TPH - Total volatile and extractable petroleum hydrocarbons. Value calculated by adding GRO and DRO concentrations.
- GRO - Gasoline range organics. DRO - Diesel range organics.
mg/kg= Milligrams per kilogram. bgs - Below ground surface.
ppm - Parts per million NS - Not Sampled
- Bold values indicate an exceedance of the COGCC soil standards for the Site.

Figures

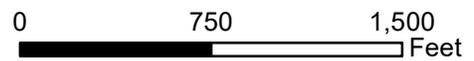
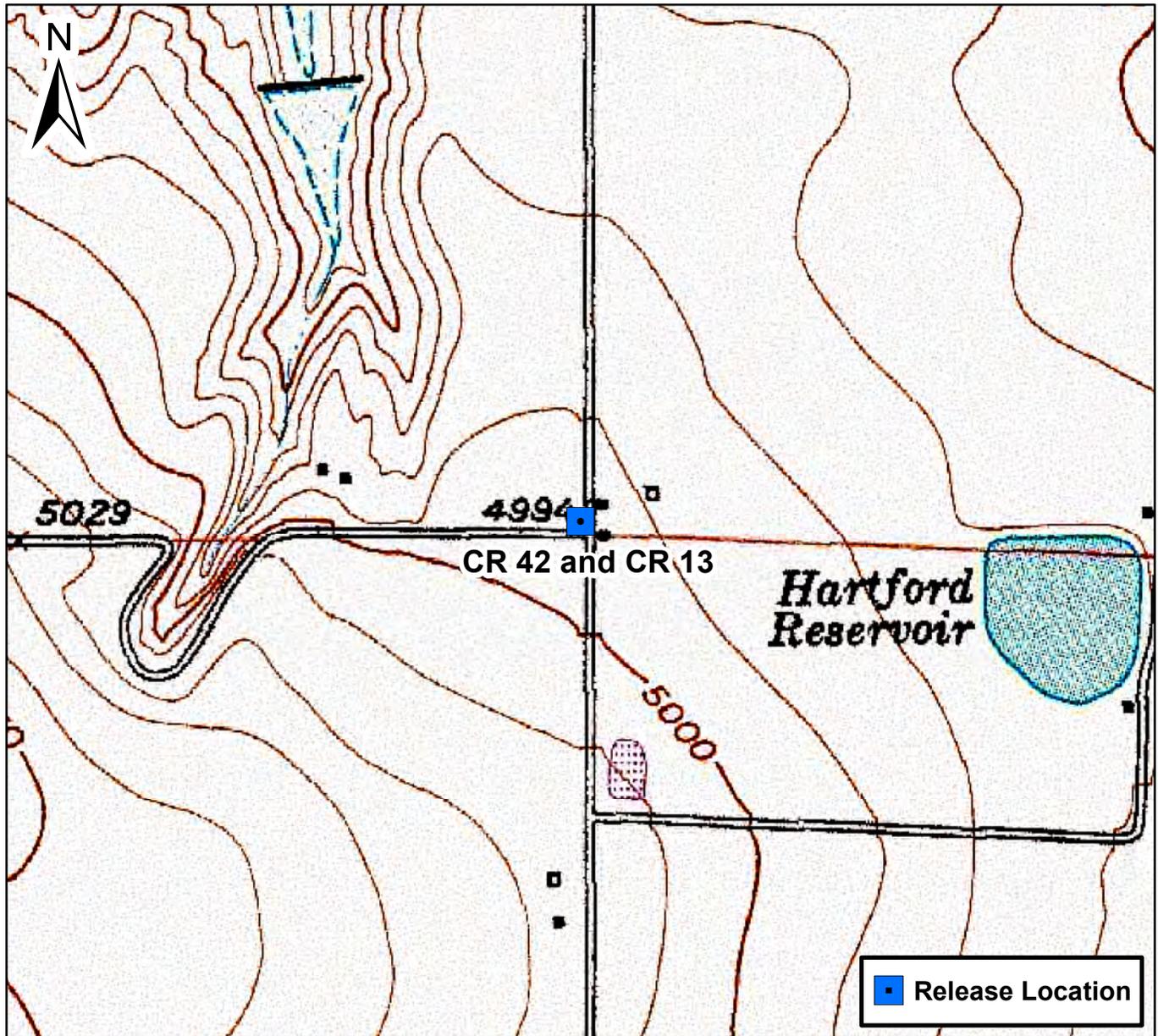


Figure 1

Site Location Map
 CR 42 and CR 13
 SESE S24 T4N R68W
 Weld County, Colorado



BH02 @ 03'		BH02 @ 10'	
4/6/2019		4/6/2019	
PID = 88		PID = 58.2	
Compound	(mg/kg)	Compound	(mg/kg)
Benzene	<0.0500	Benzene	<0.0500
Toluene	<0.0500	Toluene	<0.0500
Ethylbenzene	<0.0500	Ethylbenzene	<0.0500
Total Xylenes	<0.0500	Total Xylenes	<0.0500
TPH	<50.0	TPH	<50.0

BH10 @ 12-13'	
4/8/2019	
PID = 715	
Compound	(mg/kg)
Benzene	3.04
Toluene	9.36
Ethylbenzene	1.19
Total Xylenes	8.47
TPH	338

BH11 @ 7-8'		BH11 @ 13.5'	
4/8/2019		4/8/2019	
PID = 71.1		PID = 20.5	
Compound	(mg/kg)	Compound	(mg/kg)
Benzene	<0.0500	Benzene	<0.0500
Toluene	<0.0500	Toluene	<0.0500
Ethylbenzene	<0.0500	Ethylbenzene	<0.0500
Total Xylenes	<0.0500	Total Xylenes	<0.0500
TPH	<50.0	TPH	<50.0

BH09 @ 11-12'	
4/8/2019	
PID = 79.3	
Compound	(mg/kg)
Benzene	<0.0500
Toluene	<0.0500
Ethylbenzene	<0.0500
Total Xylenes	<0.0500
TPH	<50.0

BH03 @ 10'	
4/6/2019	
PID = 170.4	
Compound	(mg/kg)
Benzene	0.231
Toluene	0.110
Ethylbenzene	<0.0500
Total Xylenes	<0.0500
TPH	<50.0

BH08 @ 10-11'		BH08 @ 13-14'	
4/8/2019		4/8/2019	
PID = 28		PID = 18.8	
Compound	(mg/kg)	Compound	(mg/kg)
Benzene	<0.0500	Benzene	<0.0500
Toluene	<0.0500	Toluene	<0.0500
Ethylbenzene	<0.0500	Ethylbenzene	<0.0500
Total Xylenes	<0.0500	Total Xylenes	<0.0500
TPH	<50.0	TPH	<50.0

BH09 @ 13-14'	
4/8/2019	
PID = 6.8	
Compound	(mg/kg)
Benzene	<0.0500
Toluene	<0.0500
Ethylbenzene	<0.0500
Total Xylenes	<0.0500
TPH	<50.0

BH01 @ 4'	
4/6/2019	
PID = 373	
Compound	(mg/kg)
Benzene	0.452
Toluene	0.158
Ethylbenzene	<0.0500
Total Xylenes	0.0500
TPH	<50.0

BH07 @ 11-12'	
4/8/2019	
PID = 42	
Compound	(mg/kg)
Benzene	<0.0500
Toluene	<0.0500
Ethylbenzene	<0.0500
Total Xylenes	<0.0500
TPH	<50.0

Legend

- ⊗ Hand Augur Soil Boring Location (Collected via Trimble GPS)
- Direct Push Soil Boring Location (Collected via Trimble GPS)
- Communication Utility (Collected via Trimble GPS)
- . - . - Water Supply Utility (Collected via Trimble GPS)
- DCP Midstream Gathering Line (Collected via Trimble GPS)
- Abandoned DCP Midstream Line (Collected via Trimble GPS)
- ▨ Approximate Excavation Extents to Date

Notes

GPS – Global Positioning System

Bold text values indicate an exceedance of the COGCC Table 910-1 standard.

0 ft. 30 ft. 60 ft.

Image Source: Google Earth; 2017 Google
Projection: WGS 84 UTM Zone 13 North

BH01 @ 10'	
4/6/2019	
PID = 298	
Compound	(mg/kg)
Benzene	0.900
Toluene	0.837
Ethylbenzene	0.0810
Total Xylenes	0.610
TPH	101.0

BH07 @ 13-14'	
4/8/2019	
PID = 15.6	
Compound	(mg/kg)
Benzene	<0.0500
Toluene	<0.0500
Ethylbenzene	<0.0500
Total Xylenes	<0.0500
TPH	<50.0

BH04 @ 10'	
4/6/2019	
PID = 197	
Compound	(mg/kg)
Benzene	0.510
Toluene	0.306
Ethylbenzene	<0.0500
Total Xylenes	<0.0500
TPH	<50.0

BH05 @ 12-14'	
4/8/2019	
PID = 464 - 637	
Compound	(mg/kg)
Benzene	0.0980
Toluene	0.170
Ethylbenzene	<0.0500
Total Xylenes	0.177
TPH	89.3

BH06 @ 13-14'	
4/8/2019	
PID = 349	
Compound	(mg/kg)
Benzene	0.528
Toluene	0.668
Ethylbenzene	0.0650
Total Xylenes	0.460
TPH	94.9

DATE: April 9, 2019

DESIGNED BY: B. Humphrey

DRAWN BY: D. Arnold



Tasman Geosciences, Inc.
6899 Pecos Street – Unit C
Denver, CO 80221

DCP Midstream – DJ Basin
CR 42 and CR 13
SESE, Section 24, Township 4 North, Range 68 West
Weld County, Colorado

Soil Boring Location and Analytical Results Map

FIGURE 2



Legend

-  Proposed Interior Sub-Slab Soil Vapor Sample Location
-  Proposed Exterior Soil Vapor Sample Location – 14 Feet BGS

Notes

All locations are approximate unless otherwise noted.

BGS – Below Ground Surface

0 ft. 30 ft. 60 ft.

Image Source: Google Earth; 2017 Google
Projection: WGS 84 UTM Zone 13 North



DATE:	April 9, 2019
DESIGNED BY:	B. Humphrey
DRAWN BY:	D. Arnold



Tasman Geosciences, Inc.
6899 Pecos Street – Unit C
Denver, CO 80221

**DCP Midstream – DJ Basin
CR 42 and CR 13**
SESE, Section 24, Township 4 North, Range 68 West
Weld County, Colorado

Proposed Sub-Slab and
Exterior Soil Vapor Sample
Locations

**FIGURE
3**

Appendix A

Laboratory Analytical Reports



April 08, 2019

Tasman Geosciences

Brian Humphrey

6899 Pecos Street, Unit C

Denver

CO 80211

Project Name - DCP - CR42 & CR13

Project Number - [none]

Attached are your analytical results for DCP - CR42 & CR13 received by Origins Laboratory, Inc. April 07, 2019. This project is associated with Origins project number Y904133-01.

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

Brian Humphrey
Project Number: [none]
Project: DCP - CR42 & CR13

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01@4'	Y904133-01	Soil	April 6, 2019 8:30	04/07/2019 15:45
BH01@10'	Y904133-02	Soil	April 6, 2019 10:15	04/07/2019 15:45
BH02@03'	Y904133-03	Soil	April 6, 2019 12:00	04/07/2019 15:45
BH02@10'	Y904133-04	Soil	April 6, 2019 13:31	04/07/2019 15:45
BH03@10'	Y904133-05	Soil	April 6, 2019 15:44	04/07/2019 15:45
BH04@10'	Y904133-06	Soil	April 6, 2019 17:15	04/07/2019 15:45

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.

Jen Pellegrini For Noelle Doyle Mathis, President

Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

www.originslaboratory.com
 page of
YA04133
 Project Manager: J. Stelmacker
 Project Name: CR13 and CR42 Pipeline Release
 Project Number: _____
 Samples Collected By: J. Stelmacker
 Client: DCP Midstream/Tasman
 Address: _____
 Telephone Number: _____
 Email Address: _____

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis		Sample Instructions
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa Canister #	Other	DATE	
BH01-4'	4/6/19	0830	1					X				X	1
BH01-10'	4/6/19	1015	1					X				X	2
BH02-03'	4/6/19	1200	1					X				X	3
BH02-10'	4/6/19	1331	1					X				X	4
BH03-10'	4/6/19	1544	1					X				X	5
BH04-10'	4/6/19	1715	1					X				X	6
													7
													8
													9
													10

Relinquished By: <u>Chandra Solz</u>	Date: <u>4/7/19</u>	Time: <u>3:45PM</u>	Received By: <u>[Signature]</u>	Date: <u>4/7/19</u>	Time: <u>1545</u>
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

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

Temp Received: 0.5°C Date Results Needed

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: 1904133 Client: Tasman
 Client Project ID: CR13 + CR42
 Checklist Completed by: JD Shipped Via: HD
 Date/time completed: 4/7/19 (UPS, FedEx, Hand Delivered, Pick-up, etc.)
 Airbill #: NA
 Matrix(s) Received: (Check all that apply): Soil/Solid Water Other: _____
 Cooler Number/Temperature: 1 / 0.5 °c / _____ °c / _____ °c / _____ °c (Describe)
 Thermometer ID: T203

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/pH <2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄ / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)			<input checked="" type="checkbox"/>	
Additional Comments (if any):				

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

Reviewed by (Project Manager) JD

Date/Time Reviewed 4/8/19

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH01@4'
4/6/2019 8:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904133-01 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	0.452	0.0500	mg/kg	25	B9D0701	JTD	04/07/2019	04/07/2019	
Toluene	0.158	0.0500	"	"	"	JTD	"	"	
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	0.0500	0.0500	"	"	"	JTD	"	"	
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	99.7 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	99.9 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0702	JTD	04/07/2019	04/07/2019	U
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Surrogate: o-Terphenyl	64.3 %	50-150			"	"	"	"	
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Origins Laboratory, Inc.



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

Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH01@10'

4/6/2019 10:15:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904133-02 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	0.900	0.0500	mg/kg	25	B9D0701	JTD	04/07/2019	04/07/2019	
Toluene	0.837	0.0500	"	"	"	JTD	"	"	
Ethylbenzene	0.0810	0.0500	"	"	"	JTD	"	"	
Xylenes, total	0.610	0.0500	"	"	"	JTD	"	"	
Gasoline Range Hydrocarbons	21.2	5.00	"	"	"	JTD	"	"	

Surrogate: 1,2-Dichloroethane-d4	99.4 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	100 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	79.8	50.0	mg/kg	1	B9D0702	JTD	04/07/2019	04/07/2019	
Surrogate: o-Terphenyl	68.7 %	50-150			"	"	"	"	

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH02@03'

4/6/2019 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904133-03 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0701	JTD	04/07/2019	04/07/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	100 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	100 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	98.9 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0702	JTD	04/07/2019	04/07/2019	U
Surrogate: o-Terphenyl	64.4 %	50-150			"	"	"	"	

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH02@10'

4/6/2019 1:31:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
 Y904133-04 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0701	JTD	04/07/2019	04/07/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	101 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	98.4 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0702	JTD	04/07/2019	04/07/2019	U
Surrogate: o-Terphenyl	66.7 %	50-150			"	"	"	"	

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH03@10'

4/6/2019 3:44:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
 Y904133-05 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	0.231	0.0500	mg/kg	25	B9D0701	JTD	04/07/2019	04/07/2019	
Toluene	0.110	0.0500	"	"	"	JTD	"	"	
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	102 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0702	JTD	04/07/2019	04/07/2019	U
Surrogate: o-Terphenyl	68.0 %	50-150			"	"	"	"	

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH04@10'

4/6/2019 5:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904133-06 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	0.510	0.0500	mg/kg	25	B9D0701	JTD	04/07/2019	04/07/2019	
Toluene	0.306	0.0500	"	"	"	JTD	"	"	
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	102 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	99.1 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0702	JTD	04/07/2019	04/07/2019	U
Surrogate: o-Terphenyl	71.0 %	50-150			"	"	"	"	

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0701 - EPA 5030 (soil)

Blank (B9D0701-BLK1)

Prepared: 04/07/2019 Analyzed: 04/07/2019

Benzene	ND	0.00200	mg/kg							U
Toluene	ND	0.00200	"							U
Ethylbenzene	ND	0.00200	"							U
Xylenes, total	ND	0.00200	"							U
Gasoline Range Hydrocarbons	ND	0.200	"							U
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		101	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		99.9	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		95.9	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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0701 - EPA 5030 (soil)

LCS (B9D0701-BS1)

Prepared: 04/07/2019 Analyzed: 04/07/2019

Benzene	0.0886	0.00200	mg/kg	0.100		88.6	70-130			
Toluene	0.0837	0.00200	"	0.100		83.7	70-130			
Ethylbenzene	0.0831	0.00200	"	0.100		83.1	70-130			
m,p-Xylene	0.169	0.00400	"	0.200		84.6	70-130			
o-Xylene	0.0863	0.00200	"	0.100		86.3	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		95.3	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		99.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		98.7	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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0701 - EPA 5030 (soil)

Matrix Spike (B9D0701-MS1)	Source: Y904133-04			Prepared: 04/07/2019 Analyzed: 04/07/2019						
Benzene	2.58	0.0500	mg/kg	2.50	ND	103	70-130			
Toluene	2.46	0.0500	"	2.50	ND	98.5	70-130			
Ethylbenzene	2.50	0.0500	"	2.50	ND	99.9	70-130			
m,p-Xylene	5.06	0.100	"	5.00	ND	101	70-130			
o-Xylene	2.52	0.0500	"	2.50	ND	101	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		94.4	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		100	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		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.

Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0701 - EPA 5030 (soil)

Matrix Spike Dup (B9D0701-MSD1)	Source: Y904133-04			Prepared: 04/07/2019 Analyzed: 04/07/2019						
Benzene	2.74	0.0500	mg/kg	2.50	ND	110	70-130	5.80	20	
Toluene	2.61	0.0500	"	2.50	ND	104	70-130	5.64	20	
Ethylbenzene	2.64	0.0500	"	2.50	ND	106	70-130	5.68	20	
m,p-Xylene	5.42	0.100	"	5.00	ND	108	70-130	6.79	20	
o-Xylene	2.68	0.0500	"	2.50	ND	107	70-130	6.32	20	
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		95.4	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		101	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		101	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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9D0702 - EPA 3580										
Blank (B9D0702-BLK1)										
					Prepared: 04/07/2019 Analyzed: 04/07/2019					
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	33		"	50.0		66.8	50-150			

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0702 - EPA 3580

LCS (B9D0702-BS1)

Prepared: 04/07/2019 Analyzed: 04/07/2019

Diesel (C10-C28)	764	50.0	mg/kg	1000		76.4	70-130			
Surrogate: o-Terphenyl	41		"	50.0		81.7	50-150			

Origins Laboratory, Inc.



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

Jen Pellegrini For Noelle Doyle Mathis, President

Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0702 - EPA 3580

Matrix Spike (B9D0702-MS1)	Source: Y904133-04			Prepared: 04/07/2019 Analyzed: 04/07/2019						
Diesel (C10-C28)	796	50.0	mg/kg	1000	21.1	77.5	70-130			
Surrogate: o-Terphenyl	44		"	50.0		87.6	50-150			

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0702 - EPA 3580

Matrix Spike Dup (B9D0702-MSD1)	Source: Y904133-04			Prepared: 04/07/2019 Analyzed: 04/07/2019						
Diesel (C10-C28)	736	50.0	mg/kg	1000	21.1	71.5	70-130	7.88	35	
Surrogate: o-Terphenyl	39		"	50.0		78.1	50-150			

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

Brian Humphrey
Project Number: [none]
Project: DCP - CR42 & CR13

Notes and Definitions

U Sample is Non-Detect.

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



April 09, 2019

Tasman Geosciences

Brian Humphrey

6899 Pecos Street, Unit C

Denver

CO 80211

Project Name - DCP - CR42 & CR13

Project Number - [none]

Attached are your analytical results for DCP - CR42 & CR13 received by Origins Laboratory, Inc. April 08, 2019. This project is associated with Origins project number Y904163-01.

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

Brian Humphrey
Project Number: [none]
Project: DCP - CR42 & CR13

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH05@12-14'	Y904163-01	Soil	April 8, 2019 10:05	04/08/2019 18:05
BH06@13-14'	Y904163-02	Soil	April 8, 2019 11:55	04/08/2019 18:05
BH07@11-12'	Y904163-03	Soil	April 8, 2019 12:40	04/08/2019 18:05
BH07@13-14'	Y904163-04	Soil	April 8, 2019 12:45	04/08/2019 18:05
BH08@10-11'	Y904163-05	Soil	April 8, 2019 13:30	04/08/2019 18:05
BH08@13-14'	Y904163-06	Soil	April 8, 2019 13:35	04/08/2019 18:05
BH09@11-12'	Y904163-07	Soil	April 8, 2019 14:40	04/08/2019 18:05
BH09@13-14'	Y904163-08	Soil	April 8, 2019 14:45	04/08/2019 18:05
BH10@12-13'	Y904163-09	Soil	April 8, 2019 16:15	04/08/2019 18:05
BH11@7-8'	Y904163-10	Soil	April 8, 2019 17:00	04/08/2019 18:05
BH11@13.5'	Y904163-11	Soil	April 8, 2019 17:10	04/08/2019 18:05

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

www.originslaboratory.com

4904163 page 1 of 2



Client: Tasman / DCP
 Address: _____
 Telephone Number: 703-487-1228
 Email Address: bhumphrey@tasman-geol.com

Project Manager: Brian Humphrey / Brandon Hayes
 Project Name: DCP CR42 + CR13
 Project Number: _____
 Samples Collected By: James Carrington

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

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions		
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa #			Other	
B405 @ 12-14'	4/8/19	1005	1	X				X						
B406 @ 13-14'		1155												
B407 @ 11-12'		1240												
B407 @ 13-14'		1245												
B408 @ 10-11'		1330												
B408 @ 13-14'		1335												
B409 @ 11-12'		1440												
B409 @ 13-14'		1445												
B410 @ 12-13'		1615												
B411 @ 7-8'		1700												
Relinquished By: <u>[Signature]</u>	Date: <u>4/8/19</u>	Time: <u>1405</u>	Time: <u>1405</u>	Received By: <u>[Signature]</u>	Date: <u>4-8-19</u>	Time: <u>1505</u>	Turnaround Time: <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard							
Relinquished By:	Date:	Time:	Time:	Received By:	Date:	Time:								

Data Results Needed

Temp Received - 41.5

Origins Laboratory, Inc.

Jefe Pellegrini

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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: 4904163 Client: Tasman
 Client Project ID: DCP - CR42 + CR13
 Checklist Completed by: D. Le Shipped Via: HD
 Date/time completed: 4-8-19 (UPS, FedEx, Hand Delivered, Pick-up, etc.)
 Airbill #: NA
 Matrix(s) Received: (Check all that apply): Soil/Solid Water Other: _____
 Cooler Number/Temperature: 1 / 4.5 °C 1 °C 1 °C 1 °C (Describe)
 Thermometer ID: TC03

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

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

Reviewed by (Project Manager) [Signature]

Date/Time Reviewed 4-8-19

Origins Laboratory, Inc.

Jefe Pellegrini

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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH05@12-14'
4/8/2019 10:05:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-01 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	0.0980	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	
Toluene	0.170	0.0500	"	"	"	JTD	"	"	
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	0.177	0.0500	"	"	"	JTD	"	"	
Gasoline Range Hydrocarbons	17.7	5.00	"	"	"	JTD	"	"	

Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	102 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	98.5 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	71.6	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	
Surrogate: o-Terphenyl	72.9 %	50-150			"	"	"	"	

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH06@13-14'
4/8/2019 11:55:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-02 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	0.528	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	
Toluene	0.668	0.0500	"	"	"	JTD	"	"	
Ethylbenzene	0.0650	0.0500	"	"	"	JTD	"	"	
Xylenes, total	0.460	0.0500	"	"	"	JTD	"	"	
Gasoline Range Hydrocarbons	28.5	5.00	"	"	"	JTD	"	"	

Surrogate: 1,2-Dichloroethane-d4	100 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	102 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	97.9 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	66.4	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	
Surrogate: o-Terphenyl	74.0 %	50-150			"	"	"	"	

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH07@11-12'
4/8/2019 12:40:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-03 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	103 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	U
Surrogate: o-Terphenyl	65.6 %	50-150			"	"	"	"	

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH07@13-14'
4/8/2019 12:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-04 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	101 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	99.3 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	U
Surrogate: o-Terphenyl	66.5 %	50-150			"	"	"	"	

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH08@10-11'

4/8/2019 1:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-05 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	99.8 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	101 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	98.2 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	U
Surrogate: o-Terphenyl	68.1 %	50-150			"	"	"	"	

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH08@13-14'

4/8/2019 1:35:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-06 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	101 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	98.8 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	U
Surrogate: o-Terphenyl	69.8 %	50-150			"	"	"	"	

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH09@11-12'

4/8/2019 2:40:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-07 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	100 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	102 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	98.4 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	U
Surrogate: o-Terphenyl	61.4 %	50-150			"	"	"	"	

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH09@13-14'

4/8/2019 2:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-08 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	102 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	102 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	97.6 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	U
Surrogate: o-Terphenyl	65.3 %	50-150			"	"	"	"	

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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH10@12-13'

4/8/2019 4:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-09 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	3.04	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	
Toluene	9.36	0.0500	"	"	"	JTD	"	"	
Ethylbenzene	1.19	0.0500	"	"	"	JTD	"	"	
Xylenes, total	8.47	0.0500	"	"	"	JTD	"	"	
Gasoline Range Hydrocarbons	237	5.00	"	"	"	JTD	"	"	

Surrogate: 1,2-Dichloroethane-d4	98.9 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	111 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	99.3 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	101	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	
Surrogate: o-Terphenyl	69.7 %	50-150			"	"	"	"	

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH11@7-8'

4/8/2019 5:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y904163-10 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	04/09/2019	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	04/09/2019	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	99.9 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	102 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	99.4 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	U
Surrogate: o-Terphenyl	64.2 %	50-150			"	"	"	"	

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

BH11@13.5'
 4/8/2019 5:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
 Y904163-11 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	ND	0.0500	mg/kg	25	B9D0809	JTD	04/08/2019	04/09/2019	U
Toluene	ND	0.0500	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.0500	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.0500	"	"	"	JTD	"	"	U
Gasoline Range Hydrocarbons	ND	5.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	103 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	97.8 %	70-130			"	"	"	"	

Diesel Range Organics (DRO/TEPH) by EPA 8015D

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9D0810	JTD	"	04/09/2019	U
Surrogate: o-Terphenyl	77.0 %	50-150			"	"	"	"	

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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0809 - EPA 5030 (soil)

Blank (B9D0809-BLK1)

Prepared: 04/08/2019 Analyzed: 04/08/2019

Benzene	ND	0.00200	mg/kg							U
Toluene	ND	0.00200	"							U
Ethylbenzene	ND	0.00200	"							U
Xylenes, total	ND	0.00200	"							U
Gasoline Range Hydrocarbons	ND	0.200	"							U
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		103	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		101	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		98.6	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

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

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

Batch B9D0809 - EPA 5030 (soil)

Blank (B9D0809-BLK2)

Prepared: 04/08/2019 Analyzed: 04/08/2019

Benzene	ND	0.00200	mg/kg							U
Toluene	ND	0.00200	"							U
Ethylbenzene	ND	0.00200	"							U
Xylenes, total	ND	0.00200	"							U
Gasoline Range Hydrocarbons	ND	0.200	"							U
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		103	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		100	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		98.1	70-130			

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Tasman Geosciences
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 Denver CO 80211

Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0809 - EPA 5030 (soil)

LCS (B9D0809-BS1)

Prepared: 04/08/2019 Analyzed: 04/08/2019

Benzene	0.0953	0.00200	mg/kg	0.100		95.3	70-130			
Toluene	0.0909	0.00200	"	0.100		90.9	70-130			
Ethylbenzene	0.0889	0.00200	"	0.100		88.9	70-130			
m,p-Xylene	0.183	0.00400	"	0.200		91.4	70-130			
o-Xylene	0.0908	0.00200	"	0.100		90.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		96.9	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		103	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		97.9	70-130			

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Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0809 - EPA 5030 (soil)

LCS (B9D0809-BS2)

Prepared: 04/08/2019 Analyzed: 04/08/2019

Benzene	0.0993	0.00200	mg/kg	0.100		99.3	70-130			
Toluene	0.0964	0.00200	"	0.100		96.4	70-130			
Ethylbenzene	0.0940	0.00200	"	0.100		94.0	70-130			
m,p-Xylene	0.191	0.00400	"	0.200		95.7	70-130			
o-Xylene	0.0962	0.00200	"	0.100		96.2	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		97.3	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		103	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		99.2	70-130			

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Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0809 - EPA 5030 (soil)

Matrix Spike (B9D0809-MS1)	Source: Y904154-01			Prepared: 04/08/2019 Analyzed: 04/08/2019						
Benzene	2.47	0.0500	mg/kg	2.50	ND	98.8	70-130			
Toluene	2.39	0.0500	"	2.50	ND	95.5	70-130			
Ethylbenzene	2.35	0.0500	"	2.50	ND	94.0	70-130			
m,p-Xylene	4.82	0.100	"	5.00	ND	96.4	70-130			
o-Xylene	2.38	0.0500	"	2.50	ND	95.4	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		95.5	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		102	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		99.6	70-130			

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Brian Humphrey
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 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0809 - EPA 5030 (soil)

Matrix Spike (B9D0809-MS2)	Source: Y904154-02			Prepared: 04/08/2019 Analyzed: 04/08/2019						
Benzene	2.34	0.0500	mg/kg	2.50	ND	93.5	70-130			
Toluene	2.23	0.0500	"	2.50	ND	89.0	70-130			
Ethylbenzene	2.22	0.0500	"	2.50	ND	88.7	70-130			
m,p-Xylene	4.54	0.100	"	5.00	ND	90.7	70-130			
o-Xylene	2.27	0.0500	"	2.50	ND	90.9	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		95.3	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		101	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		98.2	70-130			

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Brian Humphrey
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 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0809 - EPA 5030 (soil)

Matrix Spike Dup (B9D0809-MSD1)	Source: Y904154-01			Prepared: 04/08/2019 Analyzed: 04/08/2019						
Benzene	2.41	0.0500	mg/kg	2.50	ND	96.3	70-130	2.58	20	
Toluene	2.31	0.0500	"	2.50	ND	92.6	70-130	3.08	20	
Ethylbenzene	2.27	0.0500	"	2.50	ND	90.8	70-130	3.44	20	
m,p-Xylene	4.64	0.100	"	5.00	ND	92.9	70-130	3.69	20	
o-Xylene	2.36	0.0500	"	2.50	ND	94.2	70-130	1.27	20	
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		95.9	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		103	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		99.9	70-130			

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Brian Humphrey
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 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0809 - EPA 5030 (soil)

Matrix Spike Dup (B9D0809-MSD2)	Source: Y904154-02			Prepared: 04/08/2019 Analyzed: 04/08/2019						
Benzene	2.29	0.0500	mg/kg	2.50	ND	91.6	70-130	2.01	20	
Toluene	2.18	0.0500	"	2.50	ND	87.1	70-130	2.18	20	
Ethylbenzene	2.12	0.0500	"	2.50	ND	85.0	70-130	4.26	20	
m,p-Xylene	4.33	0.100	"	5.00	ND	86.6	70-130	4.60	20	
o-Xylene	2.22	0.0500	"	2.50	ND	88.6	70-130	2.52	20	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.12</i>		<i>"</i>	<i>0.125</i>		<i>95.3</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.13</i>		<i>"</i>	<i>0.125</i>		<i>101</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.13</i>		<i>"</i>	<i>0.125</i>		<i>100</i>	<i>70-130</i>			

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9D0810 - EPA 3580										
Blank (B9D0810-BLK1)										
					Prepared: 04/08/2019 Analyzed: 04/08/2019					
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	35		"	50.0		70.7	50-150			

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Brian Humphrey
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 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9D0810 - EPA 3580										
Blank (B9D0810-BLK2)					Prepared: 04/08/2019 Analyzed: 04/08/2019					
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	36		"	50.0		71.7	50-150			

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Brian Humphrey
 Project Number: [none]
 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0810 - EPA 3580

LCS (B9D0810-BS1)

Prepared: 04/08/2019 Analyzed: 04/08/2019

Diesel (C10-C28)	790	50.0	mg/kg	1000		79.0	70-130			
Surrogate: <i>o</i> -Terphenyl	42		"	50.0		83.5	50-150			

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 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0810 - EPA 3580

LCS (B9D0810-BS2)

Prepared: 04/08/2019 Analyzed: 04/09/2019

Diesel (C10-C28)	735	50.0	mg/kg	1000		73.5	70-130			
Surrogate: o-Terphenyl	40		"	50.0		80.1	50-150			

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 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0810 - EPA 3580

Matrix Spike (B9D0810-MS1)	Source: Y904154-01			Prepared: 04/08/2019 Analyzed: 04/08/2019						
Diesel (C10-C28)	752	50.0	mg/kg	1000	135	61.7	70-130			QM-07
Surrogate: o-Terphenyl	39		"	50.0		77.4	50-150			

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0810 - EPA 3580

Matrix Spike (B9D0810-MS2)	Source: Y904102-02			Prepared: 04/08/2019 Analyzed: 04/09/2019						
Diesel (C10-C28)	889	50.0	mg/kg	1000	22.8	86.6	70-130			
Surrogate: o-Terphenyl	43		"	50.0		85.5	50-150			

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 Project: DCP - CR42 & CR13

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0810 - EPA 3580

Matrix Spike Dup (B9D0810-MSD1)	Source: Y904154-01			Prepared: 04/08/2019 Analyzed: 04/08/2019						
Diesel (C10-C28)	792	50.0	mg/kg	1000	135	65.7	70-130	5.09	35	QM-07
Surrogate: o-Terphenyl	36		"	50.0		71.2	50-150			

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9D0810 - EPA 3580

Matrix Spike Dup (B9D0810-MSD2)	Source: Y904102-02			Prepared: 04/08/2019 Analyzed: 04/09/2019						
Diesel (C10-C28)	853	50.0	mg/kg	1000	22.8	83.0	70-130	4.15	35	
Surrogate: o-Terphenyl	39		"	50.0		78.9	50-150			

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6899 Pecos Street, Unit C
Denver CO 80211

Brian Humphrey
Project Number: [none]
Project: DCP - CR42 & CR13

Notes and Definitions

U Sample is Non-Detect.

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

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

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Jen Pellegrini For Noelle Doyle Mathis, President