

# FREMONT ENVIRONMENTAL INC.

September 23, 2022

Mr. Jason Davidson  
PDC Energy Inc.  
4000 Burlington Ave.  
Greeley, CO 80620

Subject:     **Remediation Report**  
          UPRR Meyer #1  
          API # 05-001-06793  
          SWSE Sec 9, T2S, R63W  
          Adams County, Colorado  
          Fremont Project No. C020-031  
          Facility #319791, Remediation #9464

Dear Mr. Davidson:

Enclosed please find a copy of the above referenced Remediation Report for the UPRR Meyer #1 site in Adams County, Colorado. The enclosed report describes the operation of the soil vapor extraction system that was installed at the site to remediate petroleum-impacted soil at the site.

Please contact me at (303) 956-8714 if you require any additional information.

Fremont appreciates the opportunity to provide this service.

Sincerely,  
**FREMONT ENVIRONMENTAL INC.**



Paul V. Henehan, P.E.  
Senior Consultant

Enclosure

**REMEDIATION REPORT**

**PDC ENERGY INC.**

**UPRR MEYER #1**

**ADAMS COUNTY, COLORADO**

**FREMONT PROJECT NO. C020-031**

**FACILITY #319791, REMEDIATION #9464**

**Prepared by:**

**Fremont Environmental Inc.**

**1759 Redwing Lane**

**Broomfield, CO 80020**

**(303) 956-8714**

**September 23, 2022**

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**REMEDIATION REPORT**  
**PDC ENERGY INC.**  
**UPRR MEYER #1**  
**ADAMS COUNTY, COLORADO**  
**FREMONT PROJECT NO. C020-031**  
**FACILITY #319791, REMEDIATION #9464**

**1.0 INTRODUCTION**

The purpose of this document is to present information collected during the remediation of petroleum-impacted soil at PDC Energy Inc.'s (PDC's) UPRR Meyer #1 site in Adams County, Colorado. A soil remediation system consisting of two soil vapor extraction (SVE) wells was installed and activated at the site on November 19, 2021. The SVE system has operated continuously since that date.

**2.0 BACKGROUND INFORMATION**

**2.1 Site Location**

The UPRR Meyer #1 site is located approximately 11 miles north of Bennett, Colorado in Adams County as shown on Figure 1. The site is located in an agricultural area approximately 0.3 miles northwest of the intersection of County Road 33 and East 104<sup>th</sup> Avenue. The location is further described as the SW  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  of Section 9, Township 2S, Range 63W.

**2.2 Site History**

The UPRR Meyer #1 well was drilled in 1974 to a vertical depth of approximately 7,671 feet. The well and facility were permanently abandoned in 2019.

During abandonment activities, historical subsurface contamination was observed. These residual impacts triggered this remediation program.

### **3.0 REMEDIATION ACTIVITIES**

#### **3.1 Soil Remediation System**

As a result of the residual subsurface impacts at the UPRR Meyer #1 location, PDC installed an SVE system to remediate soil impacts. The system consists of two SVE wells that are individually piped to a remediation trailer. The Republic HRC 500 SVE vacuum blower operates at approximately 80 cfm and 25" H<sub>2</sub>O. The remediation system is powered by a propane fueled generator. Figure 3 illustrates the layout of the remediation system.

An SVE exhaust sample was collected on July 12, 2022 and submitted to Origins Laboratory. These data indicate that the SVE system was removing 6.11 pounds per day of petroleum hydrocarbons. The laboratory reports are provided in Appendix A.

### **4.0 DISCUSSION**

Since soil impacts remained at the site after facility abandonment, an SVE remediation system was installed and activated in November 2021 to address those impacts. The remediation system operates on a 24/7 basis. The SVE system has removed 0.88 tons of petroleum hydrocarbons since startup.

When it appears that the SVE system has reached the limits of its operational effectiveness, confirmation soil borings will be advanced to determine whether the subsurface soil impacts have been adequately remediated. The Residential Soil Screening Levels will be applied to this site since the depth to groundwater is believed to be approximately 125 feet based on a 2020 Division of Water Resources document.

### **5.0 REMARKS**

The discussion and conclusions contained in this report represent our professional opinions. These opinions are based on currently available information and are arrived at

in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

This report was prepared by **FREMONT ENVIRONMENTAL INC.**



9/22/22

Date \_\_\_\_\_

\_\_\_\_\_  
Paul V. Henehan, P.E.  
Senior Consultant

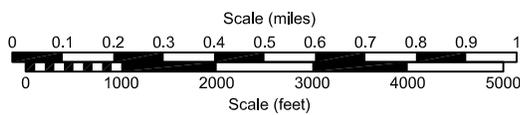
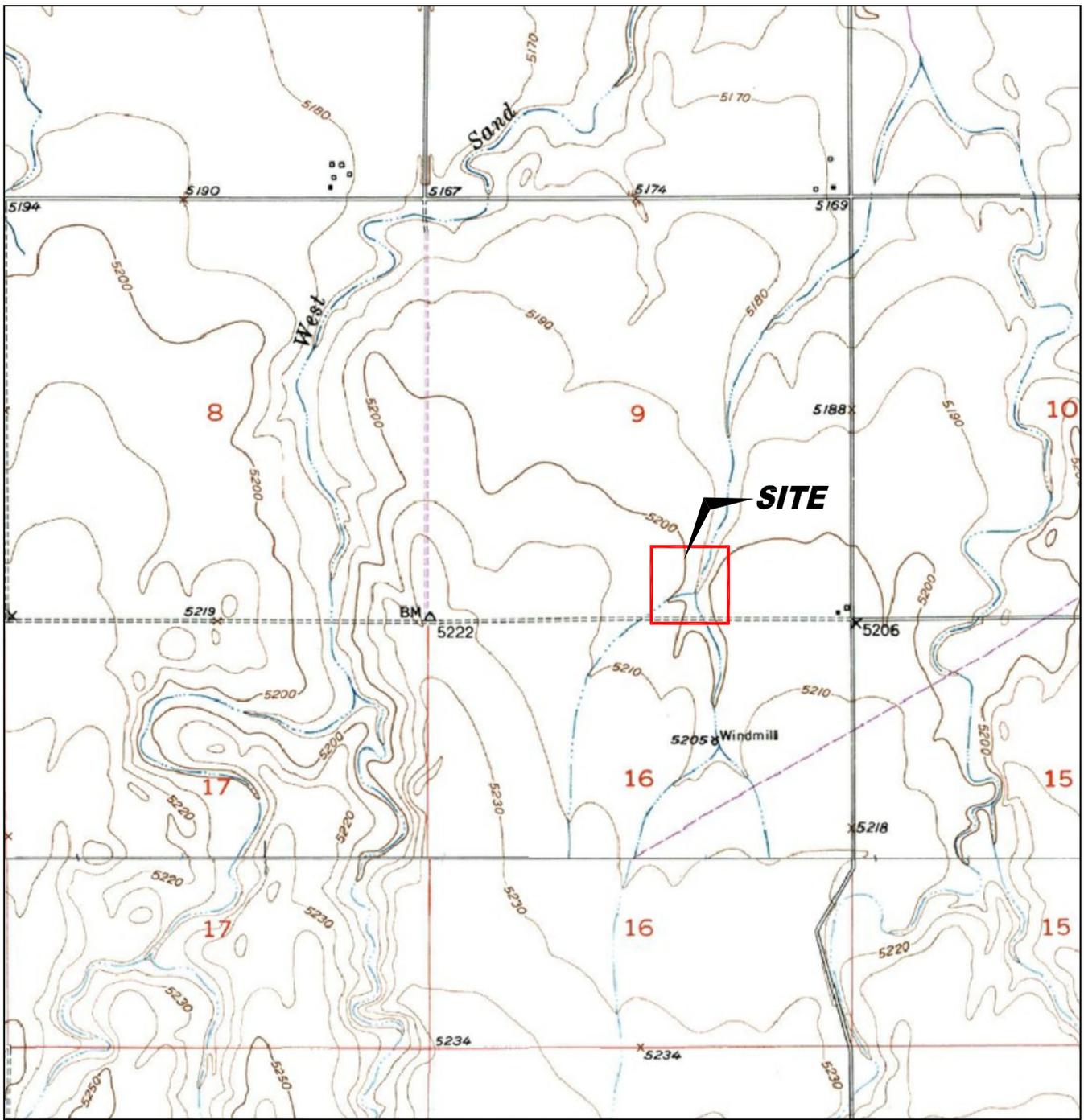
**TABLE**

**TABLE 1  
SUMMARY OF SVE DISCHARGE  
PDC ENERGY INC.  
UPRR MEYER #1, ADAMS COUNTY, COLORADO  
FREMONT PROJECT NO. C021-031**

Date	Air Discharge (CFM)	Instantaneous Hydrocarbon Removal Rate		Operational Hours	Total Pounds Removed For Period	Cumulative Pounds Removed	Cumulative Tons Removed	Benzene Lbs/Hr	Total Benzene For Period Lbs	Cumulative Pounds Benzene Removed
		(Lbs/Hr)	(Lbs/Day)							
12/03/21	80	0.46	11.13	336	155.75	155.75	0.08	0.0006	0.20	0.20
12/21/21	60	0.53	12.65	388	204.51	360.26	0.18	0.0004	0.16	0.36
12/29/21	60	1.39	33.43	173	240.97	601.23	0.30	0.0002	0.04	0.40
01/28/22	60	0.52	12.54	612	319.83	921.06	0.46	0.0000	0.01	0.41
03/07/22	60	0.20	4.81	821	164.44	1,085.50	0.54	0.0001	0.05	0.46
04/14/22	40	0.38	9.19	610	233.51	1,319.01	0.66	0.0000	0.03	0.49
07/12/22	30	0.25	6.11	1,696	431.76	1,750.77	0.88	0.0000	0.01	0.51

System started on 11/19/21

## FIGURES



USGS 7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1  
**SITE LOCATION MAP**

**Great Western Operating Company**  
**UPRR Meyer #1**  
SWSE Sec. 9, T2S, R63W 6th PM  
Adams County, Colorado

Project # <b>C021-031</b>	API # <b>05-001-06793</b>	Facility # <b>319791</b>
Date <b>09/15/21</b>	Remediation #	Filename <b>21031T</b>





**LEGEND**

- GEO-PROBE SOIL BORING LOCATION
- SOIL BORING LOCATION
- Ⓧ SOIL VAPOR EXTRACTION WELL LOCATION
- ABOVE GROUND STORAGE TANK
- FORMER FACILITY
- ▬ CONTAINMENT BERM
- ▬ CONTAINMENT WALL
- ▬ FENCE LINE

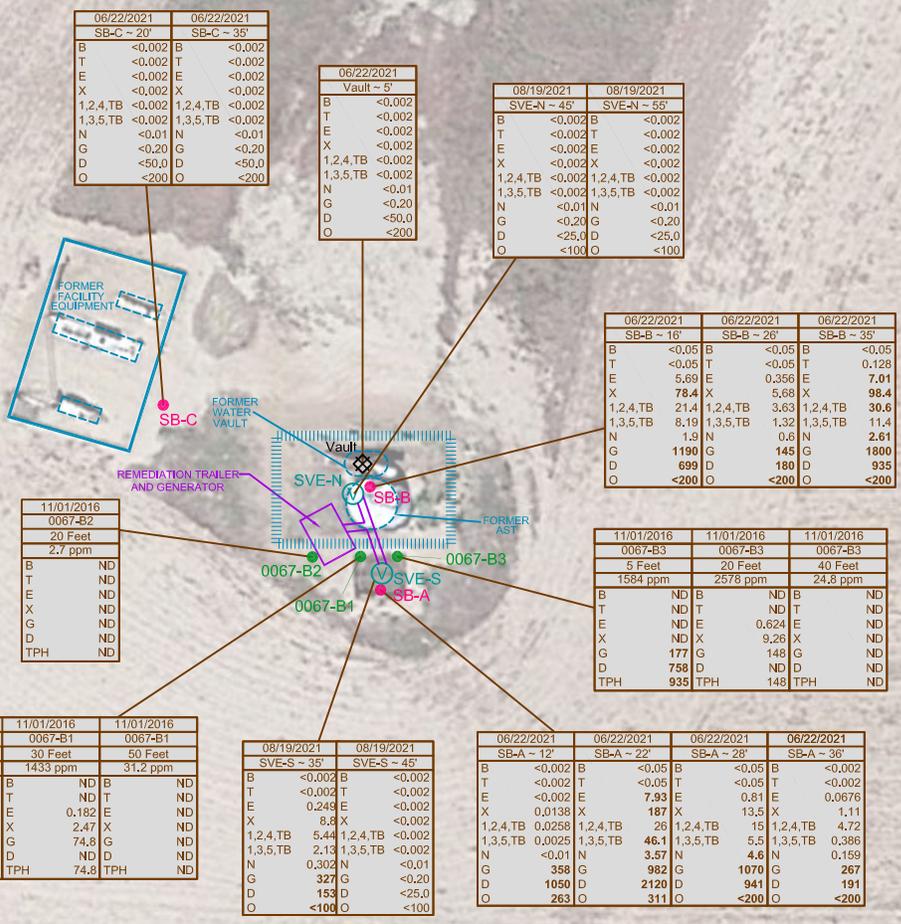
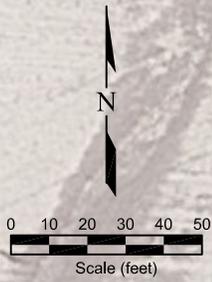
**Figure 2  
SITE MAP**

**Great Western Operating Company  
UPRR Meyer #1**  
SWSE Sec. 9, T2S, R63W 6th PM  
Adams County, Colorado

Project No. <b>C021-031</b>	API # <b>05-001-06793</b>	Facility # <b>319791</b>
Date <b>09/15/21</b>	Remediation #	Filename <b>21031Q</b>



11/01/2016 DATA TAKEN FROM AG WASSENAAR



**LEGEND**

- GEO-PROBE SOIL BORING LOCATION
- SOIL BORING LOCATION
- SOIL VAPOR EXTRACTION WELL LOCATION
- SOIL SAMPLE LOCATION
- ABOVE GROUND STORAGE TANK
- FORMER FACILITY
- CONTAINMENT BERM
- CONTAINMENT WALL
- FENCE LINE
- REMEDIATION SYSTEM TRENCH

DATE SAMPLED	SAMPLE ID and DEPTH (ft)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZENE (mg/kg)	TOTAL XYLENES (mg/kg)	1,2,4-TRIMETHYLBENZENE (mg/kg)	1,3,5-TRIMETHYLBENZENE (mg/kg)	NAPHTHALENE (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	TPH-ORO (mg/kg)
06/22/2021	SB-A ~ 12'	<0.002	<0.002	<0.002	0.0138	0.0258	0.0025	<0.01	G 358	D 1050	O 263
11/01/2016	0067-B2 20 Feet 2.7 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11/01/2016	0067-B1 5 Feet 2875 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11/01/2016	0067-B1 30 Feet 1433 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11/01/2016	0067-B1 50 Feet 31.2 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
08/19/2021	SVE-S ~ 35'	<0.002	<0.002	<0.002	0.248	8.8	5.44	<0.01	G 327	D 153	O <100
08/19/2021	SVE-S ~ 45'	<0.002	<0.002	<0.002	0.248	8.8	5.44	<0.01	G 327	D 153	O <100
06/22/2021	SB-A ~ 12'	<0.002	<0.002	<0.002	0.0138	0.0258	0.0025	<0.01	G 358	D 1050	O 263
06/22/2021	SB-A ~ 22'	<0.002	<0.002	<0.002	0.0138	0.0258	0.0025	<0.01	G 358	D 1050	O 263
06/22/2021	SB-A ~ 28'	<0.002	<0.002	<0.002	0.0138	0.0258	0.0025	<0.01	G 358	D 1050	O 263
06/22/2021	SB-A ~ 36'	<0.002	<0.002	<0.002	0.0138	0.0258	0.0025	<0.01	G 358	D 1050	O 263

ND = NOT DETECTED

**Figure 3**  
**REMEDIATION SYSTEM LAYOUT**  
 Great Western Operating Company  
 UPRR Meyer #1  
 SWSE Sec. 9, T2S, R63W 6th PM  
 Adams County, Colorado

Project No. <b>C021-031</b>	API # <b>05-001-06793</b>	Facility # <b>319791</b>	
Date <b>12/17/21</b>	Remediation #	Filename <b>21031Q</b>	

PID = PHOTO IONIZATION DETECTOR / ppm = parts per million  
 TPH = TOTAL PETROLEUM HYDROCARBONS / BOLD = EXCEEDS COGCC TABLE 9104

**APPENDIX A**

**LABORATORY DOCUMENTATION**



August 02, 2022

**Fremont Environmental**

**Paul Henehan**

**8305 6th St, PO Box 1289**

**Wellington CO 80549**

**Project Name - PDC - UPRR Meyer #1**

**Project Number - CO21-031**

Attached are your analytical results for PDC - UPRR Meyer #1 received by Origins Laboratory, Inc. July 13, 2022. This project is associated with Origins project number Y207295-01.

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

Fremont Environmental  
8305 6th St, PO Box 1289  
Wellington CO 80549

Paul Henehan  
Project Number: CO21-031  
Project: PDC - UPRR Meyer #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
UPRR Meyer #1 SVE	Y207295-01	Air	July 12, 2022 13:30	07/13/2022 10:11

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.*



Fremont Environmental  
 8305 6th St, PO Box 1289  
 Wellington CO 80549

Paul Henehan  
 Project Number: CO21-031  
 Project: PDC - UPRR Meyer #1

Origins Laboratory

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

**Sample Receipt Checklist**

Origins Work Order: \_\_\_\_\_

Client: Fremont Environmental

Client Project ID: CO21-031

Checklist Completed by: TSH

Shipped Via: F10  
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 4/18/22

Airbill #: \_\_\_\_\_

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

Water  Other: Air

Cooler Number/Temperature: \_\_\_\_\_ °C / \_\_\_\_\_ °C / \_\_\_\_\_ °C / \_\_\_\_\_ °C

Thermometer ID: \_\_\_\_\_

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>Air</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? <b>If yes, contact client and note in narrative.</b>			<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 HNO3, HCL, H2SO4) / (pH >10 for samples preserved with NaAsO2+NaOH, ZnAc+NaOH)			<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: JPH (Project Manager)

Date/Time Reviewed: 7-18-22

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.

Fremont Environmental  
 8305 6th St, PO Box 1289  
 Wellington CO 80549

Paul Henehan  
 Project Number: CO21-031  
 Project: PDC - UPRR Meyer #1

**UPRR Mever #1 SVE**  
**7/12/2022 1:30:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y207295-01 (Air)**

**GBTEX by TO-15M GC/MS**

T

Gasoline Range Hydrocarbons	2270000	50000	ug/m <sup>3</sup> Air	250	B2G2514	EPC	07/25/2022	07/26/2022	
Benzene	ND	70.0	"	25	"	EPC	"	07/27/2022	U
Toluene	422	125	"	"	"	EPC	"	"	
Ethylbenzene	658	125	"	"	"	EPC	"	"	
m,p-Xylene	9940	4750	"	250	"	EPC	"	07/26/2022	
o-Xylene	1750	1180	"	"	"	EPC	"	"	
Surrogate: 1,2-Dichloroethane-d4	85.4 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	99.8 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	82.5 %	70-130			"	"	"	"	

Origins Laboratory, Inc.



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Fremont Environmental  
 8305 6th St, PO Box 1289  
 Wellington CO 80549

Paul Henehan  
 Project Number: CO21-031  
 Project: PDC - UPRR Meyer #1

**Volatile Organic Compounds by TO-15 in Air - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch B2G2514 - Default Prep - Air</b>										
<b>Blank (B2G2514-BLK1)</b>										
					Prepared: 07/25/2022 Analyzed: 07/25/2022					T
Gasoline Range Hydrocarbons	ND	200	ug/m <sup>3</sup> Air							U
Benzene	ND	2.80	"							U
Toluene	ND	5.00	"							U
Ethylbenzene	ND	5.00	"							U
m,p-Xylene	ND	19.0	"							U
o-Xylene	ND	4.70	"							U
Surrogate: 1,2-Dichloroethane-d4	9.66		ppbv	10.0		96.6	70-130			
Surrogate: Toluene-d8	10.2		"	10.0		102	70-130			
Surrogate: 4-Bromofluorobenzene	8.99		"	10.0		89.9	70-130			
<b>LCS (B2G2514-BS1)</b>										
					Prepared: 07/25/2022 Analyzed: 07/25/2022					T
Benzene	32.2	2.80	ug/m <sup>3</sup> Air	31.9		101	70-130			
Toluene	40.4	5.00	"	37.7		107	70-130			
Ethylbenzene	45.0	5.00	"	43.4		104	70-130			
m,p-Xylene	168	19.0	"	174		96.6	70-130			
o-Xylene	44.8	4.70	"	43.4		103	70-130			
Surrogate: 1,2-Dichloroethane-d4	8.32		ppbv	10.0		83.2	70-130			
Surrogate: Toluene-d8	9.32		"	10.0		93.2	70-130			
Surrogate: 4-Bromofluorobenzene	9.38		"	10.0		93.8	70-130			
<b>LCS Dup (B2G2514-BSD1)</b>										
					Prepared: 07/25/2022 Analyzed: 07/25/2022					T
Benzene	32.9	2.80	ug/m <sup>3</sup> Air	31.9		103	70-130	2.16	25	
Toluene	38.9	5.00	"	37.7		103	70-130	3.71	25	
Ethylbenzene	44.0	5.00	"	43.4		101	70-130	2.24	25	
m,p-Xylene	167	19.0	"	174		96.4	70-130	0.207	25	
o-Xylene	43.6	4.70	"	43.4		100	70-130	2.65	25	
Surrogate: 1,2-Dichloroethane-d4	8.61		ppbv	10.0		86.1	70-130			

Origins Laboratory, Inc.



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Fremont Environmental  
 8305 6th St, PO Box 1289  
 Wellington CO 80549

Paul Henehan  
 Project Number: CO21-031  
 Project: PDC - UPRR Meyer #1

**Volatile Organic Compounds by TO-15 in Air - Quality Control**  
**Origins Laboratory, Inc.**

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

**Batch B2G2514 - Default Prep - Air**

**LCS Dup (B2G2514-BSD1)**

Prepared: 07/25/2022 Analyzed: 07/25/2022

T

Surrogate: Toluene-d8	9.38		ppbv	10.0		93.8	70-130			
Surrogate: 4-Bromofluorobenzene	9.17		"	10.0		91.7	70-130			

Origins Laboratory, Inc.



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Fremont Environmental  
8305 6th St, PO Box 1289  
Wellington CO 80549

Paul Henehan  
Project Number: CO21-031  
Project: PDC - UPRR Meyer #1

---

### Notes and Definitions

U Sample is Non-Detect.

T The TO-15 analysis is not part of the NELAC accreditation

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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---

Jen Pellegrini For Noelle Doyle Mathis, President