

FREMONT ENVIRONMENTAL INC.

November 1, 2021

Mr. Jason Davidson
Great Western Operating Company, LLC
1001 17th Street, Suite 2000
Denver, CO 80202

Subject: **Remediation System Report**
Pierce Central Station
SESE Sec 22, T8N, R66W
Weld County, Colorado
Fremont Project No. C020-025
Remediation #15435

Dear Mr. Davidson:

Enclosed please find a copy of the above referenced Remediation System Report for the Pierce Central Station release site in Weld 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 SYSTEM REPORT
GREAT WESTERN OPERATING COMPANY, LLC
PIERCE CENTRAL STATION
WELD COUNTY, COLORADO
FREMONT PROJECT NO. C020-025
REMEDIATION #15435

Prepared by:

Fremont Environmental Inc.
1759 Redwing Lane
Broomfield, CO 80020
(303) 956-8714

November 1, 2021

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REMEDIATION SYSTEM REPORT
GREAT WESTERN OPERATING COMPANY, LLC
PIERCE CENTRAL STATION
WELD COUNTY, COLORADO
FREMONT PROJECT NO. C020-025
REMEDIATION #15435

1.0 INTRODUCTION

The purpose of this document is to present information describing the operation of a soil vapor extraction (SVE) system at the Great Western Operating Company, LLC (GWOC) Pierce Central Station in Weld County, Colorado. The SVE system was installed to remediate contaminated soil that was left in place following an excavation that was conducted in August 2020. The SVE system was activated on December 7, 2020; however, the system was deactivated on January 12, 2021 due to the potential for exceeding the State of Colorado's emissions standards. Since that time, off gas control using a catalytic oxidizer has been installed allowing the SVE system to be reactivated.

2.0 BACKGROUND INFORMATION

2.1 Site Location

The Pierce Station site is located approximately one mile north of Pierce, Colorado in Weld County as shown on Figure 1. The site is located in an agricultural area approximately 0.1 miles west of the intersection of Highway 85 and County Road 90. The location is further described as the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 22, Township 8N, Range 66W.

2.2 Site History

Soil impacts were identified within the bermed area following a February 2020 release at the facility. In August 2020, approximately 1,230 cubic yards of impacted soil were removed from varying depths at the facility. However, residual soil contamination was

left in place; this soil was to be remediated with an SVE system. GWOC has taken this facility completely out of service and removed all the equipment from the site.

3.0 REMEDIATION SYSTEM

As a result of residual soil impacts at the former Pierce Station, GWOC installed an SVE system at the facility. Fifteen SVE wells were installed at the site in September and October 2020. Eleven of these wells were completed as “deep” wells with the SVE screen placed at an interval of 15 to 25 feet below grade. Four of these wells were completed as “shallow” wells with the SVE screen placed at an interval of 6 to 16 feet.

Each of the 15 wells is individually piped to a remediation system building using 2-inch diameter PVC pipe. Water drip legs are provided on each line to accommodate condensation in the piping. The SVE legs are tied into a manifold within the building that is piped to a 15 HP Rotron DR909 vacuum blower. This blower typically operates at 300 cubic feet per minute (cfm). A system as-built drawing is provided as Figure 2.

The SVE system was activated on December 7, 2020. Offgas vapor samples were collected on a weekly basis and submitted to Origins Laboratory, Inc. of Denver, Colorado for the analyses of benzene, toluene, ethylbenzene and xylenes (BTEX) and total petroleum hydrocarbons – gasoline range organics (TPH-GRO) by EPA method TO-15.

After four weeks of operation, it was determined that the offgas mass may ultimately exceed the Colorado Department of Public Health and Environment’s (CDPHE’s) unpermitted allowable emissions threshold of two tons per year (TPY). During the four week operation period, the SVE system removed approximately 0.9 tons of TPH-GRO. Therefore, the SVE system was deactivated on January 12, 2021 pending evaluation of offgas vapor treatment options.

Great Western was issued a Construction Permit by the CDPHE Air Pollution Control Division on April 21, 2021. This permit allows an annual limit of 0.7 tons of volatile Organic compounds (VOCs). The SVE system with a catalytic oxidizer was activated on April 26, 2021 and operates continuously. The catalytic oxidizer has a design destruction efficiency of 99.5%. The permit requires that, at a minimum, the system be sampled once per week for the first month, once a month for the next two months and then once every three months thereafter. This sampling frequency has been conducted and is summarized in Table 1.

Through August 2021, the SVE system has removed a total of 2.80 tons of petroleum hydrocarbons from the subsurface. Since the catalytic oxidizer has been installed, 0.01 tons have been emitted to atmosphere.

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.**

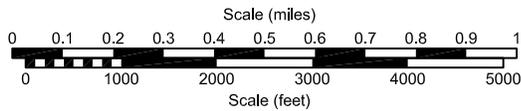
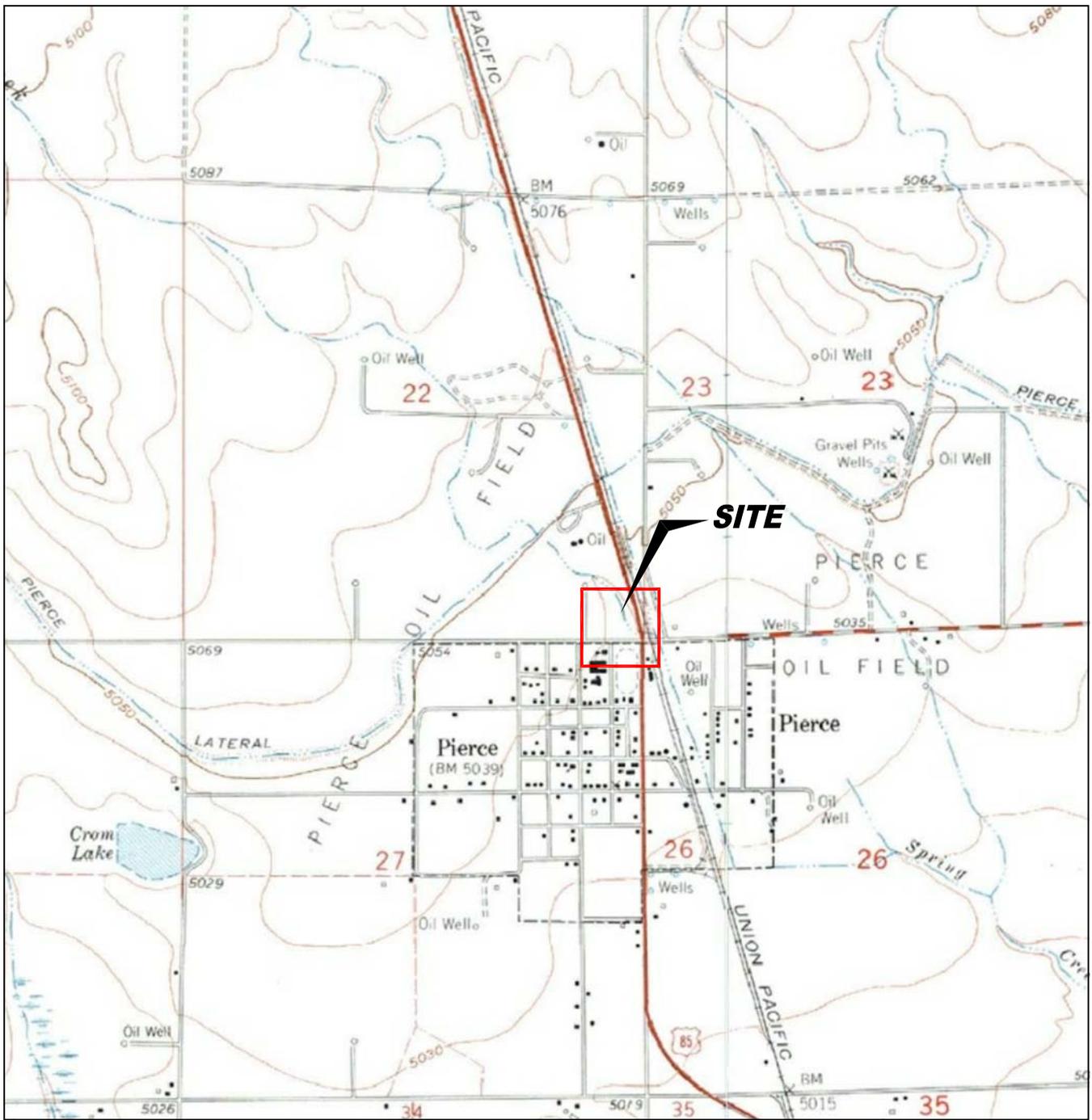


11/1/21

Date _____

Paul V. Henahan, P.E.
Senior Consultant

FIGURES



USGS 7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1
SITE LOCATION MAP

GREAT WESTERN OPERATING COMPANY, LLC
PIERCE CENTRAL STATION
 SESE Sec 22, T8N, R66W ~ 40.6438°, -104.7572°
 Weld County, Colorado

Project No. CO20-025	Prepared by	Drawn by TA
Date 10/16/20	Reviewed by PH	Filename 20025T





LEGEND

-  SOIL VAPOR EXTRACTION WELL (screen 6' to 16')
-  DEEP SOIL VAPOR EXTRACTION WELL (screen 15' to 25')
-  ABOVE GROUND STORAGE TANK
-  FORMER FACILITY
-  BUILDING
-  FENCE LINE
-  CONTAINMENT BERM
-  EXTENT OF EXCAVATION
-  REMEDIATION SYSTEM TRENCH

Figure 2
AS-BUILT AS/SVE LAYOUT

GREAT WESTERN OPERATING COMPANY, LLC
PIERCE CENTRAL STATION
 SESE Sec 22, T8N, R66W ~ 40.6438°, -104.7572°
 Weld County, Colorado

Project No. CO20-025	Prepared by 	Drawn by TA	
Date 1/4/21	Reviewed by PH	Filename 20025Q	

TABLE

**TABLE 1
SUMMARY OF SVE DISCHARGE
GREAT WESTERN OPERATING COMPANY, LLC
PIERCE STATION, WELD COUNTY, COLORADO
FREMONT PROJECT NO. C020-025**

Date	Air Discharge (CFM)	Instantaneous Hydrocarbon Removal Rate		Operational Hours	Total Pounds Removed For Period	Cumulative Pounds Removed	Cumulative Tons Removed	Cumulative Tons emitted to Atmosphere	Benzene Lbs/Hr	Total Benzene For Period Lbs	Cumulative Pounds Benzene Removed
		(Lbs/Hr)	(Lbs/Day)								
12/14/20	310	2.85	68.42	168	478.93	478.93	0.24	0.24	0.0002	0.04	0.04
12/22/20	310	2.50	60.08	192	480.60	959.53	0.48	0.48	0.0001	0.03	0.07
12/28/20	310	2.76	66.19	144	397.16	1,356.69	0.68	0.68	0.0001	0.01	0.08
01/04/21	280	2.68	64.31	168	450.17	1,806.86	0.90	0.90	0.0001	0.01	0.09
Catalytic Oxidizer Installed, Restarted 4/26/21											
04/26/21	280	1.27	30.40	168	212.77	2,019.64	1.01	0.90	0.0000	0.00	0.09
05/04/21	290	1.26	30.18	192	241.45	2,261.08	1.13	0.90	0.0001	0.01	0.11
05/12/21	290	0.99	23.78	192	190.24	2,451.33	1.23	0.90	0.0001	0.01	0.12
05/20/21	290	1.21	29.14	192	233.12	2,684.45	1.34	0.90	0.0001	0.01	0.14
06/02/21	290	0.73	17.56	312	228.31	2,912.76	1.46	0.90	0.0001	0.02	0.16
06/09/21	290	0.63	15.12	168	105.82	3,018.58	1.51	0.90	0.0001	0.01	0.17
06/25/21	290	0.53	12.75	302	160.42	3,179.00	1.59	0.90	0.0001	0.02	0.19
08/05/21	290	2.46	59.06	984	2,421.51	5,600.51	2.80	0.91	0.0001	0.07	0.27

System started on 12/7/20, deactivated on 1/12/21, re-activated on 4/26/21

Assume catox destruction efficiency of 99.5%

APPENDIX A
LABORATORY DOCUMENTATION

August 12, 2021

Fremont Environmental

Paul Henehan

8305 6th St, PO Box 1289

Wellington CO 80549

Project Name - Great Western - Pierce Station

Project Number - C020-025

Attached are your analytical results for Great Western - Pierce Station received by Origins Laboratory, Inc. August 06, 2021. This project is associated with Origins project number Y108138-01.

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



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

Paul Henehan
Project Number: C020-025
Project: Great Western - Pierce Station

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Pierce SVE	Y108138-01	Air	August 5, 2021 13:00	08/06/2021 11:00

Origins Laboratory, Inc.



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

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

Paul Henehan
 Project Number: C020-025
 Project: Great Western - Pierce Station

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

Origins Work Order: Y108138 **Sample Receipt Checklist**
 Client: Fremont/Envoc
 Client Project ID: Pierce

Checklist Completed by: Jm Shipped Via: HTD
 Date/time completed: 8-9-21 (UPS, FedEx, Hand Delivered, Pick-up, etc.)
 Airbill #: N/A

Matrix(s) Received: (Check all that apply): Soil/Solid Water Other: Air

Cooler Number/Temperature: 15.1 °C / °C / °C (Describe)
 Thermometer ID: T603

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?			X	
Is there ice present (document if blue ice is used)			X	
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		X		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		X		
Were all samples received intact ⁽¹⁾ ?	X			
Was adequate sample volume provided ⁽¹⁾ ?	X			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?		X		
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	X			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	X			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	X			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	X			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			X	
Are samples preserved that require preservation and was it checked ⁽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)			X	
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 Jm (Project Manager) Date/Time Reviewed 8-9-21

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: C020-025
 Project: Great Western - Pierce Station

Pierce SVE

8/5/2021 1:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
 Y108138-01 (Air)

GBTEX by TO-15M GC/MS

T

Gasoline Range Hydrocarbons	2270000	50000	ug/m ³ Air	250	B1H0918	DJL	08/09/2021	08/10/2021	
Benzene	ND	70.0	"	25	"	DJL	"	08/10/2021	R-01, U
Toluene	ND	125	"	"	"	DJL	"	"	R-01, U
Ethylbenzene	ND	125	"	"	"	DJL	"	"	R-01, U
m,p-Xylene	ND	475	"	"	"	DJL	"	"	R-01, U
o-Xylene	ND	118	"	"	"	DJL	"	"	R-01, U
Surrogate: 1,2-Dichloroethane-d4	92.5 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	121 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	104 %	70-130			"	"	"	"	

Origins Laboratory, Inc.



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

Paul Henehan
 Project Number: C020-025
 Project: Great Western - Pierce Station

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 B1H0918 - Default Prep - Air										
Blank (B1H0918-BLK1)										
					Prepared: 08/09/2021 Analyzed: 08/09/2021					T
Gasoline Range Hydrocarbons	ND	200	ug/m ³ 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	10.6		ppbv	10.0		106	70-130			
Surrogate: Toluene-d8	9.52		"	10.0		95.2	70-130			
Surrogate: 4-Bromofluorobenzene	9.87		"	10.0		98.7	70-130			
LCS (B1H0918-BS1)										
					Prepared: 08/09/2021 Analyzed: 08/09/2021					T
Benzene	32.4	2.80	ug/m ³ Air	31.9		101	70-130			
Toluene	40.5	5.00	"	37.7		108	70-130			
Ethylbenzene	49.1	5.00	"	43.4		113	70-130			
m,p-Xylene	180	19.0	"	174		103	70-130			
o-Xylene	50.4	4.70	"	43.4		116	70-130			
Surrogate: 1,2-Dichloroethane-d4	8.93		ppbv	10.0		89.3	70-130			
Surrogate: Toluene-d8	11.0		"	10.0		110	70-130			
Surrogate: 4-Bromofluorobenzene	8.03		"	10.0		80.3	70-130			
LCS Dup (B1H0918-BSD1)										
					Prepared: 08/09/2021 Analyzed: 08/09/2021					T
Benzene	32.1	2.80	ug/m ³ Air	31.9		100	70-130	0.892	25	
Toluene	39.9	5.00	"	37.7		106	70-130	1.41	25	
Ethylbenzene	48.9	5.00	"	43.4		113	70-130	0.266	25	
m,p-Xylene	188	19.0	"	174		108	70-130	4.67	25	
o-Xylene	51.3	4.70	"	43.4		118	70-130	1.71	25	
Surrogate: 1,2-Dichloroethane-d4	9.08		ppbv	10.0		90.8	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.

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

Paul Henehan
 Project Number: C020-025
 Project: Great Western - Pierce Station

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
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Batch B1H0918 - Default Prep - Air

LCS Dup (B1H0918-BSD1)

Prepared: 08/09/2021 Analyzed: 08/09/2021

T

Surrogate: Toluene-d8	10.9		ppbv	10.0		109	70-130			
Surrogate: 4-Bromofluorobenzene	9.61		"	10.0		96.1	70-130			

Origins Laboratory, Inc.



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

Paul Henehan
Project Number: C020-025
Project: Great Western - Pierce Station

Notes and Definitions

- U Sample is Non-Detect.
- T The TO-15 analysis is not part of the NELAC accreditation
- R-01 The Reporting Limit for this analyte has been raised to account for matrix interference.
- 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.