



December 13, 2019

**Olsson Associates**

**Trent Watne**

**1525 Raleigh St, Suite 400**

**Denver**

**CO 80204**

**Project Name - N Colorado 24-13 8**

**Project Number - [none]**

Attached are your analytical results for N Colorado 24-13 8 received by Origins Laboratory, Inc. December 06, 2019. This project is associated with Origins project number Y912098-01.

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

Olsson Associates

1525 Raleigh St, Suite 400

Denver CO 80204

Trent Watne

Project Number: [none]

Project: N Colorado 24-13 8

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Base1-5	Y912098-01	Soil	December 6, 2019 15:10	12/06/2019 16:02
SWWest-5	Y912098-02	Soil	December 6, 2019 15:03	12/06/2019 16:02

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Jen Pellegrini, Project Manager

Trent Watne  
Project Number: [none]  
Project: N Colorado 24-13 8

Chain of Custody  
4/9/2008

[illegible]

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Jeff Pellgrini

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Denver CO 80204

Trent Watne  
Project Number: [none]  
Project: N Colorado 24-13 8

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: 4912098

Client: Olsson

Client Project ID: N Colorado 24-13 8

Checklist Completed by: Don Lee

Shipped Via: HD

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

Date/time completed: 12-6-19

Airbill #: NA

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

Cooler Number/Temperature: 1 / 5.8 °C 1 / \_\_\_\_\_ °C 1 / \_\_\_\_\_ °C (Describe)

Thermometer ID: 1003

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

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

Reviewed by (Project Manager) JP

Date/Time Reviewed 12/9/19

Origins Laboratory, Inc.

*Jen Pellegrini*

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1525 Raleigh St, Suite 400  
Denver CO 80204

Trent Watne  
Project Number: [none]  
Project: N Colorado 24-13 8

## Base1-5

12/6/2019 3:10:00PM

Analyte	Result	Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc. Y912098-01 (Soil)

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

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9L0610	KDK	12/06/2019	12/06/2019	U
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Surrogate: o-Terphenyl	89.5 %	50-150			"	"	"		
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### GBTEX + Naphthalene by EPA 8260D

Gasoline Range Hydrocarbons	7.69	5.00	mg/kg	25	B9L0609	KDK	12/06/2019	12/06/2019	
Benzene	ND	0.050	"	"	"	KDK	"	"	U
Toluene	0.317	0.050	"	"	"	KDK	"	"	
Ethylbenzene	ND	0.050	"	"	"	KDK	"	"	U
Xylenes, total	0.160	0.050	"	"	"	KDK	"	"	
Naphthalene	ND	0.200	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	86.0 %	70-130			"	"	"		
Surrogate: Toluene-d8	98.1 %	70-130			"	"	"		
Surrogate: 4-Bromofluorobenzene	93.0 %	70-130			"	"	"		

### Metals (Saturated Paste Prep)

Calcium	0.95	me/L	1	[none]		12/09/2019	12/12/2019	
Magnesium	0.39	"	"	"		"	"	
Sodium	25.08	"	"	"		"	"	

### pH in Soil by EPA 9045D

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Denver CO 80204

Trent Watne  
Project Number: [none]  
Project: N Colorado 24-13 8

**Base1-5**

**12/6/2019 3:10:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y912098-01 (Soil)**

**pH in Soil by EPA 9045D**

pH	9.62	pH Units	1	B9L0607	OLAB	12/06/2019	12/06/2019
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**SAR by 20B Saturated Paste**

SAR	30.64		1	[none]		12/09/2019	12/12/2019
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.180	0.00500	mmhos/cm	1	B9L0608	KDK	12/06/2019	12/06/2019
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Jen Pellegrini, Project Manager

Olsson Associates  
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Project Number: [none]  
Project: N Colorado 24-13 8

## SWWest-5

12/6/2019 3:03:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc. Y912098-02 (Soil)

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

Diesel (C10-C28)	644	50.0	mg/kg	1	B9L0610	KDK	12/06/2019	12/06/2019
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Surrogate: o-Terphenyl	109 %	50-150			"	"	"
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### GBTEX + Naphthalene by EPA 8260D

Gasoline Range Hydrocarbons	ND	5.00	mg/kg	25	B9L0609	KDK	12/06/2019	12/06/2019	U
Benzene	ND	0.050	"	"	"	KDK	"	"	U
Toluene	ND	0.050	"	"	"	KDK	"	"	U
Ethylbenzene	ND	0.050	"	"	"	KDK	"	"	U
Xylenes, total	ND	0.050	"	"	"	KDK	"	"	U
Naphthalene	ND	0.200	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	86.8 %	70-130			"	"	"
Surrogate: Toluene-d8	96.1 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	94.0 %	70-130			"	"	"

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Jen Pellegrini, Project Manager



Olsson Associates  
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Denver CO 80204

Trent Watne  
Project Number: [none]  
Project: N Colorado 24-13 8

**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
<b>Batch B9L0609 - EPA 5030 (soil)</b>										
<b>Blank (B9L0609-BLK1)</b>					Prepared: 12/06/2019 Analyzed: 12/06/2019					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Naphthalene	ND	0.008	"							U
Surrogate: 1,2-Dichloroethane-d4	0.10		"	0.125		82.9	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		97.3	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		94.2	70-130			

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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
<b>Batch B9L0609 - EPA 5030 (soil)</b>										
<b>LCS (B9L0609-BS1)</b>					Prepared: 12/06/2019 Analyzed: 12/06/2019					
Benzene	0.088	0.002	mg/kg	0.100		88.0	70-130			
Toluene	0.096	0.002	"	0.100		96.0	70-130			
Ethylbenzene	0.083	0.002	"	0.100		82.9	70-130			
m,p-Xylene	0.166	0.004	"	0.200		83.0	70-130			
o-Xylene	0.082	0.002	"	0.100		82.1	70-130			
Naphthalene	0.098	0.008	"	0.100		97.9	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.10		"	0.125		81.7	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		98.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		94.4	70-130			

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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
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**Batch B9L0609 - EPA 5030 (soil)**

Matrix Spike (B9L0609-MS1)		Source: Y912096-01			Prepared: 12/06/2019 Analyzed: 12/06/2019					
Benzene	0.103	0.002	mg/kg	0.100	ND	103	70-130			
Toluene	0.101	0.002	"	0.100	0.002	99.2	70-130			
Ethylbenzene	0.101	0.002	"	0.100	0.004	97.2	70-130			
m,p-Xylene	0.196	0.004	"	0.200	ND	98.0	70-130			
o-Xylene	0.097	0.002	"	0.100	ND	97.3	70-130			
Naphthalene	0.111	0.008	"	0.100	0.017	94.2	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.10		"	0.125		80.8	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		96.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		92.1	70-130			

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Trent Watne  
Project Number: [none]  
Project: N Colorado 24-13 8

**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
<b>Batch B9L0609 - EPA 5030 (soil)</b>										
<b>Matrix Spike Dup (B9L0609-MSD1)</b>					<b>Source: Y912096-01</b>					Prepared: 12/06/2019 Analyzed: 12/06/2019
Benzene	0.096	0.002	mg/kg	0.100	ND	95.6	70-130	7.86	20	
Toluene	0.092	0.002	"	0.100	0.002	90.0	70-130	9.48	20	
Ethylbenzene	0.090	0.002	"	0.100	0.004	86.4	70-130	11.3	20	
m,p-Xylene	0.176	0.004	"	0.200	ND	87.8	70-130	11.0	20	
o-Xylene	0.086	0.002	"	0.100	ND	86.0	70-130	12.3	20	
Naphthalene	0.106	0.008	"	0.100	0.017	88.8	70-130	5.01	20	
Surrogate: 1,2-Dichloroethane-d4	0.10		"	0.125		83.0	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		97.8	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		92.0	70-130			

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Project: N Colorado 24-13 8

**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 B9L0610 - EPA 3580

Blank (B9L0610-BLK1)

Prepared: 12/06/2019 Analyzed: 12/06/2019

Diesel (C10-C28)	ND	25.0	mg/kg							U
Surrogate: o-Terphenyl	20		"	25.0		82.0	50-150			

Origins Laboratory, Inc.



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Jen Pellegrini, Project Manager

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Project Number: [none]  
Project: N Colorado 24-13 8

**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 B9L0610 - EPA 3580

**LCS (B9L0610-BS1)**

Prepared: 12/06/2019 Analyzed: 12/06/2019

Diesel (C10-C28)	999	50.0	mg/kg	1000		99.9	70-130			
Surrogate: o-Terphenyl	47		"	50.0		94.5	50-150			

Origins Laboratory, Inc.



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Project Number: [none]  
Project: N Colorado 24-13 8

**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 B9L0610 - EPA 3580

<b>Matrix Spike (B9L0610-MS1)</b>		<b>Source: Y912099-01</b>			Prepared: 12/06/2019 Analyzed: 12/06/2019					
Diesel (C10-C28)	1040	50.0	mg/kg	1000	ND	104	70-130			
Surrogate: o-Terphenyl	49		"	50.0		97.9	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 B9L0610 - EPA 3580**

<b>Matrix Spike Dup (B9L0610-MSD1)</b>		<b>Source: Y912099-01</b>			Prepared: 12/06/2019 Analyzed: 12/06/2019					
Diesel (C10-C28)	969	50.0	mg/kg	1000	ND	96.9	70-130	7.24	35	
Surrogate: o-Terphenyl	45		"	50.0		90.7	50-150			

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Project Number: [none]  
Project: N Colorado 24-13 8

## 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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## Classical Chemistry Parameters - 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 B9L0607 - NO PREP

<b>Duplicate (B9L0607-DUP1)</b>		<b>Source: Y912096-01</b>			Prepared: 12/06/2019 Analyzed: 12/06/2019					
pH	7.89		pH Units		8.39			6.14	25	

#### Batch B9L0608 - NO PREP

<b>Blank (B9L0608-BLK1)</b>		Prepared: 12/06/2019 Analyzed: 12/06/2019								
Specific Conductance (EC)	0.00420	0.00500	mmhos/cm							
<b>Duplicate (B9L0608-DUP1)</b>		<b>Source: Y912096-01</b>			Prepared: 12/06/2019 Analyzed: 12/06/2019					
Specific Conductance (EC)	0.0696	0.00500	mmhos/cm		0.0710			1.99	25	

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Project Number: [none]

Project: N Colorado 24-13 8

### 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.



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Jen Pellegrini, Project Manager