



April 30, 2015

LT Environmental, Inc.

Eric Lang

4600 West 60th Avenue

Arvada

CO 80003

**Project Name - Emerald J. Sand Unit**

**Project Number - 028415003**

Attached are your analytical results for Emerald J. Sand Unit received by Origins Laboratory, Inc. April 23, 2015. This project is associated with Origins project number X504281-01.

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

LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**CROSS REFERENCE REPORT**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01	X504281-01	Soil	April 23, 2015 12:17	04/23/2015 16:00
SS02	X504281-02	Soil	April 23, 2015 12:19	04/23/2015 16:00
SS03	X504281-03	Soil	April 23, 2015 12:21	04/23/2015 16:00
SS04	X504281-04	Soil	April 23, 2015 12:26	04/23/2015 16:00
SS05	X504281-05	Soil	April 23, 2015 12:28	04/23/2015 16:00
SS06	X504281-06	Soil	April 23, 2015 12:33	04/23/2015 16:00
SS07	X504281-07	Soil	April 23, 2015 12:36	04/23/2015 16:00
SS08	X504281-08	Soil	April 23, 2015 12:39	04/23/2015 16:00
SS09	X504281-09	Soil	April 23, 2015 12:42	04/23/2015 16:00
SS10	X504281-10	Soil	April 23, 2015 12:45	04/23/2015 16:00

Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BG01	X504281-11	Soil	April 23, 2015 12:55	04/23/2015 16:00

Origins Laboratory, Inc.



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Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

# ORIGINS

LABORATORY, INC

X504281

www.originslaboratory.com

page 1 of 1

Client: LTE

Project Manager: Eric Long

Address: 4100 W 60th ave

Project Name: Emerald J. Sand unit

Arvada, CO

Project Number: 028415003

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

Samples Collected By: D. Steinbock

Email Address: elong@itenv.com

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis				Turnaround Time:	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa #	Other	DRO/GRO	BTEX	SAF		EC
S501	4/23/15	12:17	2	X				X				X	X	X	X	1
S502		12:19	1													2
S503		12:21	1													3
S504		12:26	1													4
S505		12:28	1													5
S506		12:33	1													6
S507		12:36	1													7
S508		12:39	1													8
S509		12:42	1													9
S510		12:45	1													10
BG01	4/23/15	12:55	1													11
Relinquished By: _____ Date: _____ Time: _____																
Relinquished By: <u>DJH</u> Date: <u>4/23/15</u> Time: <u>1600</u>																
Received By: <u>off</u> Date: <u>4/23/15</u> Time: <u>1600</u>																
Date Results Needed: _____																

Temp Received: 131

Date Results Needed

Origins Laboratory, Inc.

Jeff Pellgrini

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4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: XS04281

Client: LTE

Client Project ID: Emerald J. Sand Unit

Checklist Completed by: Jeff Smith

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

Date/time completed: 4/24/15

Airbill #: NA

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

Cooler Number/Temperature: 113.1 °C 1 °C 1 °C (Describe) \_\_\_\_\_ °C

Thermometer ID: 7203

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

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

Reviewed by (Project Manager) [Signature]

4/27/15  
Date/Time Reviewed

Origins Laboratory, Inc.

[Signature]

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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

## SS01

4/23/2015 12:17:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc. X504281-01 (Soil)

### BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	111 %	70-130			"	"	"
Surrogate: Toluene-d8	100 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	99.2 %	70-130			"	"	"

### GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	ND	50.0	"	"	"	"	"

Surrogate: o-Terphenyl	78.1 %	59-131			"	"	"
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### pH in Soil by EPA 9045D

pH	8.22		pH Units	1	5D28005	04/28/2015	04/28/2015
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### SAR Metals by SW846 3050B/6010C

Calcium	2590	27.5	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	2010	33.0	"	"	"	"	"
Sodium	192	27.5	"	"	"	"	"

Origins Laboratory, Inc.



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Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**SS01**

**4/23/2015 12:17:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-01 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	0.689		none	1	1475229		04/30/2015	
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.0810		mmhos/cm	1	5D28006	04/28/2015	04/28/2015	
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Origins Laboratory, Inc.



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Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

## SS02

4/23/2015 12:19:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc. X504281-02 (Soil)

### BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	108 %	70-130			"	"	"
Surrogate: Toluene-d8	97.4 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	106 %	70-130			"	"	"

### GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	ND	50.0	"	"	"	"	"

Surrogate: o-Terphenyl	88.0 %	59-131			"	"	"
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### pH in Soil by EPA 9045D

pH	7.41		pH Units	1	5D28005	04/28/2015	04/28/2015
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### SAR Metals by SW846 3050B/6010C

Calcium	2360	27.3	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	1730	32.8	"	"	"	"	"
Sodium	232	27.3	"	"	"	"	"

Origins Laboratory, Inc.



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**SS02**

**4/23/2015 12:19:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-02 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	0.884		none	1	1475229		04/30/2015	
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.130		mmhos/cm	1	5D28006	04/28/2015	04/28/2015	
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Origins Laboratory, Inc.



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Project: Emerald J. Sand Unit

## SS03

4/23/2015 12:21:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc. X504281-03 (Soil)

### BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	108 %	70-130			"	"	"
Surrogate: Toluene-d8	96.7 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	104 %	70-130			"	"	"

### GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	157	50.0	"	"	"	"	"

Surrogate: o-Terphenyl	92.0 %	59-131			"	"	"
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### pH in Soil by EPA 9045D

pH	8.41		pH Units	1	5D28005	04/28/2015	04/28/2015
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### SAR Metals by SW846 3050B/6010C

Calcium	1760	23.6	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	1150	28.3	"	"	"	"	"
Sodium	119	23.6	"	"	"	"	"

Origins Laboratory, Inc.



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4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**SS03**

**4/23/2015 12:21:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-03 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	0.542		none	1	1475229		04/30/2015	
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.0777		mmhos/cm	1	5D28006	04/28/2015	04/28/2015	
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Origins Laboratory, Inc.



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LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Eric Lang

Project Number: 028415003

Project: Emerald J. Sand Unit

## SS04

4/23/2015 12:26:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc.

X504281-04 (Soil)

### BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4

108 %

70-130

"

"

"

Surrogate: Toluene-d8

97.5 %

70-130

"

"

"

Surrogate: 4-Bromofluorobenzene

106 %

70-130

"

"

"

### GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	ND	50.0	"	"	"	"	"

Surrogate: o-Terphenyl

76.6 %

59-131

"

"

"

### pH in Soil by EPA 9045D

pH	8.52		pH Units	1	5D28005	04/28/2015	04/28/2015
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### SAR Metals by SW846 3050B/6010C

Calcium	2250	25.5	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	1620	30.6	"	"	"	"	"
Sodium	260	25.5	"	"	"	"	"

Origins Laboratory, Inc.



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Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**SS04**

**4/23/2015 12:26:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-04 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	1.02	none	1	1475229	04/30/2015
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.106	mmhos/cm	1	5D28006	04/28/2015	04/28/2015
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Origins Laboratory, Inc.



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4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

## SS05

4/23/2015 12:28:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc. X504281-05 (Soil)

### BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	108 %	70-130			"	"	"
Surrogate: Toluene-d8	97.4 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	109 %	70-130			"	"	"

### GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	ND	50.0	"	"	"	"	"

Surrogate: o-Terphenyl	74.0 %	59-131			"	"	"
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### pH in Soil by EPA 9045D

pH	8.42		pH Units	1	5D28005	04/28/2015	04/28/2015
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### SAR Metals by SW846 3050B/6010C

Calcium	2820	27.4	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	2030	32.9	"	"	"	"	"
Sodium	371	27.4	"	"	"	"	"

Origins Laboratory, Inc.



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4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**SS05**

**4/23/2015 12:28:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-05 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	1.30	none	1	1475229	04/30/2015
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.170	mmhos/cm	1	5D28006	04/28/2015	04/28/2015
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4600 West 60th Avenue

Arvada CO 80003

Eric Lang

Project Number: 028415003

Project: Emerald J. Sand Unit

SS06

4/23/2015 12:33:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X504281-06 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4

109 %

70-130

"

"

"

Surrogate: Toluene-d8

98.1 %

70-130

"

"

"

Surrogate: 4-Bromofluorobenzene

108 %

70-130

"

"

"

## GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	ND	50.0	"	"	"	"	"

Surrogate: o-Terphenyl

80.7 %

59-131

"

"

"

## pH in Soil by EPA 9045D

pH	8.95		pH Units	1	5D28005	04/28/2015	04/28/2015
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## SAR Metals by SW846 3050B/6010C

Calcium	3270	27.9	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	1790	33.4	"	"	"	"	"
Sodium	722	27.9	"	"	"	"	"

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Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**SS06**

**4/23/2015 12:33:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-06 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	2.52		none	1	1475229		04/30/2015	
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.147		mmhos/cm	1	5D28006	04/28/2015	04/28/2015	
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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

SS07

4/23/2015 12:36:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X504281-07 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	112 %	70-130			"	"	"
Surrogate: Toluene-d8	98.3 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	114 %	70-130			"	"	"

**GRO (TVPH)/DRO (TEPH)by EPA 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	1290	50.0	"	"	"	"	"

Surrogate: o-Terphenyl	117 %	59-131			"	"	"
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**pH in Soil by EPA 9045D**

pH	9.22		pH Units	1	5D28005	04/28/2015	04/28/2015
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**SAR Metals by SW846 3050B/6010C**

Calcium	7540	24.0	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	1460	28.8	"	"	"	"	"
Sodium	375	24.0	"	"	"	"	"

Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**SS07**

**4/23/2015 12:36:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-07 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	1.03	none	1	1475229		04/30/2015
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.157	mmhos/cm	1	5D28006	04/28/2015	04/28/2015
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Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

SS08

4/23/2015 12:39:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X504281-08 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	113 %	70-130			"	"	"
Surrogate: Toluene-d8	96.4 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	113 %	70-130			"	"	"

**GRO (TVPH)/DRO (TEPH)by EPA 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	247	50.0	"	"	"	"	"

Surrogate: o-Terphenyl	92.0 %	59-131			"	"	"
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**pH in Soil by EPA 9045D**

pH	9.13		pH Units	1	5D28005	04/28/2015	04/28/2015
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**SAR Metals by SW846 3050B/6010C**

Calcium	12100	25.7	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	1650	30.9	"	"	"	"	"
Sodium	309	25.7	"	"	"	"	"

Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**SS08**

**4/23/2015 12:39:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-08 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	0.701	none	1	1475229		04/30/2015
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.170	mmhos/cm	1	5D28006	04/28/2015	04/28/2015
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Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

## SS09

4/23/2015 12:42:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc. X504281-09 (Soil)

### BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	110 %	70-130			"	"	"
Surrogate: Toluene-d8	96.5 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	105 %	70-130			"	"	"

### GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	127	50.0	"	"	"	"	"

Surrogate: o-Terphenyl	87.4 %	59-131			"	"	"
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### pH in Soil by EPA 9045D

pH	9.18		pH Units	1	5D28005	04/28/2015	04/28/2015
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### SAR Metals by SW846 3050B/6010C

Calcium	4480	23.3	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	963	27.9	"	"	"	"	"
Sodium	180	23.3	"	"	"	"	"

Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**SS09**

**4/23/2015 12:42:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-09 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	0.636	none	1	1475229		04/30/2015
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.0909	mmhos/cm	1	5D28006	04/28/2015	04/28/2015
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Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

## SS10

4/23/2015 12:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc. X504281-10 (Soil)

### BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5D28008	04/28/2015	04/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	109 %	70-130			"	"	"
Surrogate: Toluene-d8	97.4 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	108 %	70-130			"	"	"

### GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	5D28007	04/28/2015	04/28/2015
Diesel (C10-C28)	ND	50.0	"	"	"	"	"

Surrogate: o-Terphenyl	86.7 %	59-131			"	"	"
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### pH in Soil by EPA 9045D

pH	9.20		pH Units	1	5D28005	04/28/2015	04/28/2015
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### SAR Metals by SW846 3050B/6010C

Calcium	13400	26.1	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	2580	31.3	"	"	"	"	"
Sodium	511	26.1	"	"	"	"	"

Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

**SS10**

**4/23/2015 12:45:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**GEL Laboratories, LLC**  
**X504281-10 (Soil)**

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	1.06	none	1	1475229		04/30/2015
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.170	mmhos/cm	1	5D28006	04/28/2015	04/28/2015
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Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

BG01

4/23/2015 12:55:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X504281-11 (Soil)**

**pH in Soil by EPA 9045D**

pH	8.97		pH Units	1	5D28005	04/28/2015	04/28/2015
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**SAR Metals by SW846 3050B/6010C**

Calcium	27600	24.9	mg/kg dry	1	1474153	04/27/2015	04/27/2015
Magnesium	4190	29.9	"	"	"	"	"
Sodium	337	24.9	"	"	"	"	"

**Sodium Adsorption Ratio**

Sodium Adsorption Ratio	0.499		none	1	1475229		04/30/2015
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.141		mmhos/cm	1	5D28006	04/28/2015	04/28/2015
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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 5D28008 - EPA 5030 (soil)**

**Blank (5D28008-BLK1)**

Prepared: 04/28/2015 Analyzed: 04/28/2015

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5	105	70-130				
Surrogate: Toluene-d8	62		"	62.5	98.9	70-130				
Surrogate: 4-Bromofluorobenzene	64		"	62.5	102	70-130				

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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 5D28008 - EPA 5030 (soil)**

**Blank (5D28008-BLK2)**

Prepared: 04/28/2015 Analyzed: 04/28/2015

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5	108		70-130			
Surrogate: Toluene-d8	60		"	62.5	96.5		70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5	102		70-130			

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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5D28008 - EPA 5030 (soil)</b>										
<b>LCS (5D28008-BS1)</b>					Prepared: 04/28/2015 Analyzed: 04/28/2015					
Benzene	0.104	0.002	mg/kg	0.100		104	77.1-124			
Toluene	0.101	0.002	"	0.100		101	74.5-128			
Ethylbenzene	0.100	0.002	"	0.100		100	66.4-127			
m,p-Xylene	0.201	0.004	"	0.200		100	76.6-124			
o-Xylene	0.101	0.002	"	0.100		101	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	70-130			

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Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5D28008 - EPA 5030 (soil)</b>										
<b>LCS (5D28008-BS2)</b>					Prepared: 04/28/2015 Analyzed: 04/28/2015					
Benzene	0.095	0.002	mg/kg	0.100		95.3	77.1-124			
Toluene	0.089	0.002	"	0.100		89.4	74.5-128			
Ethylbenzene	0.092	0.002	"	0.100		92.2	66.4-127			
m,p-Xylene	0.183	0.004	"	0.200		91.6	76.6-124			
o-Xylene	0.093	0.002	"	0.100		93.2	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		105	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.7	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 5D28008 - EPA 5030 (soil)**

Matrix Spike (5D28008-MS1)		Source: X504281-01			Prepared: 04/28/2015 Analyzed: 04/28/2015					
Benzene	0.102	0.002	mg/kg	0.100	ND	102	71.8-126			
Toluene	0.099	0.002	"	0.100	ND	98.6	65.1-130			
Ethylbenzene	0.095	0.002	"	0.100	ND	95.0	62.2-130			
m,p-Xylene	0.190	0.004	"	0.200	ND	95.0	46.5-137			
o-Xylene	0.099	0.002	"	0.100	ND	99.0	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	69		ug/kg	62.5		111	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.1	70-130			

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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 5D28008 - EPA 5030 (soil)**

Matrix Spike (5D28008-MS2)		Source: X504316-01			Prepared: 04/28/2015 Analyzed: 04/28/2015					
Benzene	0.099	0.002	mg/kg	0.100	ND	99.1	71.8-126			
Toluene	0.094	0.002	"	0.100	ND	94.4	65.1-130			
Ethylbenzene	0.102	0.002	"	0.100	ND	102	62.2-130			
m,p-Xylene	0.203	0.004	"	0.200	ND	101	46.5-137			
o-Xylene	0.102	0.002	"	0.100	ND	102	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		104	70-130			
Surrogate: Toluene-d8	62		"	62.5		98.6	70-130			
Surrogate: 4-Bromofluorobenzene	67		"	62.5		108	70-130			

Origins Laboratory, Inc.



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4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 5D28008 - EPA 5030 (soil)**

Matrix Spike Dup (5D28008-MSD1)		Source: X504281-01			Prepared: 04/28/2015 Analyzed: 04/28/2015					
Benzene	0.105	0.002	mg/kg	0.100	ND	105	71.8-126	3.45	11.3	
Toluene	0.105	0.002	"	0.100	ND	105	65.1-130	6.52	15.4	
Ethylbenzene	0.102	0.002	"	0.100	ND	102	62.2-130	6.91	19.6	
m,p-Xylene	0.204	0.004	"	0.200	ND	102	46.5-137	6.92	19.2	
o-Xylene	0.105	0.002	"	0.100	ND	105	54.2-134	6.17	17.9	
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5		109	70-130			
Surrogate: Toluene-d8	66		"	62.5		105	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		103	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 5D28008 - EPA 5030 (soil)**

Matrix Spike Dup (5D28008-MSD2)		Source: X504316-01			Prepared: 04/28/2015 Analyzed: 04/28/2015					
Benzene	0.102	0.002	mg/kg	0.100	ND	102	71.8-126	2.57	11.3	
Toluene	0.096	0.002	"	0.100	ND	96.5	65.1-130	2.24	15.4	
Ethylbenzene	0.103	0.002	"	0.100	ND	103	62.2-130	0.430	19.6	
m,p-Xylene	0.203	0.004	"	0.200	ND	101	46.5-137	0.0888	19.2	
o-Xylene	0.103	0.002	"	0.100	ND	103	54.2-134	0.801	17.9	
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	61		"	62.5		98.3	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		105	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

## Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control

### Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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## Extractable Petroleum Hydrocarbons by 8015C - 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 5D28007 - EPA 3580

#### Blank (5D28007-BLK1)

Prepared: 04/28/2015 Analyzed: 04/28/2015

Gasoline (C6-C10)	ND	50.0	mg/kg							
Diesel (C10-C28)	ND	50.0	"							
Surrogate: o-Terphenyl	43		"	50.0		85.9	59-131			

#### LCS (5D28007-BS1)

Prepared: 04/28/2015 Analyzed: 04/28/2015

Gasoline (C6-C10)	939	50.0	mg/kg	1000		93.9	59-133			
Diesel (C10-C28)	969	50.0	"				64-121			
Surrogate: o-Terphenyl	51		"	50.0		102	59-131			

#### Matrix Spike (5D28007-MS1)

Source: X504281-01

Prepared: 04/28/2015 Analyzed: 04/28/2015

Gasoline (C6-C10)	961	50.0	mg/kg	1000	ND	96.1	57-139			
Diesel (C10-C28)	1000	50.0	"		16.5		53-125			
Surrogate: o-Terphenyl	49		"	50.0		98.0	59-131			

#### Matrix Spike Dup (5D28007-MSD1)

Source: X504281-01

Prepared: 04/28/2015 Analyzed: 04/28/2015

Gasoline (C6-C10)	957	50.0	mg/kg	1000	ND	95.7	57-139	0.338	20	
Diesel (C10-C28)	987	50.0	"		16.5		53-125	1.56	20	
Surrogate: o-Terphenyl	51		"	50.0		102	59-131			

Origins Laboratory, Inc.



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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Eric Lang  
Project Number: 028415003  
Project: Emerald J. Sand Unit

## Classical Chemistry Parameters - Quality Control Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5D28005 - NO PREP</b>										
<b>Duplicate (5D28005-DUP1)</b>		<b>Source: X504281-01</b>			Prepared: 04/28/2015 Analyzed: 04/28/2015					
pH	8.28		pH Units		8.22			0.727	25	
<b>Batch 5D28006 - NO PREP</b>										
<b>Blank (5D28006-BLK1)</b>		Prepared: 04/28/2015 Analyzed: 04/28/2015								
Specific Conductance (EC)	0.00210		mmhos/cm							
<b>Duplicate (5D28006-DUP1)</b>		<b>Source: X504281-01</b>			Prepared: 04/28/2015 Analyzed: 04/28/2015					
Specific Conductance (EC)	0.0768		mmhos/cm		0.0810			5.32	25	

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**SAR Metals by SW846 3050B/6010C - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1474153 - SW846 3050B</b>										
<b>BLANK (1203306830-BLK)</b>					Prepared: 04/27/2015 Analyzed: 04/27/2015					
Sodium	ND	24.9	mg/kg				-			U
Magnesium	ND	29.9	"				-			U
Calcium	9.23	24.9	"				-			J
<b>LCS (1203306831-BKS)</b>					Prepared: 04/27/2015 Analyzed: 04/27/2015					
Sodium	483	24.7	mg/kg	494		97.7	80-120			
Magnesium	481	29.6	"	494		97.3	80-120			
Calcium	488	24.7	"	494		98.8	80-120			
<b>DUP (1203306832 D)</b>					<b>Source: X504281-01</b>		Prepared: 04/27/2015 Analyzed: 04/27/2015			
Magnesium	1900	33.1	mg/kg dry		2010		0-20	5.36	20	
Calcium	2440	27.6	"		2590		0-20	6.04	20	
Sodium	175	27.6	"		192		0-20	9.41	20	
<b>MS (1203306833 S)</b>					<b>Source: X504281-01</b>		Prepared: 04/27/2015 Analyzed: 04/27/2015			
Calcium	3090	27.0	mg/kg dry	541	2590	91.1	75-125			
Magnesium	3110	32.4	"	541	2010	205	75-125			
Sodium	693	27.0	"	541	192	92.6	75-125			
<b>PS (1203308088 S)</b>					<b>Source: X504281-01</b>		Prepared: 04/27/2015 Analyzed: 04/28/2015			
Magnesium	27.5	0.339	mg/kg dry	5000		123	80-120			

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### Notes and Definitions

- U Result not detected above the detection limit
- J Greater than the detection limit but less than the reporting limit
- 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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