



August 21, 2014

Olsson Associates

James Hix

4690 Table Mountain Drive

Golden

CO 80403

Project Name - Nelson - Whiting Antelope Field
Spill

Project Number - 014 -

Attached are your analytical results for Nelson - Whiting Antelope Field Spill received by Origins Laboratory, Inc. August 20, 2014. This project is associated with Origins project number X408183-01.

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.

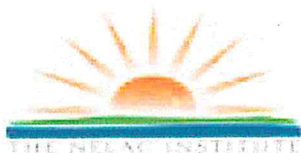
The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

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

Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
CS-1	X408183-01	Soil	August 19, 2014 8:30	08/20/2014 12:00
CS-4	X408183-02	Soil	August 19, 2014 8:42	08/20/2014 12:00
CS-5	X408183-03	Soil	August 19, 2014 8:47	08/20/2014 12:00
CS-6	X408183-04	Soil	August 19, 2014 8:53	08/20/2014 12:00
CS-7	X408183-05	Soil	August 19, 2014 8:59	08/20/2014 12:00

J. Hix ok'ed that GRO be reported by 8260. ndm

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

page 1 of 1

X468183

ORIGINS





Project Manager: JAMES HIX

Project Name: NELSON - Working Antares Field Site

Project Number: 014 -

Samples Collected By: James Hix

Client:	OLSSON ASSOCIATES
Address:	4140 TABLE MTN. / NW 6, SUITE 201 GOWEN, CO 80403
Telephone Number:	303.237.2072
Email Address:	l.h.v@olssonassociates.co

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative					Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summ #	Other			
CS-1	8/19/14	8:30	1	X						X			X	1
CS-4	8/19/14	8:42	1	X						X			X	2
CS-5	8/19/14	8:47	1	Y						X			X	3
CS-6	8/19/14	8:53	1	X						X			X	4
CS-7	8/19/14	8:59	1	X						X			X	5
														6
														7
														8
														9
														10
Relinquished By: 	Date: 8/19/14	Time: 4:35 PM	Received By: 	Date: 8/19/14	Time: 11:25	Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> Standard <input checked="" type="checkbox"/>								
Relinquished By: 	Date: 8/19/14	Time: 12:00	Received By: 	Date: 8/19/14	Time: 12:00									

Date Results Needed 9/1/2000

Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X408183

Client: Olsson

Client Project ID: Nelson - Whiting Antelope Field Spill

Checklist Completed by: Joseph Smith

Shipped Via: H/D
(UPS, FedEx, Hand Delivered, Pick up, etc.)

Date/time completed: 8/20/14 1200

Airbill #: NA

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

Cooler Number/Temperature: 112 °C 1 °C 1 °C 1 °C

Thermometer ID: 1002

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"/>	<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 ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water — is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input type="checkbox"/>	<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 analytes 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 type="checkbox"/>	<input type="checkbox"/>	<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)

08-21-14 1246
Date/Time Reviewed

Origins Laboratory, Inc.

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Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

CS-1

8/19/2014 8:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X408183-01 (Soil)

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

Diesel (C10-C28)	299	50.0	mg/kg	1	4H20012	08/20/2014	08/21/2014
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Surrogate: o-Terphenyl	93.9 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	108	5.00	mg/kg	25	4H20011	08/20/2014	08/21/2014
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Benzene	ND	0.0500	"	"	"	"	"
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Toluene	ND	0.0500	"	"	"	"	"
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Ethylbenzene	ND	0.0500	"	"	"	"	"
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Xylenes, total	ND	0.0500	"	"	"	"	"
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Surrogate: 1,2-Dichloroethane-d4	114 %	70-130			"	"	"
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Surrogate: Toluene-d8	119 %	70-130			"	"	"
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Surrogate: 4-Bromofluorobenzene	106 %	70-130			"	"	"
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Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

Olsson Associates
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Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

CS-4

8/19/2014 8:42:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X408183-02 (Soil)

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

Diesel (C10-C28)	ND	50.0	mg/kg	1	4H20012	08/20/2014	08/21/2014
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Surrogate: o-Terphenyl	92.0 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	1.20	0.200	mg/kg	1	4H20011	08/20/2014	08/21/2014
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Benzene	ND	0.0020	"	"	"	"	"
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Toluene	ND	0.0020	"	"	"	"	"
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Ethylbenzene	ND	0.0020	"	"	"	"	"
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Xylenes, total	0.0071	0.0020	"	"	"	"	"
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Surrogate: 1,2-Dichloroethane-d4	99.0 %	70-130			"	"	08/21/2014
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Surrogate: Toluene-d8	108 %	70-130			"	"	"
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Surrogate: 4-Bromofluorobenzene	105 %	70-130			"	"	"
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Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

CS-5

8/19/2014 8:47:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X408183-03 (Soil)

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

Diesel (C10-C28)	111	50.0	mg/kg	1	4H20012	08/20/2014	08/21/2014	
Surrogate: o-Terphenyl	88.5 %	59-131			"	"	"	

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	4.02	0.200	mg/kg	1	4H20011	08/20/2014	08/21/2014	
Benzene	ND	0.0020	"	"	"	"	"	
Toluene	0.0023	0.0020	"	"	"	"	"	
Ethylbenzene	0.0027	0.0020	"	"	"	"	"	
Xylenes, total	0.0314	0.0020	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4	98.9 %	70-130			"	"	08/21/2014	
Surrogate: Toluene-d8	103 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"	

Origins Laboratory, Inc.



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Olsson Associates
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Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

CS-6

8/19/2014 8:53:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X408183-04 (Soil)

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

Diesel (C10-C28)	113	50.0	mg/kg	1	4H20012	08/20/2014	08/21/2014
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Surrogate: o-Terphenyl	89.4 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	2.57	0.200	mg/kg	1	4H20011	08/20/2014	08/21/2014
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Benzene	ND	0.0020	"	"	"	"	"
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Toluene	0.0044	0.0020	"	"	"	"	"
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Ethylbenzene	ND	0.0020	"	"	"	"	"
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Xylenes, total	0.0416	0.0020	"	"	"	"	"
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Surrogate: 1,2-Dichloroethane-d4	105 %	70-130			"	"	"
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Surrogate: Toluene-d8	110 %	70-130			"	"	"
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Surrogate: 4-Bromofluorobenzene	106 %	70-130			"	"	"
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Origins Laboratory, Inc.



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Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

CS-7

8/19/2014 8:59:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X408183-05 (Soil)

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

Diesel (C10-C28)	323	50.0	mg/kg	1	4H20012	08/20/2014	08/21/2014
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Surrogate: o-Terphenyl	90.0 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	113	5.00	mg/kg	25	4H20011	08/20/2014	08/21/2014
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Benzene	ND	0.0500	"	"	"	"	"
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Toluene	0.167	0.0500	"	"	"	"	"
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Ethylbenzene	0.0970	0.0500	"	"	"	"	"
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Xylenes, total	0.906	0.0500	"	"	"	"	"
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Surrogate: 1,2-Dichloroethane-d4	110 %	70-130			"	"	"
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Surrogate: Toluene-d8	115 %	70-130			"	"	"
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Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"
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Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

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 4H20011 - EPA 5030 (soil)

Blank (4H20011-BLK1)

Prepared: 08/20/2014 Analyzed: 08/20/2014

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							
Benzene	ND	0.0020	"							
Toluene	ND	0.0020	"							
Ethylbenzene	ND	0.0020	"							
Xylenes, total	ND	0.0020	"							
Surrogate: 1,2-Dichloroethane-d4	66.0		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	64.9		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	63.0		"	62.5		101	70-130			

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

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 4H20011 - EPA 5030 (soil)

LCS (4H20011-BS1)

Prepared: 08/20/2014 Analyzed: 08/20/2014

Benzene	0.0928	0.0020	mg/kg	0.100		92.8	77.1-124			
Toluene	0.0933	0.0020	"	0.100		93.3	74.5-128			
Ethylbenzene	0.0824	0.0020	"	0.100		82.4	66.4-127			
m,p-Xylene	0.167	0.0040	"	0.200		83.3	76.6-124			
o-Xylene	0.0823	0.0020	"	0.100		82.3	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	67.0		ug/kg	62.5		107	70-130			
Surrogate: Toluene-d8	65.7		"	62.5		105	70-130			
Surrogate: 4-Bromofluorobenzene	64.3		"	62.5		103	70-130			

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Golden CO 80403

James Hix
Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

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 4H20011 - EPA 5030 (soil)

LCS Dup (4H20011-BSD1)

Prepared: 08/20/2014 Analyzed: 08/20/2014

Benzene	0.107	0.0020	mg/kg	0.100	107	77.1-124	14.5	20	
Toluene	0.109	0.0020	"	0.100	109	74.5-128	15.2	20	
Ethylbenzene	0.0944	0.0020	"	0.100	94.4	66.4-127	13.6	20	
m,p-Xylene	0.186	0.0040	"	0.200	93.1	76.6-124	11.1	20	
o-Xylene	0.0948	0.0020	"	0.100	94.8	76.6-124	14.1	20	
Surrogate: 1,2-Dichloroethane-d4	65.4		ug/kg	62.5	105	70-130			
Surrogate: Toluene-d8	65.8		"	62.5	105	70-130			
Surrogate: 4-Bromofluorobenzene	64.5		"	62.5	103	70-130			

Origins Laboratory, Inc.



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Golden CO 80403

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Project Number: 014 -
Project: Nelson - Whiting Antelope Field Spill

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 8015M - 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 4H20012 - EPA 3580

Blank (4H20012-BLK1)					Prepared: 08/20/2014 Analyzed: 08/20/2014					
Diesel (C10-C28)	ND	50.0	mg/kg							
Surrogate: o-Terphenyl	43		g	50.0		85.1	59-131			
LCS (4H20012-BS1)					Prepared: 08/20/2014 Analyzed: 08/20/2014					
Diesel (C10-C28)	947	50.0	mg/kg	1000		94.7	64-121			
Surrogate: o-Terphenyl	44		g	50.0		88.8	59-131			
LCS Dup (4H20012-BSD1)					Prepared: 08/20/2014 Analyzed: 08/20/2014					
Diesel (C10-C28)	914	50.0	mg/kg	1000		91.4	64-121	3.53	20	
Surrogate: o-Terphenyl	43		g	50.0		86.0	59-131			

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

Olsson Associates

4690 Table Mountain Drive

Golden CO 80403

James Hix

Project Number: 014 -

Project: Nelson - Whiting Antelope Field Spill

Notes and Definitions

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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Noelle Doyle Mathis, President