



November 11, 2016

Mr. Jacob Evans  
Noble Energy, Inc.  
1600 Broadway, Suite 2200  
Denver, Colorado 80202

**RE: Source Excavation Report - No Further Action Recommendation  
Roukema #5-1  
Produced Water Release  
40.334251 / -104.581237  
SW1/4 SW1/4 SEC.5 T4N R64W 6PM  
WELD COUNTY, COLORADO  
API # 05-123-11909  
Spill ID 446759**

Dear Mr. Evans,

Eagle Environmental Consulting, Inc. (EAGLE) is pleased to present this Source Excavation Report - No Further Action Recommendation for the above referenced site.

## **1.0 SITE BACKGROUND**

EAGLE was requested by Noble Energy, Inc. (Noble) to perform subsurface assessment activities at the site in response to potential soil and groundwater impacts associated with a water vault removal at the Roukema #5-1 site (site). On July 18, 2016, EAGLE collected soil samples SS-01 through SS-04 and groundwater sample GW-01 following removal of the associated water vault. Groundwater was observed within the excavated area at a depth of approximately 14 feet below ground surface (bgs) at the time of the initial assessment.

Based on laboratory analytical results, additional remediation was required. The following narrative details source excavation activities that were completed at the site.

## **2.0 SITE DESCRIPTION**

The Roukema #5-1 site is located within the southwest quarter of the southwest quarter of Section 5, Township 4 north, Range 64 west of the 6<sup>th</sup> Prime Meridian. The removed water vault was located at latitude: 40.334251 and longitude: -104.581237. A topographic site location map is presented as Figure 1. An aerial site location map is presented in Figure 2.

### **2.1 Site Hydrogeology**

The soil lithology observed beneath the release location consists of soft, silty clay from the surface to approximately 14 feet below ground surface (bgs). Depth to groundwater during excavation activities was observed at approximately 14 feet bgs.

### **3.0 SOIL EXCAVATION ACTIVITIES**

#### **3.1 Assessment Activities**

Following removal of the water vault associated with the Roukema #5-1 well on July 18, 2016, EAGLE collected soil samples, SS-01 through SS-04, to determine if adsorbed petroleum hydrocarbon impacts existed above Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 regulatory limits. A portion of each soil sample was placed in a sealable plastic bag for volatile organic compound (VOC) headspace analysis utilizing a field calibrated photoionization detector (PID). Another portion of the soil sample was placed in a 2-ounce glass jar and packed in an iced cooler for laboratory analysis. Groundwater was observed at approximately 14 feet bgs during initial assessment activities; therefore, a grab groundwater sample (GW-01) was collected from the excavation. Based on PID readings, EAGLE submitted soil samples SS-01 through SS-04 and grab groundwater sample GW-01 to Origins under standard chain of custody procedures.

Soil samples (SS-01@10', SS-02@10', SS-03@10', and SS-04@10') were analyzed for benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons – gasoline range organics (TPH-GRO), and total petroleum hydrocarbons – diesel range organics (TPH-DRO) following modified Environmental Protection Agency (EPA) Methods 8260c and 8015. Grab groundwater sample GW-01 was submitted for laboratory analysis of BTEX. The soil and groundwater samples were received within the required holding time for each laboratory analysis.

Based on laboratory analytical results:

- Soil sample SS-01@10' contained concentrations of benzene (0.276 milligrams per kilograms (mg/kg)) and total petroleum hydrocarbons (TPH) (2,803 mg/kg) exceeding applicable COGCC Table 910-1 regulatory limits of 0.17 mg/kg and 500 mg/kg, respectively.
- Soil samples SS-02@10', SS-03@10', and SS-04@10' did not contain concentrations of BTEX, naphthalene, or TPH exceeding applicable COGCC Table 910-1 regulatory limits.
- Groundwater sample GW-01 did not contain concentrations of BTEX exceeding applicable COGCC Table 910-1 regulatory limits.

Per conversations with Noble, additional excavation activities would be scheduled to remove source material.

Soil analytical results are summarized in Table 1 and presented in Figure 3. Groundwater analytical results are summarized in Table 2 and presented in Figure 4. The laboratory analytical report is included in Attachment A.

#### **3.2 Excavation Activities**

On August 1, 2016, EAGLE supervised excavation activities to remove adsorbed petroleum hydrocarbon impacts beneath the site. Wells Trucking, LLC (Wells Trucking) provided the necessary equipment and personnel to remove and transport petroleum hydrocarbon impacted soil from the site.

Waste characterization/confirmation soil samples (SS-05 through SS-07) were collected at various locations to determine the lateral and vertical extent of petroleum hydrocarbon impacts in the soil beneath and adjacent to the produced water release. A portion of each soil sample was placed in a sealable plastic

bag for VOC headspace analysis utilizing a field calibrated PID. Another portion of the soil sample was placed in a 2-ounce glass jar and packed in an iced cooler for laboratory analysis.

Based on location and PID analysis, selected jarred soil samples were submitted to Origins, under standard chain of custody procedures, for analysis of BTEX, naphthalene, TPH-GRO, and TPH-DRO following modified EPA Methods 8260c and 8015. The laboratory received the soil samples within the required holding time for each laboratory analysis.

A total of 3 confirmation soil samples (SS-05@7', SS-06@6', and SS-07@7') were submitted for laboratory analysis. Spatial location of each soil sample was recorded using a Trimble GeoXT 6000 series instrument. A site map presenting the limits of the excavation, as well as soil sample locations, is included as Figure 3.

On August 1, 2016, groundwater was observed within the excavation at a depth of approximately 11 feet bgs. Per a conversation with Noble, a grab groundwater sample was not collected since a grab groundwater sample (GW-01) was initially collected on July 18, 2016.

The final limits of the Roukema #5-1 excavation extended approximately 35 feet north to south and 19 feet east to west. The excavation was advanced to a depth of approximately 12-14 feet bgs. Approximately 210 cubic yards of soil was removed during source excavation activities, and transported offsite for disposal at an appropriately permitted facility.

Following collection of confirmatory soil samples, the excavation was backfilled with pea gravel to above the groundwater table, followed by clean structural fill and compacted to grade.

### **3.2.1 Laboratory Analytical Results**

Based on soil laboratory analytical results:

- Confirmation soil samples (SS-05@7', SS-06@6', and SS-07@7') collected from the Roukema #5-1 excavation did not contain concentrations of BTEX, naphthalene, or TPH exceeding their respective COGCC Table 910-1 regulatory limits and/or laboratory reporting limits.
- Based on the laboratory analytical results from soil samples SS-01@10', the excavation was extended laterally and vertically to a total depth of approximately 12 feet bgs. Since groundwater was observed at approximately 11.5 feet bgs during source excavation activities, groundwater sample (GW-01) acted as the confirmation sample to vertically define soil sample location SS-01@10'. Soil samples SS-05@7', SS-06@6', and SS-07@7' were collected as lateral confirmatory samples.

Excavation soil analytical results are summarized in Table 1 and presented in Figure 3. The laboratory analytical reports for the soil samples collected during source removal activities at the Roukema #5-1 site are included in Attachment A.

## 4.0 CONCLUSIONS

Based on the information presented in this report, EAGLE concludes the following:

- Soil sample SS-01@10', collected from the side wall of the water vault removal excavation on July 18, 2016, contained concentrations of benzene and TPH exceeding applicable COGCC Table 910-1 regulatory limits.
- Grab groundwater sample GW-01, collected from the base of the water vault removal excavation on July 18, 2016, did not contain concentrations of BTEX exceeding applicable COGCC Table 910-1 regulatory limits.
- Approximately 210 cubic yards of soil was removed from the Roukema #5-1 excavation on August 1, 2016.
- Based on the laboratory analytical results from soil sample SS-01@10', the excavation was extended laterally and vertically to a total depth of approximately 12 feet bgs. Since groundwater was observed at approximately 11.5 feet bgs during source excavation activities, confirmation soil samples were not collected to vertically define soil sample location SS-01@10'. Soil samples SS-05@7', SS-06@6', and SS-07@6' were collected as lateral confirmatory samples.
- Confirmation soil samples (SS-05@7', SS-06@6', and SS-07@6') collected from the Roukema #5-1 excavation did not contain concentrations of BTEX, naphthalene, or TPH exceeding applicable COGCC Table 910-1 regulatory limits and/or laboratory reporting limits.

## 5.0 RECOMMENDATIONS

Based on the information presented in this report, EAGLE recommends the following:

- No further assessment or remediation appears warranted for the Roukema #5-1 produced water release at this time.

EAGLE sincerely appreciates the opportunity to provide our services. If you have any questions or require further information, please contact us at (303) 433-0479.

Sincerely,

**EAGLE ENVIRONMENTAL CONSULTING, INC.**



Andrew Newberry  
Project Geologist



Robin Lockwood  
Project Scientist

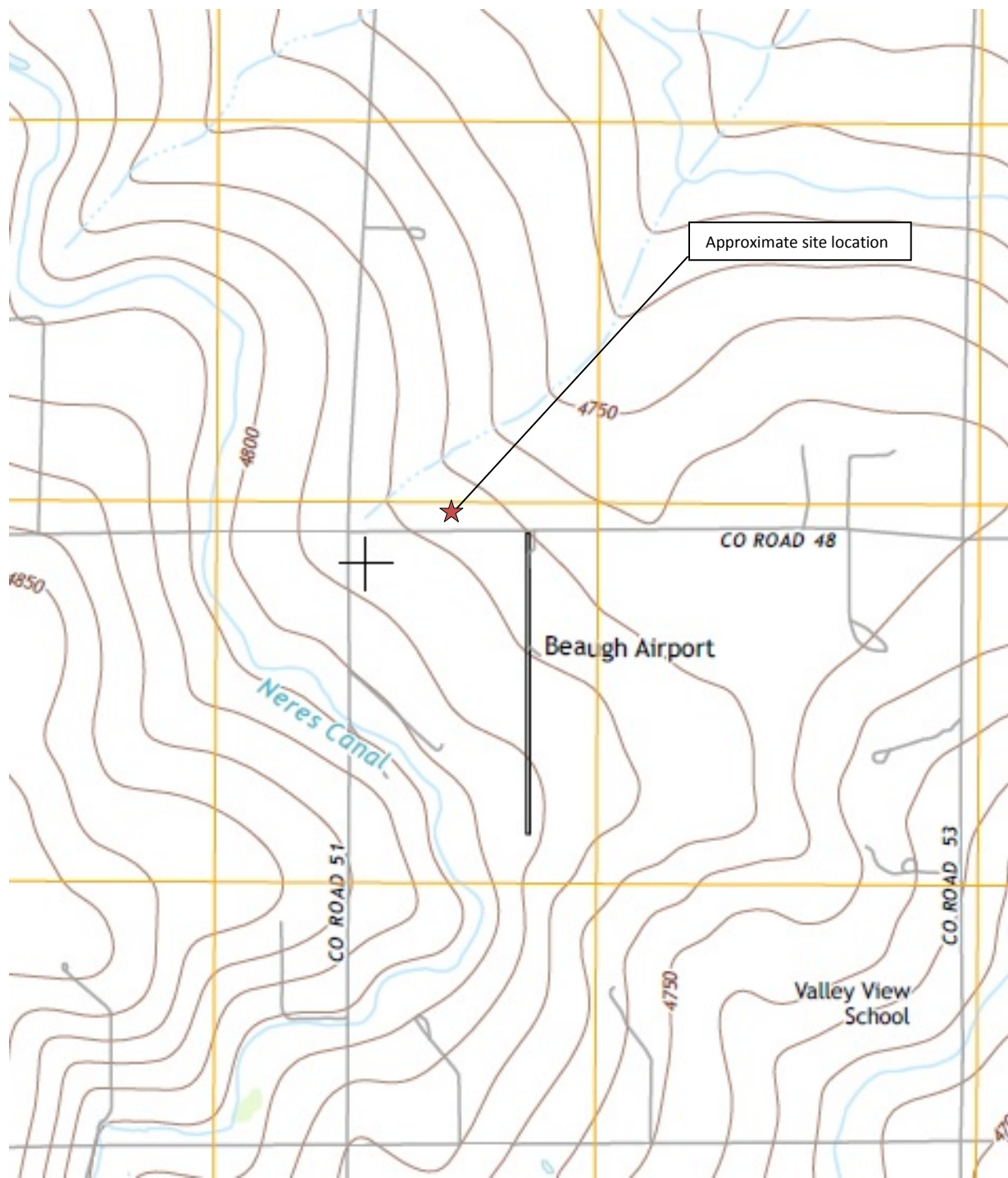
## **FIGURES**

**Figure 1: Topographic Site Location Map**

**Figure 2: Aerial Site Location Map**

**Figure 3: Soil Sample Analytical Map**

**Figure 4: Groundwater Sample Analytical Map**



**Topographic Site Location Map**

Roukema #5-1

Produced Water Release

40.334251 / -104.581237

SW¼ SW¼ SEC.5 T4N R64W 6PM

Weld County, Colorado

API # 05-123-11909



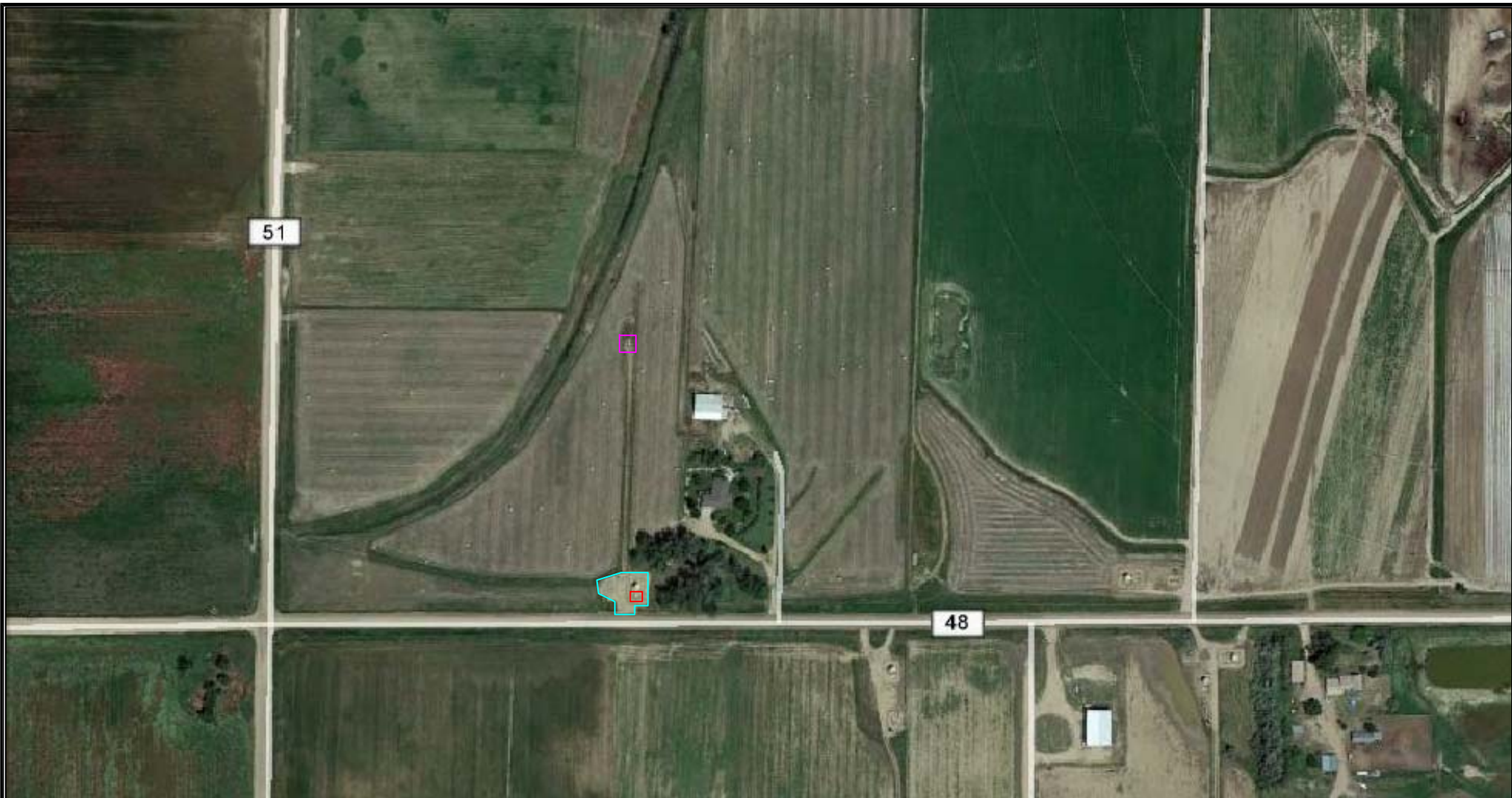
Source: USGS 7.5 Minute Topographic Map, Valley View School, CO Quadrangle 2013

**Figure 1**



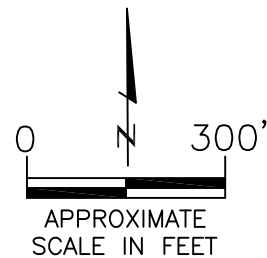
**EAGLE**  
ENVIRONMENTAL  
CONSULTING, INC.





#### LEGEND

- ROUKEMA #5-1 TANK BATTERY
- ROUKEMA #5-1 WELL HEAD
- APPROXIMATE LOCATION OF WATER VAULT REMOVAL



#### AERIAL SITE LOCATION MAP

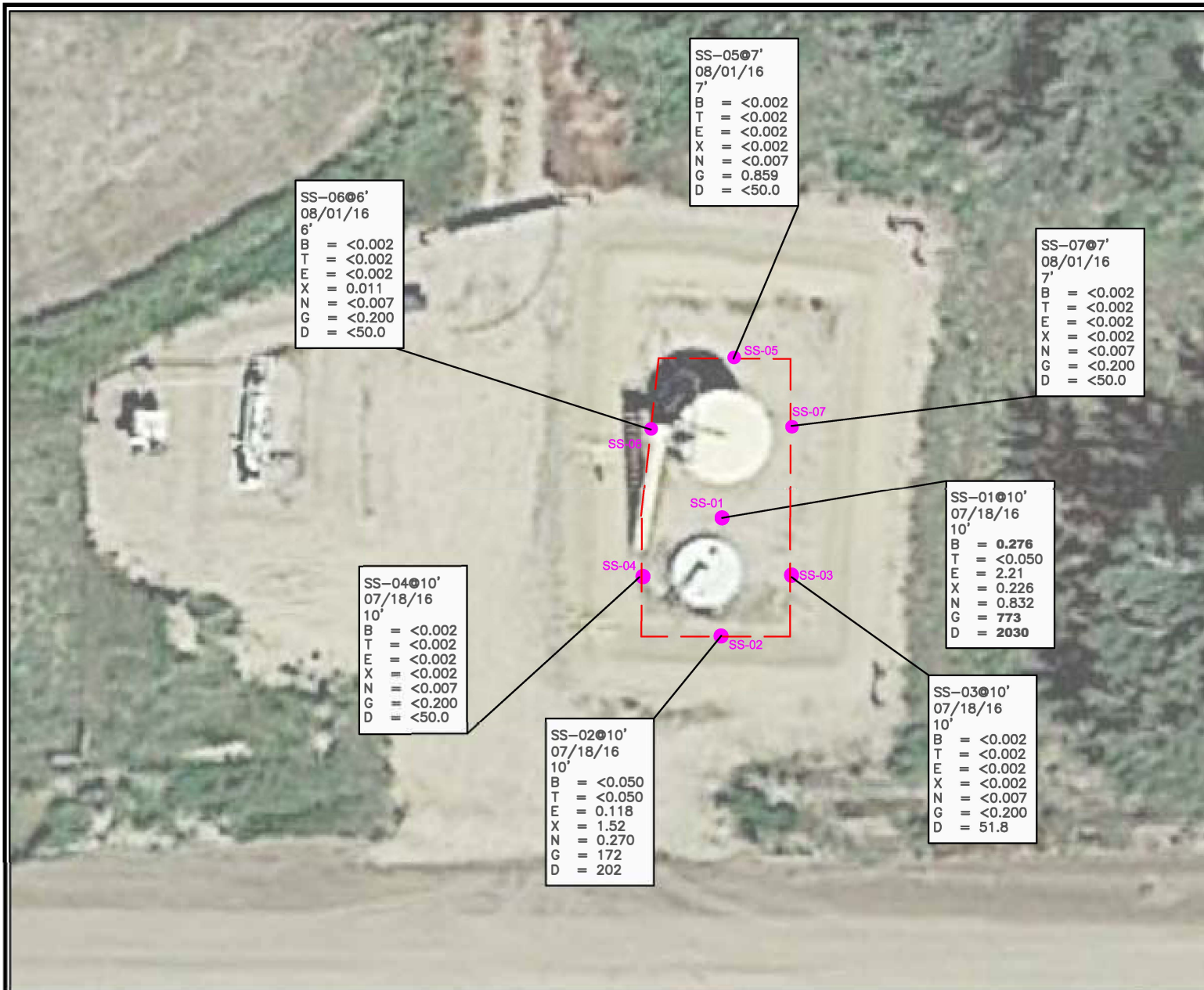
ROUKEMA #5-1  
 PRODUCED WATER RELEASE  
 40.334251 / -104.581237  
 SW1/4 SW1/4 SEC.5 T4N R64W 6PM  
 WELD COUNTY, COLORADO  
 API # 05-123-11909

DATE: 07/18/16

FIG. NO. 2  
 DRAWN BY: ar



**EAGLE**  
 ENVIRONMENTAL  
 CONSULTING, INC.  
 4101 INCA STREET, DENVER, CO 80211  
 Ph: 303-433-0479 • F: 303-325-5449



#### LEGEND

--- APPROXIMATE EXCAVATION BOUNDARIES

● SS-02 APPROXIMATE LOCATION OF SOIL SAMPLES  
SUBMITTED FOR LABORATORY ANALYSIS

#### PARAMETERS

##### SAMPLE LOCATION

DATE  
DEPTH (FEET)  
B = BENZENE (mg/kg)  
T = TOLUENE (mg/kg)  
E = ETHYLBENZENE (mg/kg)  
X = TOTAL XYLENES (mg/kg)  
N = NAPHTHALENE (mg/kg)  
G = TPH-GRO (mg/kg)  
D = TPH-DRO (mg/kg)

mg/kg = MILLIGRAMS PER KILOGRAM

TPH-GRO = TOTAL PETROLEUM HYDROCARBONS - GASOLINE  
RANGE ORGANICS

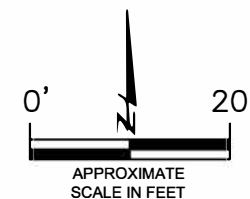
TPH-DRO = TOTAL PETROLEUM HYDROCARBONS - DIESEL  
RANGE ORGANICS

NOTE: VALUES PRESENTED WITH A LESS THAN SYMBOL (<)  
DID NOT CONTAIN CONCENTRATIONS AT OR ABOVE  
LABORATORY DETECTION LIMITS

VALUES PRESENTED IN **BOLD** TYPEFACE CONTAIN  
CONCENTRATIONS EXCEEDING COGCC TABLE 910-1  
REGULATORY LIMITS.

COGCC - COLORADO OIL AND GAS CONSERVATION  
COMMISSION

NOTE: AERIAL DOES NOT REFLECT CURRENT  
SITE CONDITIONS. SITE UNDER DECOMMISSIONING.  
FACILITIES NOT OBSERVED ONSITE DURING  
TIME OF ASSESSMENT.



APPROXIMATE  
SCALE IN FEET

#### SOIL SAMPLE ANALYTICAL MAP

ROUKEMA #5-1

PRODUCED WATER RELEASE

40.334251/-104.581237

SW1/4 SW1/4 SEC.5 T4N R64W 6PM

WELD COUNTY, COLORADO

API # 05-123-11909

DATE: 11/10/16

FIG.  
NO.  
3

DRAWN BY:  
or



**EAGLE**  
ENVIRONMENTAL  
CONSULTING, INC.  
4101 INCA STREET, DENVER, CO 80211  
Ph: 303-433-0479 F: 303-325-5449





GW-01  
07/18/16  
B = <4.00  
T = <4.00  
E = 16.1  
X = 153

**LEGEND**

--- APPROXIMATE EXCAVATION BOUNDARIES

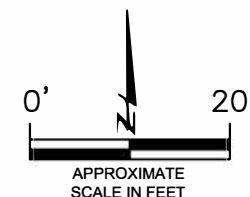
● GW-01 APPROXIMATE LOCATION OF GROUNDWATER  
SAMPLE SUBMITTED FOR LABORATORY  
ANALYSIS

**PARAMETERS**

SAMPLE LOCATION  
DATE  
B = BENZENE (ug/l)  
T = TOLUENE (ug/l)  
E = ETHYLBENZENE (ug/l)  
X = TOTAL XYLENES (ug/l)

ug/l = MICROGRAMS PER LITER

NOTE: AERIAL DOES NOT REFLECT CURRENT  
SITE CONDITIONS. SITE UNDER  
DECOMMISSIONING. FACILITIES NOT OBSERVED  
ONSITE DURING TIME OF ASSESSMENT.



GROUNDWATER SAMPLE ANALYTICAL MAP  
ROUKEMA #5-1  
PRODUCED WATER RELEASE  
40.334251/-104.581237  
SW1/4 SW1/4 SEC.5 T4N R64W 6PM  
WELD COUNTY, COLORADO  
API # 05-123-11909

DATE: 11/10/16

FIG.  
NO.  
  
4

DRAWN BY:  
  
or



**EAGLE**  
ENVIRONMENTAL  
CONSULTING, INC.  
4101 INCA STREET, DENVER, CO 80211  
Ph: 303-433-0479 • F: 303-325-5449

## **TABLES**

**Table 1:     Soil Analytical Results Summary**

**Table 2:     Groundwater Analytical Results Summary**

TABLE 1  
SOIL ANALYTICAL RESULTS SUMMARY  
ROUKEMA #5-1  
PRODUCED WATER RELEASE  
40.334251 / -104.581237  
SW¼ SW¼ SEC.5 T4N R64W 6PM  
WELD COUNTY, COLORADO  
API # 05-123-11909

Sample Location (Latitude/Longitude)	Date	Approximate Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Naphthalene (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)
<b>COGCC Table 910-1 Regulatory Limits (mg/kg)</b>			<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>23</b>	<b>500</b>	
SS-01 @ 10' (40.334269 / -104.581234)	07/18/16	10	<b>0.276</b>	<0.050	2.21	0.266	0.832	<b>773</b>	<b>2030</b>
SS-02 @ 10' (40.334223 / -104.581234)	07/18/16	10	<0.050	<0.050	0.118	1.52	0.270	172	202
SS-03 @ 10' (40.334249 / -104.581201)	07/18/16	10	<0.002	<0.002	<0.002	<0.002	<0.007	<0.200	51.8
SS-04 @ 10' (40.334250 / -104.581278)	07/18/16	10	<0.002	<0.002	<0.002	<0.002	<0.007	<0.200	<50.0
SS-05 @ 7' (40.334327 / -104.581228)	08/01/16	7	<0.002	<0.002	<0.002	<0.002	<0.007	0.859	<50.0
SS-06 @ 6' (40.334300 / -104.581267)	08/01/16	6	<0.002	<0.002	<0.002	0.011	<0.007	<0.200	<50.0
SS-07 @ 7' (40.334300 / -104.581206)	08/01/16	7	<0.002	<0.002	<0.002	<0.002	<0.007	<0.200	<50.0
COGCC = Colorado Oil and Gas Conservation Commission mg/kg = milligrams per kilogram  TPH-GRO = Total Petroleum Hydrocarbons - Gasoline Range Organics TPH-DRO = Total Petroleum Hydrocarbons - Diesel Range Organics Note: Values presented in <b>bold</b> contained concentration exceeding COGCC Table 910-1 regulatory limits. Values presented with a less than symbol (<) did not contain concentrations at or above the laboratory reporting limit.									



**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS SUMMARY**  
**ROUKEMA #5-1**  
**PRODUCED WATER RELEASE**  
**40.334251 / -104.581237**  
**SW¼ SW¼ SEC.5 T4N R64W 6PM**  
**WELD COUNTY, COLORADO**  
**API # 05-123-11909**

Sample Location (Latitude/Longitude)	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
<b>COGCC Table 910-1 Regulatory Limits (µg/L)</b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1400</b>
GW-01 (40.334255 / -104.581235)	07/18/16	<4.00	<4.00	16.1	153
COGCC = Colorado Oil and Gas Conservation Commission µg/L - micrograms per liter Note: Values presented with a less than symbol (<) indicate concentrations were not observed at or above the laboratory reporting limit.					

## **ATTACHMENT A**

### **Laboratory Analytical Reports**





July 19, 2016

Eagle Environmental Consulting, Inc.

Martin C Eckert III

4101 Inca Street

Denver

CO 80211

**Project Name - Noble - Roukema # 5-1**

**Project Number - [none]**

Attached are your analytical results for Noble - Roukema # 5-1 received by Origins Laboratory, Inc. July 18, 2016. This project is associated with Origins project number X607190-01.

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

Eagle Environmental Consulting, Inc.

4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-01 @ 10'	X607190-01	Soil	July 18, 2016 11:30	07/18/2016 13:15
SS-02 @ 10'	X607190-02	Soil	July 18, 2016 11:35	07/18/2016 13:15
SS-03 @ 10'	X607190-03	Soil	July 18, 2016 11:40	07/18/2016 13:15
SS-04 @ 10'	X607190-04	Soil	July 18, 2016 11:45	07/18/2016 13:15
GW-01	X607190-05	Water	July 18, 2016 11:20	07/18/2016 13:15

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.*

Jen Pellegrini For Noelle Doyle Mathis, President



Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: X607190

Client: Eagle

Client Project ID: Roukema # 5-1

Checklist Completed by: JEP Smith

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

Date/time completed: 7/18/14

Airbill #: NA

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

Cooler Number/Temperature: 1 / 13.2 °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"/>		<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"/>		
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"/>			<u>HCL</u>
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.

[Signature]  
Reviewed by (Project Manager)

7/18/14  
Date/Time Reviewed

Origins Laboratory, Inc.

Jefe Pellegrini

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.

Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

SS-01 @ 10'

7/18/2016 11:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X607190-01 (Soil)

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

Diesel (C10-C28)	2030	50.0	mg/kg	1	B6G1802	07/18/2016	07/18/2016
------------------	------	------	-------	---	---------	------------	------------

Surrogate: o-Terphenyl	77.2 %	59-131			"	"	"
------------------------	--------	--------	--	--	---	---	---

## GBTEX + Napthalene by 8260C

Gasoline Range Hydrocarbons	773	50.0	mg/kg	250	B6G1801	07/18/2016	07/18/2016
Benzene	0.276	0.050	"	25	"	"	07/18/2016
Toluene	ND	0.050	"	"	"	"	" U
Ethylbenzene	2.21	0.050	"	"	"	"	"
Xylenes, total	0.266	0.050	"	"	"	"	"
Napthalene	0.832	0.175	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	100 %	70-130			"	"	07/18/2016
Surrogate: Toluene-d8	111 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	93.6 %	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.



Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

SS-02 @ 10'

7/18/2016 11:35:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X607190-02 (Soil)

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

Diesel (C10-C28)	202	50.0	mg/kg	1	B6G1802	07/18/2016	07/18/2016
------------------	-----	------	-------	---	---------	------------	------------

Surrogate: o-Terphenyl	69.0 %	59-131			"	"	"
------------------------	--------	--------	--	--	---	---	---

## GBTEX + Napthalene by 8260C

Gasoline Range Hydrocarbons	172	5.00	mg/kg	25	B6G1801	07/18/2016	07/18/2016	
Benzene	ND	0.050	"	"	"	"	"	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	0.118	0.050	"	"	"	"	"	
Xylenes, total	1.52	0.050	"	"	"	"	"	
Napthalene	0.270	0.175	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	106 %	70-130			"	"	"
Surrogate: Toluene-d8	104 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	111 %	70-130			"	"	"

Origins Laboratory, Inc.



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4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

## SS-03 @ 10'

7/18/2016 11:40:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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## Origins Laboratory, Inc. X607190-03 (Soil)

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

Diesel (C10-C28)	51.8	50.0	mg/kg	1	B6G1802	07/18/2016	07/18/2016
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Surrogate: o-Terphenyl	63.4 %	59-131			"	"	"
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### GBTEX + Napthalene by 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B6G1801	07/18/2016	07/18/2016	U
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U
Napthalene	ND	0.007	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	110 %	70-130			"	"	"
Surrogate: Toluene-d8	95.5 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	98.5 %	70-130			"	"	"

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Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

SS-04 @ 10'

7/18/2016 11:45:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X607190-04 (Soil)

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

Diesel (C10-C28)	ND	50.0	mg/kg	1	B6G1802	07/18/2016	07/18/2016	U
Surrogate: o-Terphenyl	71.3 %	59-131			"	"	"	

## GBTEX + Napthalene by 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B6G1801	07/18/2016	07/18/2016	U
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U
Napthalene	ND	0.007	"	"	"	"	"	U
Surrogate: 1,2-Dichloroethane-d4	109 %	70-130			"	"	"	
Surrogate: Toluene-d8	94.3 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	91.1 %	70-130			"	"	"	

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Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

## GW-01

7/18/2016 11:20:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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### Origins Laboratory, Inc. X607190-05 (Water)

#### BTEX by EPA 8260C

Benzene	ND	4.00	ug/L	4	B6G1805	07/18/2016	07/18/2016	U
Toluene	ND	4.00	"	"	"	"	"	U
Ethylbenzene	16.1	4.00	"	"	"	"	"	
Xylenes, total	153	4.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	113 %	84-121			"	"	"	
Surrogate: Toluene-d8	103 %	85-115			"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %	84-114			"	"	"	

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Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

**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 B6G1801 - EPA 5030 (soil)</b>										
<b>Blank (B6G1801-BLK1)</b>					Prepared: 07/18/2016 Analyzed: 07/18/2016					
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	0.007	"							U
Surrogate: 1,2-Dichloroethane-d4	71		ug/kg	62.5		113	70-130			
Surrogate: Toluene-d8	59		"	62.5		94.5	70-130			
Surrogate: 4-Bromofluorobenzene	57		"	62.5		91.8	70-130			

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Project Number: [none]

Project: Noble - Roukema # 5-1

**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 B6G1801 - EPA 5030 (soil)**

**Blank (B6G1801-BLK2)**

Prepared: 07/18/2016 Analyzed: 07/18/2016

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	0.007	"							U
Surrogate: 1,2-Dichloroethane-d4	71		ug/kg	62.5		113	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.8	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G1801 - EPA 5030 (soil)</b>										
<b>LCS (B6G1801-BS1)</b>					Prepared: 07/18/2016 Analyzed: 07/18/2016					
Benzene	0.106	0.002	mg/kg	0.100		106	70-130			
Toluene	0.102	0.002	"	0.100		102	70-130			
Ethylbenzene	0.084	0.002	"	0.100		83.9	70-130			
m,p-Xylene	0.172	0.004	"	0.200		86.1	70-130			
o-Xylene	0.084	0.002	"	0.100		84.3	70-130			
Naphthalene	0.087	0.007	"	0.100		87.4	70-130			
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.3	70-130			
Surrogate: 4-Bromofluorobenzene	57		"	62.5		91.3	70-130			

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Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G1801 - EPA 5030 (soil)</b>										
<b>LCS (B6G1801-BS2)</b>					Prepared: 07/18/2016 Analyzed: 07/18/2016					
Benzene	0.095	0.002	mg/kg	0.100		94.7	70-130			
Toluene	0.093	0.002	"	0.100		92.5	70-130			
Ethylbenzene	0.083	0.002	"	0.100		83.1	70-130			
m,p-Xylene	0.170	0.004	"	0.200		84.8	70-130			
o-Xylene	0.087	0.002	"	0.100		87.0	70-130			
Naphthalene	0.097	0.007	"	0.100		97.1	70-130			
Surrogate: 1,2-Dichloroethane-d4	70		ug/kg	62.5		112	70-130			
Surrogate: Toluene-d8	65		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G1801 - EPA 5030 (soil)</b>										
<b>Matrix Spike (B6G1801-MS1)</b>		<b>Source: X607179-01</b>			Prepared: 07/18/2016 Analyzed: 07/18/2016					
Benzene	0.100	0.002	mg/kg	0.100	ND	99.6	70-130			
Toluene	0.095	0.002	"	0.100	ND	95.1	70-130			
Ethylbenzene	0.079	0.002	"	0.100	ND	78.6	70-130			
m,p-Xylene	0.160	0.004	"	0.200	ND	79.8	70-130			
o-Xylene	0.079	0.002	"	0.100	ND	79.0	70-130			
Naphthalene	0.087	0.007	"	0.100	ND	86.6	70-130			
Surrogate: 1,2-Dichloroethane-d4	61		ug/kg	62.5		97.4	70-130			
Surrogate: Toluene-d8	60		"	62.5		95.9	70-130			
Surrogate: 4-Bromofluorobenzene	57		"	62.5		90.6	70-130			

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Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G1801 - EPA 5030 (soil)</b>										
<b>Matrix Spike (B6G1801-MS2)</b>		<b>Source: X607190-04</b>			Prepared: 07/18/2016 Analyzed: 07/18/2016					
Benzene	0.096	0.002	mg/kg	0.100	ND	95.6	70-130			
Toluene	0.091	0.002	"	0.100	ND	91.3	70-130			
Ethylbenzene	0.085	0.002	"	0.100	ND	84.7	70-130			
m,p-Xylene	0.171	0.004	"	0.200	ND	85.3	70-130			
o-Xylene	0.087	0.002	"	0.100	ND	86.6	70-130			
Naphthalene	0.089	0.007	"	0.100	0.002	87.1	70-130			
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

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Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G1801 - EPA 5030 (soil)</b>										
<b>Matrix Spike Dup (B6G1801-MSD1)</b>		<b>Source: X607179-01</b>			Prepared: 07/18/2016 Analyzed: 07/18/2016					
Benzene	0.102	0.002	mg/kg	0.100	ND	102	70-130	2.60	20	
Toluene	0.098	0.002	"	0.100	ND	98.2	70-130	3.25	20	
Ethylbenzene	0.081	0.002	"	0.100	ND	80.7	70-130	2.56	20	
m,p-Xylene	0.165	0.004	"	0.200	ND	82.5	70-130	3.27	20	
o-Xylene	0.082	0.002	"	0.100	ND	82.1	70-130	3.95	20	
Naphthalene	0.089	0.007	"	0.100	ND	89.0	70-130	2.78	20	
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.4	70-130			
Surrogate: 4-Bromofluorobenzene	57		"	62.5		91.3	70-130			

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Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G1801 - EPA 5030 (soil)</b>										
<b>Matrix Spike Dup (B6G1801-MSD2)</b>		<b>Source: X607190-04</b>			Prepared: 07/18/2016 Analyzed: 07/18/2016					
Benzene	0.100	0.002	mg/kg	0.100	ND	100	70-130	4.78	20	
Toluene	0.095	0.002	"	0.100	ND	95.1	70-130	4.06	20	
Ethylbenzene	0.091	0.002	"	0.100	ND	90.6	70-130	6.78	20	
m,p-Xylene	0.185	0.004	"	0.200	ND	92.3	70-130	7.84	20	
o-Xylene	0.093	0.002	"	0.100	ND	93.3	70-130	7.40	20	
Naphthalene	0.101	0.007	"	0.100	0.002	99.3	70-130	12.8	20	
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	65		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		100	70-130			

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Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G1805 - EPA 5030B (Water)</b>										
<b>Blank (B6G1805-BLK1)</b>					Prepared: 07/18/2016 Analyzed: 07/18/2016					
Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	56		"	62.5		89.6	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	84-114			

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4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

**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 B6G1805 - EPA 5030B (Water)**

**LCS (B6G1805-BS1)**

Prepared: 07/18/2016 Analyzed: 07/18/2016

Benzene	59.3	1.00	ug/L	50.0	119	73.3-129
Toluene	59.8	1.00	"	50.0	120	76.2-123
Ethylbenzene	57.9	1.00	"	50.0	116	73.6-130
m,p-Xylene	119	2.00	"	100	119	76.1-126
o-Xylene	57.3	1.00	"	50.0	115	76.6-124
Surrogate: 1,2-Dichloroethane-d4	52		"	62.5	83.6	84-121
Surrogate: Toluene-d8	63		"	62.5	101	85-115
Surrogate: 4-Bromofluorobenzene	65		"	62.5	104	84-114

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4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

**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 B6G1805 - EPA 5030B (Water)**

Matrix Spike (B6G1805-MS1)		Source: X607172-01			Prepared: 07/18/2016 Analyzed: 07/18/2016					
Benzene	63.9	1.00	ug/L	50.0	ND	128	74-130			
Toluene	65.2	1.00	"	50.0	ND	130	73-131			
Ethylbenzene	63.3	1.00	"	50.0	ND	127	76-132			
m,p-Xylene	129	2.00	"	100	0.210	129	69-139			
o-Xylene	61.8	1.00	"	50.0	ND	124	74-131			
Surrogate: 1,2-Dichloroethane-d4	54		"	62.5		86.1	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	84-114			

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4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

**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 B6G1805 - EPA 5030B (Water)**

Matrix Spike Dup (B6G1805-MSD1)		Source: X607172-01			Prepared: 07/18/2016 Analyzed: 07/18/2016					
Benzene	65.7	1.00	ug/L	50.0	ND	131	74-130	2.72	20	QM-07
Toluene	67.2	1.00	"	50.0	ND	134	73-131	3.05	20	QM-07
Ethylbenzene	65.2	1.00	"	50.0	ND	130	76-132	2.92	20	
m,p-Xylene	133	2.00	"	100	0.210	133	69-139	3.34	20	
o-Xylene	64.3	1.00	"	50.0	ND	129	74-131	4.06	20	
Surrogate: 1,2-Dichloroethane-d4	53		"	62.5		84.6	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	84-114			

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Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

## 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 B6G1802 - EPA 3580

<b>Blank (B6G1802-BLK1)</b>				Prepared: 07/18/2016 Analyzed: 07/18/2016						
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	41		"	50.0		81.9	59-131			
<b>Blank (B6G1802-BLK2)</b>				Prepared: 07/18/2016 Analyzed: 07/18/2016						
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	50		"	50.0		99.1	59-131			
<b>LCS (B6G1802-BS1)</b>				Prepared: 07/18/2016 Analyzed: 07/18/2016						
Diesel (C10-C28)	1020	50.0	mg/kg	1000		102	64-121			
Surrogate: o-Terphenyl	48		"	50.0		96.9	59-131			
<b>LCS (B6G1802-BS2)</b>				Prepared: 07/18/2016 Analyzed: 07/18/2016						
Diesel (C10-C28)	999	50.0	mg/kg	1000		99.9	64-121			
Surrogate: o-Terphenyl	48		"	50.0		95.1	59-131			
<b>Matrix Spike (B6G1802-MS1)</b>				<b>Source: X607179-01</b>		Prepared: 07/18/2016 Analyzed: 07/18/2016				
Diesel (C10-C28)	1020	50.0	mg/kg	1000	17.9	101	53-125			
Surrogate: o-Terphenyl	50		"	50.0		100	59-131			
<b>Matrix Spike (B6G1802-MS2)</b>				<b>Source: X607190-04</b>		Prepared: 07/18/2016 Analyzed: 07/18/2016				
Diesel (C10-C28)	1000	50.0	mg/kg	1000	16.5	98.8	53-125			
Surrogate: o-Terphenyl	46		"	50.0		91.3	59-131			

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.

Eagle Environmental Consulting, Inc.

4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

## 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 B6G1802 - EPA 3580

<b>Matrix Spike Dup (B6G1802-MSD1)</b>		<b>Source: X607179-01</b>			Prepared: 07/18/2016 Analyzed: 07/18/2016					
Diesel (C10-C28)	979	50.0	mg/kg	1000	17.9	96.1	53-125	4.63	20	
Surrogate: o-Terphenyl	47		"	50.0		93.1	59-131			
<b>Matrix Spike Dup (B6G1802-MSD2)</b>		<b>Source: X607190-04</b>			Prepared: 07/18/2016 Analyzed: 07/18/2016					
Diesel (C10-C28)	948	50.0	mg/kg	1000	16.5	93.2	53-125	5.76	20	
Surrogate: o-Terphenyl	46		"	50.0		92.2	59-131			

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.

4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

### Notes and Definitions

U Sample is Non-Detect.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

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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August 02, 2016

Eagle Environmental Consulting, Inc.

Martin C Eckert III

4101 Inca Street

Denver

CO 80211

**Project Name - Noble - Roukema # 5-1**

**Project Number - [none]**

Attached are your analytical results for Noble - Roukema # 5-1 received by Origins Laboratory, Inc. August 01, 2016. This project is associated with Origins project number X608007-01.

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

Eagle Environmental Consulting, Inc.

4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-05 @ 7'	X608007-01	Soil	August 1, 2016 11:50	08/01/2016 16:10
SS-06 @ 6'	X608007-02	Soil	August 1, 2016 12:20	08/01/2016 16:10
SS-07 @ 7'	X608007-03	Soil	August 1, 2016 12:30	08/01/2016 16:10

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

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page 1 of 1

X608007

**ORIGINS**  
LABORATORY, INC

Client: Eagle Environmental Consulting  
Address: 4101 Inca St  
Denver CO 80211  
Telephone Number: 303 433 0479  
Email Address: MCE3@eagle-enviro.com

Project Manager: Martin Eckert III  
Project Name: Roukema # 5-1  
Project Number: JS  
Samples Collected By:

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa			
SS-0507	8/1/16	1150	2	X					X			TFH-GRO TFH-DRO BTEX Methanol	1
SS-0606	↓	1220	2	X					X			X	2
SS-0707	↓	1230	2	X					X			X	3
													4
													5
													6
													7
													8
													9
													10

Relinquished By: [Signature]

Relinquished By: [Signature]

Date: 8/1/16

Date: 8/1/16

Time: 1600

Time: 1800

Received By: [Signature]

Received By: [Signature]

Date: 8/1/16

Date: 8/1/16

Turnaround Time:  
Same Day ☒ 24 Hr  
48 Hr ☐ 72 Hr ☐ Standard

Temp Received: 3.4

Date Results Needed: 8/11 to 8/12 (Cable)

Eagle Environmental Consulting, Inc.

4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: X608007

Client: Eagle

Client Project ID: Roukema #5-1

Checklist Completed by: Jeff Smith

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

Date/time completed: 8/1/16

Airbill #: N/A

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

Cooler Number/Temperature: 1 13.4 °C 1 °C 1 °C (Describe) 1 °C

Thermometer ID: T803

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"/>			
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 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) Jeff Smith

Date/Time Reviewed 8/1/16

Origins Laboratory, Inc.

*Jeff Pellegrini*

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.

Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

SS-05 @ 7'  
8/1/2016 11:50:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X608007-01 (Soil)

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

Diesel (C10-C28)	ND	50.0	mg/kg	1	B6H0102	08/01/2016	08/01/2016	U
Surrogate: o-Terphenyl	68.4 %	59-131			"	"	"	

## GBTEX + Napthalene by 8260C

Gasoline Range Hydrocarbons	0.859	0.200	mg/kg	1	B6G2904	08/01/2016	08/01/2016	
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U
Napthalene	ND	0.007	"	"	"	"	"	U
Surrogate: 1,2-Dichloroethane-d4	118 %	70-130			"	"	"	
Surrogate: Toluene-d8	93.0 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	98.0 %	70-130			"	"	"	

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

SS-06 @ 6'  
8/1/2016 12:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X608007-02 (Soil)

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

Diesel (C10-C28)	ND	50.0	mg/kg	1	B6H0102	08/01/2016	08/01/2016	U
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Surrogate: o-Terphenyl	77.4 %	59-131			"	"	"	
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## GBTEX + Napthalene by 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B6G2904	08/01/2016	08/01/2016	U
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	0.011	0.002	"	"	"	"	"	
Napthalene	ND	0.007	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	116 %	70-130			"	"	"	
Surrogate: Toluene-d8	95.2 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	102 %	70-130			"	"	"	

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Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

SS-07 @ 7'  
8/1/2016 12:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X608007-03 (Soil)

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

Diesel (C10-C28)	ND	50.0	mg/kg	1	B6H0102	08/01/2016	08/01/2016	U
Surrogate: o-Terphenyl	78.8 %	59-131			"	"	"	

## GBTEX + Napthalene by 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B6G2904	08/01/2016	08/01/2016	U
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U
Napthalene	ND	0.007	"	"	"	"	"	U
Surrogate: 1,2-Dichloroethane-d4	114 %	70-130			"	"	"	
Surrogate: Toluene-d8	93.9 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"	

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G2904 - EPA 5030 (soil)</b>										
<b>Blank (B6G2904-BLK1)</b>					Prepared: 07/29/2016 Analyzed: 08/01/2016					
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	0.007	"							U
Surrogate: 1,2-Dichloroethane-d4	69		ug/kg	62.5		110	70-130			
Surrogate: Toluene-d8	61		"	62.5		96.8	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	70-130			

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G2904 - EPA 5030 (soil)</b>										
<b>Blank (B6G2904-BLK2)</b>					Prepared: 07/29/2016 Analyzed: 08/01/2016					
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	0.007	"							U
Surrogate: 1,2-Dichloroethane-d4	73		ug/kg	62.5		117	70-130			
Surrogate: Toluene-d8	59		"	62.5		93.9	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.

4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

**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 B6G2904 - EPA 5030 (soil)

**LCS (B6G2904-BS1)**

Prepared: 07/29/2016 Analyzed: 08/01/2016

Benzene	0.115	0.002	mg/kg	0.100		115	70-130			
Toluene	0.110	0.002	"	0.100		110	70-130			
Ethylbenzene	0.112	0.002	"	0.100		112	70-130			
m,p-Xylene	0.227	0.004	"	0.200		114	70-130			
o-Xylene	0.110	0.002	"	0.100		110	70-130			
Naphthalene	0.089	0.007	"	0.100		88.7	70-130			
Surrogate: 1,2-Dichloroethane-d4	62		ug/kg	62.5		99.6	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.5	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.

4101 Inca Street

Denver CO 80211

Martin C Eckert III

Project Number: [none]

Project: Noble - Roukema # 5-1

**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 B6G2904 - EPA 5030 (soil)

**LCS (B6G2904-BS2)**

Prepared: 07/29/2016 Analyzed: 08/01/2016

Benzene	0.107	0.002	mg/kg	0.100		107	70-130			
Toluene	0.097	0.002	"	0.100		96.7	70-130			
Ethylbenzene	0.096	0.002	"	0.100		95.9	70-130			
m,p-Xylene	0.194	0.004	"	0.200		96.9	70-130			
o-Xylene	0.096	0.002	"	0.100		95.9	70-130			
Naphthalene	0.094	0.007	"	0.100		93.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		107	70-130			
Surrogate: Toluene-d8	59		"	62.5		94.9	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	70-130			

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G2904 - EPA 5030 (soil)

Matrix Spike (B6G2904-MS1)		Source: X607289-01			Prepared: 07/29/2016 Analyzed: 08/01/2016					
Benzene	0.114	0.002	mg/kg	0.100	ND	114	70-130			
Toluene	0.108	0.002	"	0.100	ND	108	70-130			
Ethylbenzene	0.110	0.002	"	0.100	ND	110	70-130			
m,p-Xylene	0.222	0.004	"	0.200	ND	111	70-130			
o-Xylene	0.108	0.002	"	0.100	ND	108	70-130			
Naphthalene	0.094	0.007	"	0.100	0.003	90.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.6	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	70-130			

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G2904 - EPA 5030 (soil)</b>										
<b>Matrix Spike (B6G2904-MS2)</b>		<b>Source: X607289-02</b>			Prepared: 07/29/2016 Analyzed: 08/01/2016					
Benzene	0.114	0.002	mg/kg	0.100	ND	114	70-130			
Toluene	0.104	0.002	"	0.100	ND	104	70-130			
Ethylbenzene	0.103	0.002	"	0.100	ND	103	70-130			
m,p-Xylene	0.206	0.004	"	0.200	ND	103	70-130			
o-Xylene	0.101	0.002	"	0.100	ND	101	70-130			
Naphthalene	0.072	0.007	"	0.100	ND	71.5	70-130			
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.5	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		106	70-130			

Origins Laboratory, Inc.



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Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G2904 - EPA 5030 (soil)</b>										
<b>Matrix Spike Dup (B6G2904-MSD1)</b>	<b>Source: X607289-01</b>				Prepared: 07/29/2016 Analyzed: 08/01/2016					
Benzene	0.115	0.002	mg/kg	0.100	ND	115	70-130	1.17	20	
Toluene	0.108	0.002	"	0.100	ND	108	70-130	0.222	20	
Ethylbenzene	0.108	0.002	"	0.100	ND	108	70-130	1.01	20	
m,p-Xylene	0.220	0.004	"	0.200	ND	110	70-130	0.824	20	
o-Xylene	0.107	0.002	"	0.100	ND	107	70-130	1.25	20	
Naphthalene	0.092	0.007	"	0.100	0.003	89.4	70-130	1.55	20	
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.7	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	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.



Eagle Environmental Consulting, Inc.  
4101 Inca Street  
Denver CO 80211

Martin C Eckert III  
Project Number: [none]  
Project: Noble - Roukema # 5-1

**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 B6G2904 - EPA 5030 (soil)</b>										
<b>Matrix Spike Dup (B6G2904-MSD2)</b>	<b>Source: X607289-02</b>				Prepared: 07/29/2016 Analyzed: 08/01/2016					
Benzene	0.115	0.002	mg/kg	0.100	ND	115	70-130	0.105	20	
Toluene	0.104	0.002	"	0.100	ND	104	70-130	0.192	20	
Ethylbenzene	0.103	0.002	"	0.100	ND	103	70-130	0.505	20	
m,p-Xylene	0.205	0.004	"	0.200	ND	103	70-130	0.175	20	
o-Xylene	0.101	0.002	"	0.100	ND	101	70-130	0.0594	20	
Naphthalene	0.074	0.007	"	0.100	ND	74.2	70-130	3.68	20	
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.1	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		105	70-130			

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## 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 B6H0102 - EPA 3580

#### Blank (B6H0102-BLK1)

Prepared: 08/01/2016 Analyzed: 08/01/2016

Diesel (C10-C28)	ND	50.0	mg/kg							U
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Surrogate: o-Terphenyl

44

"

50.0

88.9

59-131

#### LCS (B6H0102-BS1)

Prepared: 08/01/2016 Analyzed: 08/01/2016

Diesel (C10-C28)	1050	50.0	mg/kg	1000		105	64-121			
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Surrogate: o-Terphenyl

46

"

50.0

92.1

59-131

#### Matrix Spike (B6H0102-MS1)

Source: X607084-13

Prepared: 08/01/2016 Analyzed: 08/01/2016

Diesel (C10-C28)	1200	50.0	mg/kg	1000	314	88.5	53-125			
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Surrogate: o-Terphenyl

47

"

50.0

94.0

59-131

#### Matrix Spike Dup (B6H0102-MSD1)

Source: X607084-13

Prepared: 08/01/2016 Analyzed: 08/01/2016

Diesel (C10-C28)	1400	50.0	mg/kg	1000	314	109	53-125	15.7	20	
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Surrogate: o-Terphenyl

49

"

50.0

97.6

59-131

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Project Number: [none]

Project: Noble - Roukema # 5-1

### 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.

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