

State of Colorado  
**Oil and Gas Conservation Commission**

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109



#8502

FOR OGCC USE ONLY

Received  
5/27/2014

**SITE INVESTIGATION AND REMEDIATION WORKPLAN**

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

**CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED**

Spill or Release    Plug & Abandon    Central Facility Closure    Site/Facility Closure    Other (describe): \_\_\_\_\_

OGCC Operator Number: _____	Contact Name and Telephone: _____
Name of Operator: _____	_____
Address: _____	No: _____
City: _____ State: _____ Zip: _____	Fax: _____
API Number: _____	County: _____
Facility Name: _____	Facility Number: _____
Well Name: _____	Well Number: _____
Location: (QtrQtr, Sec, Twp, Rng, Meridian): _____ Latitude: _____ Longitude: _____	

**TECHNICAL CONDITIONS**

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): \_\_\_\_\_

Site Conditions: Is location within a sensitive area (according to Rule 901e)?      Y      N      If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): \_\_\_\_\_

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: \_\_\_\_\_

Potential receptors (water wells within 1/4 mi, surface waters, etc.): \_\_\_\_\_

\_\_\_\_\_

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):	Extent of Impact:	How Determined:
Soils	_____	_____
Vegetation	_____	_____
Groundwater	_____	_____
Surface Water	_____	_____

**REMEDIALTION WORKPLAN**

Describe initial action taken (if previously provided, refer to that form or document):

\_\_\_\_\_

Describe how source is to be removed:

\_\_\_\_\_

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

\_\_\_\_\_



Tracking Number: 2148159  
Name of Operator: Noble Energy, Inc.  
OGCC Operator No: 100322  
Received Date: 5/27/2014  
Well Name & No: \_\_\_\_\_  
Facility Name & No: \_\_\_\_\_

**REMEDIATION WORKPLAN (Cont.)**

\_\_\_\_\_

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required?                      Y                      N                      If yes, describe:

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

**IMPLEMENTATION SCHEDULE**

Date Site Investigation Began: \_\_\_\_\_ Date Site Investigation Completed: \_\_\_\_\_ Date Remediation Plan Submitted: \_\_\_\_\_  
Remediation Start Date: \_\_\_\_\_ Anticipated Completion Date: \_\_\_\_\_ Actual Completion Date: \_\_\_\_\_

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: \_\_\_\_\_ Signed: \_\_\_\_\_  
Title: \_\_\_\_\_ Date: \_\_\_\_\_

---

OGCC Approved: \_\_\_\_\_ Title: Northeast EPS Date: 5/27/2014

# **EXCAVATION REPORT**

Orr E 19-05  
Weld County, Colorado

## **Prepared For:**

Noble Energy, Inc.  
1625 Broadway, Suite 2000  
Denver, CO 80202



## **Prepared by:**

Tasman Geosciences, LLC  
6899 Pecos Street, Unit C  
Denver, CO 80221



**May 23, 2014**

May 23, 2014

Mr. Jacob Evans  
Noble Energy Inc.  
1625 Broadway, Suite 2000  
Denver, CO 80202

Subject:       **Excavation Report**  
                  Orr E 19-05  
                  API # 05-123-26397, Release Tracking # 2148159  
                  Weld County, Colorado

Dear Mr. Evans:

Below please find a copy of the above referenced Excavation Report for the Orr E 19-05 Tank Battery site in Weld County, Colorado. This report describes soil assessment activities conducted to confirm the removal of impacted soil proximate to former produced water vault and secondary containment berm.

## **Introduction**

The purpose of this document is to describe the removal of impacted soil and subsequent confirmation sampling activities at the Orr E 19-05 Tank Battery (Site). The activities described below were performed to remove impacted material encountered during the investigation of the produced water vault and confirm via laboratory analytical methods that said materials impacted above applicable regulatory standards were removed.

## **Facility Background**

The Site is located approximately 1.0 miles west of Highway 85 and the city of Greeley, Colorado in Weld County, as illustrated in Figure 1. The Site is surrounded by agricultural land and is located approximately 250 feet west of the Greeley 2 Canal. The Site legal description is the NW ¼ of the NW ¼ of Section 19, Township 6N, Range 65W.

The Site water vault was observed to have overflowed on March 11, 2014, and impacts were noted surrounding the water vault. Site production equipment was shut in.

## **Field Activities**

On March 11, 2014, sidewalls of the water vault were exposed. Four sidewall samples were collected and submitted to eAnalytics Laboratory in Loveland, CO for analysis of benzene, toluene,

ethylbenzene and total xylenes (collectively referred to as BTEX), naphthalene, and total petroleum hydrocarbons-gasoline range organics (TPH-GRO) using USEPA Method 8260B and TPH-diesel range organics (TPH-DRO) using USEPA Method 8015. Laboratory analysis indicated concentrations of benzene, TPH-GRO and TPH-DRO in excess of applicable COGCC Table 910-1 standards. Excavation equipment was scheduled to be mobilized to the Site for subsequent removal of impacted soils.

Excavation activities were initiated on March 31, 2014 and continued through April 1, 2014. Soil removal activities produced an excavation with final dimensions of approximately 18 feet (ft.) by 30 ft. by 13 ft. below ground surface (bgs) (Figure 2). Approximately 260 cubic yards of impacted soil was removed from the Site and taken to North Weld Landfill for disposal, and clean fill soil was then returned to the site. Sixteen soil samples were collected from the sidewalls of the excavation and one soil sample was taken from the base of the excavation at 13 feet bgs. Samples were field screened with a photoionization detector (PID), and four perimeter and one base sample with PID values ranging between 3.4 ppm and 19.6 ppm were retained for laboratory confirmation analysis. Samples were submitted to eAnalytics Laboratory in Loveland, Colorado, for analysis of BTEX, naphthalene, TPH-GRO, and TPH-DRO.

Groundwater was not encountered within the excavation.

## Results

Soil confirmation sample analysis indicated that confirmation samples collected from the final extent of the excavation were below applicable Colorado Oil and Gas Conservation Commission (COGCC) standards. These data are presented in Table 1. Groundwater was not encountered during excavation activities.

## Conclusions

Laboratory data indicate that BTEX, naphthalene, TPH-GRO, and TPH-DRO concentrations are below the applicable COGCC Table 910-1 standards for soil samples collected from the final extent of the excavation. Based on field observations and laboratory analytical confirmation, impacted media with constituent concentrations above the applicable standards was successfully removed from the Site. As such, a no further action designation for the Site is appropriate.

## Remarks

The discussion and conclusions contained in this report represent the professional opinions of Tasman Geosciences, LLC. These opinions are based on currently available information and are arrived at in accordance with currently accepted geologic and engineering practices. Tasman appreciates the opportunity to provide Noble with the services described above. Please feel free to contact me with any questions or comments at 303-487-1228.

This report was prepared by TASMAN GEOSCIENCES, LLC.

A handwritten signature in blue ink, appearing to read 'Daniel Wade'.

Date 05/23/14

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Daniel Wade P.G.  
Senior Geologist – Assessment & Remediation

Attached:

Table 1 – Soil Analytical Data

Figure 1 – Site Location Map

Figure 2 – Excavation Extent & Soil Sample Locations

Appendices – Laboratory Analytical Reports

## Tables

**TABLE 1 - SOIL DATA**  
**NOBLE ENERGY, INC. - ORR E 19-05**  
**FIELD AND LABORATORY ANALYTICAL DATA**

Date	Soil Sample ID	PID (ppm)	Laboratory Results	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	Naphthalene (mg/kg)
			COGCC Standard	0.17	85	100	175	500		23
3/11/14	SS01@4'	0.7	Result=	0.087	0.147	0.018	0.251	<50	<50	<0.01
3/11/14	SS02@3'	1.1	Result =	6.12	48.2	11.1	115	1863	489	2.01
3/11/14	SS03@5'	3.4	Result=	0.038	0.041	0.010	0.133	<50	<50	0.013
3/11/14	SS04@4'	1.3	Result =	0.017	0.027	<0.01	0.081	<50	<50	<0.01
3/31/14	SS01@11'	1124	--	--	--	--	--	--	--	--
3/31/14	SS03@11'	17	Result=	<0.01	<0.01	<0.01	<0.01	<50	<50	<0.01
3/31/14	SS04@11'	341	--	--	--	--	--	--	--	--
3/31/14	SS05@6'	950	--	--	--	--	--	--	--	--
3/31/14	SS05@9'	1326	--	--	--	--	--	--	--	--
3/31/14	SS05@11'	373	--	--	--	--	--	--	--	--
3/31/14	SS05@13'	18	Result=	<0.01	<0.01	<0.01	<0.01	<50	<50	<0.01
3/31/14	SS06@6'	5	--	--	--	--	--	--	--	--
3/31/14	SS06@11'	4	Result=	0.07	0.013	<0.01	<0.01	<50	<50	<0.01
3/31/14	SS07@11'	307	--	--	--	--	--	--	--	--
3/31/14	SS08@11'	24	Result=	0.173	0.098	<0.01	0.015	<50	<50	<0.01
3/31/14	SS09@11'	18	Result=	<0.01	<0.01	<0.01	<0.01	<50	<50	<0.01
4/1/14	SS10@11'	20	Result=	<0.01	<0.01	<0.01	<0.01	<50	<50	<0.01

PID photoionization detector (10.6 eV lamp)

COGCC Colorado Oil and Gas Conservation Commission

mg/Kg milligrams per kilogram

ppm parts per million

-- sample was not submitted for laboratory analysis

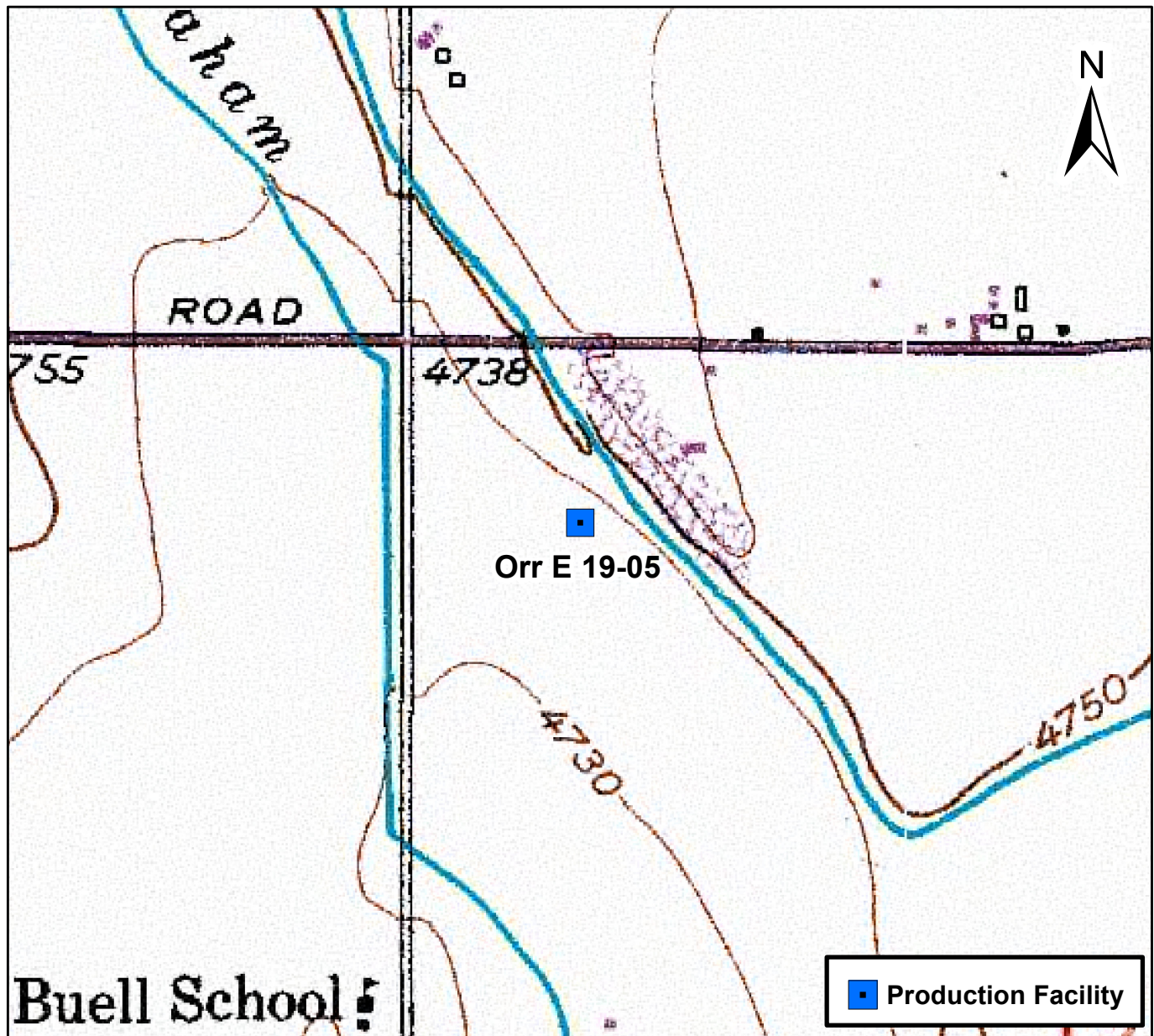
< Analytical result is less than the indicated laboratory reporting limit

Soil standards referenced from COGCC Table 910-1

Highlighted results exceed the COGCC Table 910-1 standard



## Figures



0 750 1,500  
Feet



## Figure 1

Site Location Map  
Orr E 19-05  
SWNW S19 T6N R65W  
Weld County, Colorado

Drawn By: DBA  
Date: 05/07/2014

  
Tasman Geosciences





PROJECT NO:  
 DRAWN BY: ATF  
 DATE: 5/7/2014






6899 Pecos St., Unit C  
 Denver, CO 80221

**Facility Diagram**  
 Noble Energy  
 Orr E 19-05  
 Weld County, CO

**LEGEND:**

 Soil Sample and PID Location  
 Excavation Extent (Surveyed Via Trimble Unit)

 Earthen Berm  
 Oil Tank



Scale: 1" = 12'

Excavation Extent & Soil Sample Locations  
 Figure 2

## Appendices



# Test Report



March 12, 2014

Client: Tasman Geosciences / Noble Energy

Project: Orr E 19-5

Lab ID: 899

Date Samples Received: 3/11/2014

Number of Samples: 4

Sample Condition: Samples arrived intact and in appropriate sample containers

Sample Temperature: Within acceptable range of 2-6° C, or as specified in EPA Method

The quality control procedures associated with the requested analyses were satisfactorily passed before the samples were run.

Thank you for allowing eAnalytics Laboratory to provide laboratory services for you.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Dieken".

Christopher Dieken  
Quality Assurance Manager

A handwritten signature in black ink, appearing to read "Todd Rhea".

Todd Rhea  
Laboratory Manager



Proudly certified by A2LA & The  
United States Department of Defense  
(DoD ELAP)

**eAnalytics Laboratory**

1767 Rocky Mountain Avenue Loveland CO 80538

## Chain of Custody

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WO # 899

**eANALYTICS: Environmental testing made Easy**

Page 1 of 1

## eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

The results contained within this report relate only to the items analyzed

# eANALYTICS

## LABORATORY

Client: Tasman Geosciences / Noble Energy Lab ID: 899

Project: Orr E 19-5

Analysis: Volatile Organics Method: EPA8260  
TPH EPA8260/8015

Sample Name	Benzene mg/kg	Toluene mg/kg	Ethyl- benzene mg/kg	Total Xylenes mg/kg	Naph- thalene mg/kg	TPH GRO C6-C10 mg/kg	TPH DRO C10-C28 mg/kg	Date Sampled	Date Analyzed	Lab ID
SS01 @ 4'	0.087	0.147	0.018	0.251	< 0.01	< 50	< 50	03/11/14	03/11/14	899 1
SS02 @ 3'	6.12	48.2	11.1	115	2.01	1863	489	03/11/14	03/11/14	899 2
SS03 @ 5'	0.038	0.041	0.010	0.133	0.013	< 50	< 50	03/11/14	03/11/14	899 3
SS04 @ 4'	0.017	0.027	< 0.01	0.081	< 0.01	< 50	< 50	03/11/14	03/11/14	899 4

**eAnalytics Laboratory**

1767 Rocky Mountain Avenue Loveland CO 80538

**e**ANALYTICS  
L A B O R A T O R Y

Client: Tasman Geosciences / Noble Energy

Lab ID: 899

Project: Orr E 19-5

Method: EPA8260

Sample Name	Dibromo- fluoromethane % Recovery	1,2 Dichloro- ethane-D4 % Recovery	Toluene-D8 % Recovery	Bromo- fluorobenzene % Recovery	Date Sampled	Date Analyzed	Lab ID
SS01 @ 4'	106	107	93	95	03/11/14	03/11/14	899 1
SS02 @ 3'	88	103	99	106	03/11/14	03/11/14	899 2
SS03 @ 5'	92	102	100	88	03/11/14	03/11/14	899 3
SS04 @ 4'	109	109	94	101	03/11/14	03/11/14	899 4

**eAnalytics Laboratory**

1767 Rocky Mountain Avenue Loveland CO 80538



**e**ANALYTICS  
LABORATORY

Client: Tasman Geosciences / Noble Energy

Lab ID: 899

Project: Orr E 19-5

Analysis: Volatile Organics  
TPHMethod: EPA8260  
EPA8260/8015

Sample Name	Benzene	Toluene	Ethyl- benzene	Total Xylenes	Naphth- thalene	TPH GRO C6-C10	TPH DRO C10-C28	Date Analyzed	Lab ID	
	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec			
Laboratory Control Sample	97	98	96	99	96	100	103	03/11/14	LCS	899 1
(70-130%)										
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	03/11/14	MB	899 1
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			

**eAnalytics Laboratory**

1767 Rocky Mountain Avenue Loveland CO 80538

# Test Report



March 31, 2014

Client: Tasman Geosciences / Noble Energy

Project: Orr E 19-5

Lab ID: 1046

Date Samples Received: 3/31/2014

Number of Samples: 5

Sample Condition: Samples arrived intact and in appropriate sample containers

Sample Temperature: Within acceptable range of 2-6° C, or as specified in EPA Method

The quality control procedures associated with the requested analyses were satisfactorily passed before the samples were run.

Thank you for allowing eAnalytics Laboratory to provide laboratory services for you.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Dieken".

Christopher Dieken  
Quality Assurance Manager

A handwritten signature in black ink, appearing to read "Todd Rhea".

Todd Rhea  
Laboratory Manager

**eAnalytics Laboratory**

1767 Rocky Mountain Avenue Loveland CO 80538

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WO # 1046

## eANALYTICS: Environmental testing made Easy

Page 1 of 1

## eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

The results contained within this report relate only to the items analyzed

# eANALYTICS

## L A B O R A T O R Y

Client: Tasman Geosciences / Noble Energy Lab ID: 1046

Project: Orr E 19-5

Analysis: Volatile Organics Method: EPA8260  
TPH EPA8260/8015

Sample Name	Benzene	Toluene	Ethyl- benzene	Total Xylenes	Naph- thalene	TPH GRO C6-C10	TPH DRO C10-C28	Date Sampled	Date Analyzed	Lab ID	
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
SS05 @ 13'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	03/31/14	03/31/14	1046	1
SS06 @ 11'	<b>0.070</b>	<b>0.013</b>	< 0.01	< 0.01	< 0.01	< 50	< 50	03/31/14	03/31/14	1046	2
SS03 @ 11'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	03/31/14	03/31/14	1046	3
SS08 @ 11'	<b>0.173</b>	<b>0.098</b>	< 0.01	<b>0.015</b>	< 0.01	< 50	< 50	03/31/14	03/31/14	1046	4
SS09 @ 11'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	03/31/14	03/31/14	1046	5

**eAnalytics Laboratory**

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**e**ANALYTICS  
LABORATORY

Client: Tasman Geosciences / Noble Energy

Lab ID: 1046

Project: Orr E 19-5

Method: EPA8260

Sample Name	Dibromo- fluoromethane % Recovery	1,2 Dichloro- ethane-D4 % Recovery	Toluene-D8 % Recovery	Bromo- fluorobenzene % Recovery	Date Sampled	Date Analyzed	Lab ID
SS05 @ 13'	88	92	94	103	03/31/14	03/31/14	1046 1
SS06 @ 11'	96	93	94	110	03/31/14	03/31/14	1046 2
SS03 @ 11'	94	91	111	93	03/31/14	03/31/14	1046 3
SS08 @ 11'	94	87	88	108	03/31/14	03/31/14	1046 4
SS09 @ 11'	93	108	101	87	03/31/14	03/31/14	1046 5

**eAnalytics Laboratory**

1767 Rocky Mountain Avenue Loveland CO 80538

# eANALYTICS

## LABORATORY

Client: Tasman Geosciences / Noble Energy Lab ID: 1046

Project: Orr E 19-5

Analysis: Volatile Organics Method: EPA8260  
TPH EPA8260/8015

Sample Name	Benzene	Toluene	Ethyl- benzene	Total Xylenes	Naph- thalene	TPH GRO C6-C10	TPH DRO C10-C28	Date Analyzed	Lab ID	
	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec			
Laboratory Control Sample	94	95	93	104	93	101	96	03/31/14	LCS	1046 1
(70-130%)										
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	03/31/14	MB	1046 1
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			

**eAnalytics Laboratory**

1767 Rocky Mountain Avenue Loveland CO 80538

# Test Report



April 1, 2014

Client: Tasman Geosciences / Noble Energy

Project: Orr E 19-5

Lab ID: 1055

Date Samples Received: 4/1/2014

Number of Samples: 1

Sample Condition: Samples arrived intact and in appropriate sample containers

Sample Temperature: Within acceptable range of 2-6° C, or as specified in EPA Method

The quality control procedures associated with the requested analyses were satisfactorily passed before the samples were run.

Thank you for allowing eAnalytics Laboratory to provide laboratory services for you.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Dieken".

Christopher Dieken  
Quality Assurance Manager

A handwritten signature in black ink, appearing to read "Todd Rhea".

Todd Rhea  
Laboratory Manager

**eAnalytics Laboratory**

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**e**ANALYTICS  
LABORATORY

Client: Tasman Geosciences / Noble Energy      Lab ID: 1055

Project: Orr E 19-5

Analysis: Volatile Organics      Method: EPA8260  
TPH      EPA8260/8015

Sample Name							TPH	TPH	Date Sampled	Date Analyzed	Lab ID
	Benzene	Toluene	Ethyl- benzene	Total Xylenes	Naph- thalene	TPH GRO C6-C10	C10-C28				
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
SS10 @ 11'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50		04/01/14	04/01/14	1055 1

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**e**ANALYTICS  
LABORATORY

Client: Tasman Geosciences / Noble Energy

Lab ID: 1055

Project: Orr E 19-5

Method: EPA8260

Sample Name	Dibromo- fluoromethane % Recovery	1,2 Dichloro- ethane-D4 % Recovery	Toluene-D8 % Recovery	Bromo- fluorobenzene % Recovery	Date Sampled	Date Analyzed	Lab ID
SS10 @ 11'	93	110	110	96	04/01/14	04/01/14	1055 1

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## LABORATORY

Client: Tasman Geosciences / Noble Energy Lab ID: 1055

Project: Orr E 19-5

Analysis: Volatile Organics Method: EPA8260  
TPH EPA8260/8015

Sample Name	Benzene % Rec	Toluene % Rec	Ethyl- benzene % Rec	Total Xylenes % Rec	Naph- thalene % Rec	TPH GRO C6-C10 % Rec	TPH DRO C10-C28 % Rec	Date Analyzed	Lab ID
Laboratory Control Sample	90	90	97	101	95	104	103	04/01/14	LCS 1055 1
(70-130%)									
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/01/14	MB 1055 1
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		

**eAnalytics Laboratory**

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