

FREMONT ENVIRONMENTAL INC.

May 7, 2014

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

Subject: **Excavation Report**
 Gruen 22-1
 API # 05-123-11749
 Weld County, Colorado
 Fremont Project No. C014-018

Dear Mr. Evans:

Enclosed please find a copy of the above referenced Excavation Report for the Gruen 22-1 release site in Weld County, Colorado. The enclosed report describes excavation actions to remove impacted soil from the site. Please contact me at (303) 956-8714 if you require any additional information.

Fremont appreciates the opportunity to provide this service.

Sincerely,
FREMONT ENVIRONMENTAL INC.



Paul V. Henahan, P.E.
Senior Consultant

Enclosure

EXCAVATION REPORT
NOBLE ENERGY INC.
GRUEN 22-1
WELD COUNTY, COLORADO
FREMONT PROJECT NO. C014-018
FACILITY #243957

Prepared by:

Fremont Environmental Inc.
12061 Pennsylvania Street, Suite B-101
Thornton, CO 80241
(303) 956-8714

May 7, 2014

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EXCAVATION REPORT
NOBLE ENERGY INC.
GRUEN 22-1
WELD COUNTY, COLORADO
FREMONT PROJECT NO. C014-018
FACILITY #243957

1.0 INTRODUCTION

The purpose of this document is to present information collected during the excavation of petroleum-impacted soil at the Gruen 22-1 release location in Weld County, Colorado. This three day excavation project was completed between April 17 and 22, 2014.

2.0 BACKGROUND INFORMATION

2.1 Site Location

The Gruen 22-1 site is located approximately six miles northeast of Greeley, Colorado in Weld County as shown on Figure 1. The site is located in a rural and agricultural area 0.5 miles northeast of the intersection of County Road 66 and County Road 55. The location is further described as the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 22, Township 6N, Range 64W.

2.2 Site History

The site consists of the well head and immediate surrounding area of this natural gas well. The well was drilled in 1984 to a depth of 7,081 feet. Soil impacts were recently identified during maintenance activities at this location. These soil impacts initiated this excavation effort.

3.0 FIELD ACTIVITIES

Remediation efforts consisted of the excavation of petroleum-impacted soil at this site. The soil consisted of topsoil which was underlain by sandy clay to a depth of approximately 16 feet. Ground water was not encountered during the excavation work. The excavated area is shown on Figure 2.

Excavation was initiated near the well head in the southern portion of the overall dig on April 17, 2014 and proceeded east. Excavation continued to the east and then north until clean sidewalls were encountered on both sides of the dig. The soil removal continued westward until the extent of impact was completely identified and removed on April 22, 2014.

A total of 550 cubic yards of petroleum impacted soil were removed by B&G Oilfield Services Inc. from the location over a three day period. The impacted soil was disposed of at the Waste Management Inc. Northern Colorado Landfill in Ault, Colorado as non-hazardous waste.

A photoionization detector (PID) was used to field screen soil samples during the excavation. The instrument was calibrated with a 100 ppm isobutylene standard. Based on the field screening results, 14 soil samples were collected from the side walls and floor of the excavation to confirm that impacted soil had been removed. The laboratory analyses indicated that all of these samples had concentrations that were less than the Colorado Oil and Gas Conservation Commission (COGCC) limits.

The sidewall samples were collected as grab samples near the lower portion of the excavation wall at depths of five to 15 feet. In addition, four floor samples were also collected. Since ground water was not encountered, no water samples could be collected.

The soil samples were analyzed by eAnalytics Laboratory, Inc. of Loveland, Colorado for benzene, toluene, ethylbenzene and xylenes (BTEX), naphthalene, Total Petroleum Hydrocarbons – Gasoline Range Organics (TPH-GRO) by EPA method 8260C, and TPH – Diesel Range Organics (TPH-DRO) by EPA method 8015. The laboratory reports and chain-of-custody documentation are included in Appendix A.

A summary of the laboratory data is included in Table 1. This table shows the PID value and laboratory analyses for each soil sample. In addition, a column stating whether the laboratory analyses passed or failed the COGCC limits is provided. The laboratory analyses indicated that all of the 14 soil samples collected from the sidewalls and floor achieved the COGCC Table 910-1 limits.

A daily summary of the excavation work is provided below:

April 17, 2014 (Day 1) – Excavation of the impacted area was initiated near the location of the Gruen 22-1 well head and continued to the south and then east. Petroleum impacted soil was present to a depth of approximately 16 feet. The soil consisted of sandy clay to a depth of at least 16 feet. Ground water was not present in the excavation. Approximately 210 cubic yards of impacted soil were removed using a trackhoe and transported to the landfill.

Four wall samples (1-8', 2-15', 3-6' and 4-5') and two floor samples (A-16' and B-16') were collected and submitted to the laboratory. These wall samples defined the southern and southeastern extent of the overall excavation. The floor samples collected at a depth of 16 feet delineated the maximum depth of the overall excavation. The locations of the soil samples are illustrated on Figure 2. The PID values and laboratory analyses are provided on Table 1.

April 21, 2014 (Day 2) – Excavation continued just north of the well head and moved to the east until a clean sidewall was observed on the east side of the overall dig based on PID values. Three wall samples (5-6', 6-8', and 7-8') and two floor samples (C-10' and D-9') were collected and submitted to the laboratory. These wall samples defined the northeastern and northern extent of the overall excavation. The floor samples defined the vertical extent of impacts in the northeastern portion of the dig. Approximately 300 cubic yards of impacted soil were removed and transported to the landfill. The locations of the soil samples are illustrated on Figure 2. The PID values and laboratory analyses are provided on Table 1.

April 22, 2014 (Day 3, Final Day) – Excavation to remove impacted soil continued to the northwest of the well head. Approximately 40 cubic yards of impacted soil were removed and transported to the landfill. Two wall samples (8-8' and 9-12') and one floor sample (E-14') were collected and submitted to the laboratory. These wall samples defined the northwestern and western extent of the overall excavation. The floor sample defined the vertical extent of impacts in the northwestern portion of the dig.

4.0 DISCUSSION

As demonstrated by the soil sampling, the petroleum impacted soil was removed from the site by excavation. This was confirmed by the analyses of the soil samples collected from the excavation sidewalls and floor which were below the COGCC Table 910-1 concentrations. Approximately 550 cubic yards of impacted soil were removed and transported to the landfill. Ground water was not encountered during excavation. Therefore, Noble should request a no further action (NFA) determination from the COGCC.

5.0 REMARKS

The discussion and conclusions contained in this report represent our professional opinions. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

This report was prepared by **FREMONT ENVIRONMENTAL INC.**

 For MWA

5/7/14

Date_____

Wayne Austin

Construction Consultant

Reviewed by:



5/7/14

Date_____

Paul V. Hennehan, P.E.

Senior Consultant

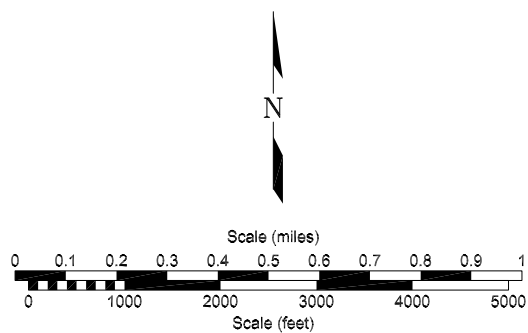
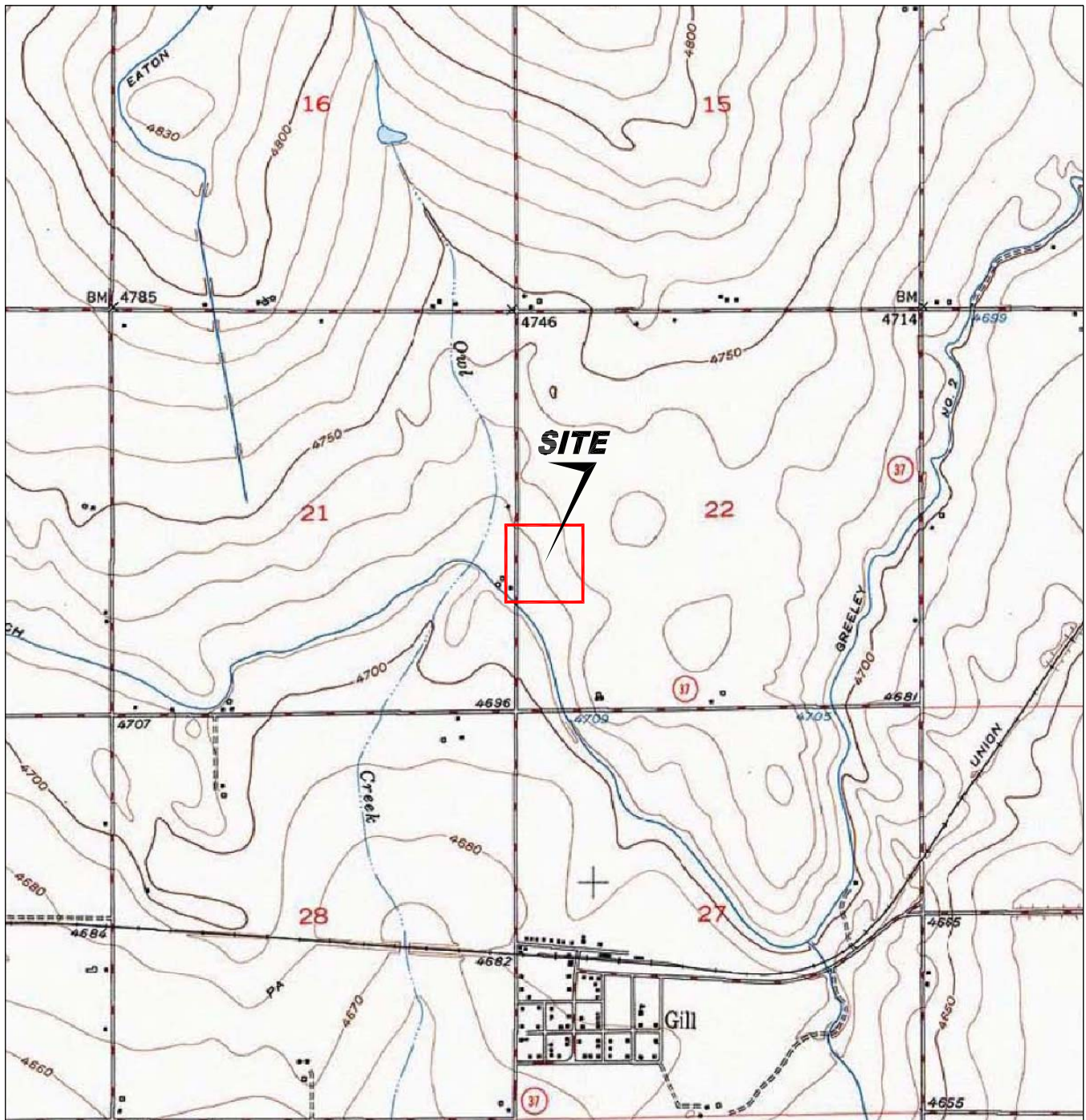
TABLE

TABLE 1
SUMMARY OF SOIL CHEMISTRY DATA
NOBLE ENERGY INC.
GRUEN 22-1, WELD COUNTY, COLORADO
FREMONT PROJECT NO. C014-018

Sample	Depth (ft)	Date Sampled	Location	Pass or Fail	PID (ppm)	Benzene mg/kg	Toluene mg/kg	Ethyl-Benzene mg/kg	Xylenes mg/kg	Naphthalene mg/kg	TPH GRO mg/kg	TPH DRO mg/kg
1-8'	8	4/17/2014	Sidewall	Pass	3	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
2-15'	15	4/17/2014	Sidewall	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
3-6'	6	4/17/2014	Sidewall	Pass	4	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
4-5'	5	4/17/2014	Sidewall	Pass	9	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
A-16'	16	4/17/2014	Floor	Pass	53	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
B-16'	16	4/17/2014	Floor	Pass	28	<0.01	<0.01	<0.01	<0.01	0.035	<50	<50
5-6'	6	4/21/2014	Floor	Pass	41	<0.01	<0.01	<0.01	<0.01	<0.01	<50	152
6-8'	8	4/21/2014	Floor	Pass	62	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
7-8'	8	4/21/2014	Floor	Pass	30	<0.01	<0.01	<0.01	<0.01	<0.01	<50	62.7
C-10'	10	4/21/2014	Floor	Pass	3	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
D-9'	9	4/21/2014	Floor	Pass	42	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
8-8'	8	4/22/2014	Floor	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
9-12'	12	4/22/2014	Floor	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
E-14'	14	4/22/2014	Sidewall	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
COGCC Table 910 Limits						0.17	85	100	175	23	500	500

Bold faced values exceed the COGCC Table 910-1 concentrations

FIGURES



USGS 7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1
SITE LOCATION MAP

Noble Gruen 22-1
NW SW Section 22, T6N, R64W
Weld County, Colorado

Project No.
C014-018

Prepared by

Drawn by
JMA

Date
4/1/14

Reviewed by

Filename
14018T






LEGEND

●	WELL LOCATION
—○—○—○—	FENCE LINE
BUILDING	BUILDING
⊗	SOIL SAMPLE LOCATION

Figure 2
SITE MAP

Noble Gruen 22-1
NW SW Section 22, T6N, R64W
Weld County, Colorado

Project No. C014-018	Prepared by JMA	Drawn by JMA	
Date 4/30/14	Reviewed by	Filename 14018Q	

APPENDIX A

LABORATORY DOCUMENTATION

Test Report



April 18, 2014

Client: Fremont Environmental / Noble Energy

Project: Gruen 22-1

Lab ID: 1188

Date Samples Received: 4/17/2014

Number of Samples: 6

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

Chain of Custody

eANALYTICS
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Chain of Custody Form

[illegible]

WO# 1188

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eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

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

eANALYTICS

LABORATORY

Client: Fremont Environmental / Noble Energy Lab ID: 1188

Project: Gruen 22-1

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
1-8'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/17/14	04/17/14	1188 1
2-15'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/17/14	04/17/14	1188 2
3-6'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/17/14	04/17/14	1188 3
4-5'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/17/14	04/17/14	1188 4
A-16'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/17/14	04/17/14	1188 5
B-16'	< 0.01	< 0.01	< 0.01	< 0.01	0.035	< 50	< 50	04/17/14	04/17/14	1188 6

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eANALYTICS
LABORATORY

Client: Fremont Environmental / Noble Energy

Lab ID: 1188

Project: Gruen 22-1

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
1-8'	104	108	111	107	04/17/14	04/17/14	1188 1
2-15'	110	107	99	103	04/17/14	04/17/14	1188 2
3-6'	102	105	109	97	04/17/14	04/17/14	1188 3
4-5'	89	104	91	99	04/17/14	04/17/14	1188 4
A-16'	100	110	105	104	04/17/14	04/17/14	1188 5
B-16'	101	104	103	107	04/17/14	04/17/14	1188 6

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eANALYTICS

LABORATORY

Client: Fremont Environmental / Noble Energy Lab ID: 1188

Project: Gruen 22-1

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	91	103	92	101	92	100	91	04/17/14	LCS 1188 1
(70-130%)									
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/17/14	MB 1188 1
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		

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Test Report



April 22, 2014

Client: Fremont Environmental / Noble Energy

Project: Gruen 22-1

Lab ID: 1215

Date Samples Received: 4/21/2014

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

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WO # 1215

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eANALYTICS

LABORATORY

Client: Fremont Environmental / Noble Energy Lab ID: 1215

Project: Gruen 22-1

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				
5-6 Ft	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	152	04/21/14	04/21/14	1215	1
6-8 Ft	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/21/14	04/21/14	1215	2
7-8 Ft	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	62.7	04/21/14	04/21/14	1215	3
C-10 Ft	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/21/14	04/21/14	1215	4
D-9 Ft	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/21/14	04/21/14	1215	5

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L A B O R A T O R Y

Client: Fremont Environmental / Noble Energy

Lab ID: 1215

Project: Gruen 22-1

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
5-6 Ft	104	89	90	108	04/21/14	04/21/14	1215 1
6-8 Ft	103	87	89	98	04/21/14	04/21/14	1215 2
7-8 Ft	103	98	99	99	04/21/14	04/21/14	1215 3
C-10 Ft	90	92	100	110	04/21/14	04/21/14	1215 4
D-9 Ft	92	100	99	92	04/21/14	04/21/14	1215 5

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eANALYTICS

LABORATORY

Client: Fremont Environmental / Noble Energy Lab ID: 1215

Project: Gruen 22-1

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	99	94	96	99	89	96	89	04/21/14	LCS 1215 1
(70-130%)									
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/21/14	MB 1215 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 23, 2014

Client: Fremont Environmental / Noble Energy

Project: Gruen 22-1

Lab ID: 1218

Date Samples Received: 4/22/2014

Number of Samples: 3

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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WO # 1218

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Client: Fremont Environmental / Noble Energy Lab ID: 1218

Project: Gruen 22-1

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				
E-13 FT	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/22/14	04/22/14	1218	1
8-8 FT	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/22/14	04/22/14	1218	2
9-12 FT	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/22/14	04/22/14	1218	3

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L A B O R A T O R Y

Client: Fremont Environmental / Noble Energy

Lab ID: 1218

Project: Gruen 22-1

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
E-13 FT	89	104	91	86	04/22/14	04/22/14	1218 1
8-8 FT	101	107	93	102	04/22/14	04/22/14	1218 2
9-12 FT	87	90	94	87	04/22/14	04/22/14	1218 3

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eANALYTICS

LABORATORY

Client: Fremont Environmental / Noble Energy Lab ID: 1218

Project: Gruen 22-1

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	93	92	96	104	90	102	96	04/22/14	LCS 1218 1
(70-130%)									
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	04/22/14	MB 1218 1
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		

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