

FREMONT ENVIRONMENTAL INC.

August 10, 2014

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

Subject: **Excavation Report**
Hull 1-1, Bernhardt 1,4,5,18,21,22,24,29,31, 37-36
API #05-123-13735
SENW Sec 1, T4N, R67W
Weld County, Colorado
Fremont Project No. C014-049
Facility #245940

Dear Mr. Evans:

Enclosed please find a copy of the above referenced Excavation Report for the Hull 1-1 and various Bernhardt wells 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.

HULL 1-1, BERNHARDT 1,4,5,18,21,22,24,29,31, 37-36

WELD COUNTY, COLORADO

FREMONT PROJECT NO. C014-049

FACILITY #245940

Prepared by:

**Fremont Environmental Inc.
12061 Pennsylvania Street, Suite A-105
Thornton, CO 80241
(303) 956-8714**

August 10, 2014

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EXCAVATION REPORT

NOBLE ENERGY INC.

HULL 1-1, BERNHARDT 1,4,5,18,21,22,24,29,31, 37-36

WELD COUNTY, COLORADO

FREMONT PROJECT NO. C014-049

FACILITY #245940

1.0 INTRODUCTION

The purpose of this document is to present information collected during the excavation of petroleum-impacted soil at the tank battery for the Hull 1-1 and various Bernhardt wells (11 wells total) release site in Weld County, Colorado. This six day excavation project was completed between July 1 and 11, 2014.

2.0 BACKGROUND INFORMATION

2.1 Site Location

The Hull and Bernhardt site is located approximately one mile northeast of Milliken, Colorado in Weld County as shown on Figure 1. The site is located in a rural and agricultural area one mile southeast of the intersection of County Road 52 and Highway 257. The location is further described as the SE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 1, Township 4N, Range 67W.

2.2 Site History

The site consists of the tank battery for the Hull 1-1 and ten Bernhardt wells noted above. The Hull 1-1 well was drilled in 1987 to a depth of approximately 7,465 feet. Soil impacts were recently discovered adjacent to the water vault. These soil impacts initiated this excavation effort.

Prior to the installation of this six tank battery, a "Bent-O-Mat" style clay liner was placed beneath the footprint of the aboveground storage tanks and two water vaults.

This liner was present at a depth of approximately five feet and came to the ground surface at the edges of the berm. Initial potholing at this site indicated that the liner's integrity appeared to be intact. Free phase condensate was present immediately above the liner on the southern end of the bermed area; however, the soil immediately below the liner appeared to be clean based on field observations.

3.0 FIELD ACTIVITIES

Remediation efforts consisted of the excavation of petroleum-impacted soil from the tank battery bermed area at this site. The soil consisted of roadbase to a depth of four feet which was underlain by a one foot layer of sand that was placed immediately above the clay liner. Ground water was not encountered during the excavation work. The excavated area is shown on Figure 2.

Excavation was initiated at the location of the former tank battery on July 1, 2014. After clean sidewalls were observed to the east and south, excavation continued to the north then west and back south until clean sidewalls were encountered on all sides of the dig. The overall excavation, which measured approximately 40 feet x 65 feet, removed the entire footprint of the tank battery bermed area. The soil removal continued until the extent of impact was completely identified and removed on July 11, 2014.

A total of 2,320 cubic yards of petroleum impacted soil were removed by BG Oilfield Services Inc. from the location over a six day period. The impacted soil was disposed of at the Waste Management Inc. Buffalo Ridge landfill in Keenesburg, 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 approximately five to six 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 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:

July 1, 2014 (Day 1) – Excavation of the impacted area was initiated in the southeastern corner of the former tank battery bermed area. Petroleum impacted soil was present to a depth of approximately five feet which was the depth of the Bent-O-Mat clay liner. This soil consisted of roadbase which was underlain by sand. Ground water was not

present in the excavation. Approximately 140 cubic yards of impacted soil were removed using an excavator and transported to the landfill.

Two wall samples (1-5' and 2-5') and one floor sample (3-6') were collected and submitted to the laboratory. The floor sample collected at a depth of six feet delineated the depth of the excavation on the southeastern side. The locations of the soil samples are illustrated on Figure 2. The PID values and laboratory analyses are provided on Table 1.

July 2, 2014 (Day 2) – Excavation of the impacted area continued in the southeastern corner and proceeded north while maintaining a clean eastern wall based on field observations. Approximately 450 cubic yards of impacted soil were removed using a trackhoe and transported to the landfill.

One floor sample (4-6') and one wall sample (5-5') were collected and submitted to the laboratory. The locations of the soil samples are illustrated on Figure 2. The PID values and laboratory analyses are provided on Table 1.

July 7, 2014 (Day 3) – Soil removal proceeded to the north until the northern extent of the liner area was removed. The clay liner was still present at a depth of approximately five feet and no ground water was observed within the excavation. Approximately 480 cubic yards of impacted soil were removed and transported to the landfill.

Two wall samples (6-5' and 7-6') were collected and submitted to the laboratory. The locations of the soil samples are illustrated on Figure 2. The PID values and laboratory analyses are provided on Table 1.

July 8, 2014 (Day 4) – Excavation of the impacted area continued west while maintaining a clean northern wall until the northwestern corner of the liner was encountered. Approximately 550 cubic yards of impacted soil were removed using an excavator and transported to the landfill. Two wall samples (8-6' and 9-5') were collected and submitted to the laboratory.

July 10, 2014 (Day 5) – Soil removal of the impacted area continued north along the western edge of the clay liner. Petroleum impacted soil was present in the area of the former water vault to approximately five feet. Approximately 350 cubic yards of impacted soil were removed and transported to the landfill.

One floor sample (12-6') and two wall samples (10-5' and 11-5') were collected and submitted to the laboratory. The wall samples defined the southwestern extent 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.

July 11, 2014 (Day 6, Final Day) – Excavation continued to the north while maintaining a clean sidewall on the west wall until the previously excavated northwestern corner was encountered. One wall sample (14-5') and one floor sample (13-6') were collected and submitted to the laboratory. This wall sample defined the western extent of the overall excavation. Approximately 350 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.

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 2,320 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.**



8/10/14

Date_____

Paul V. Henehan, P.E.

Senior Consultant

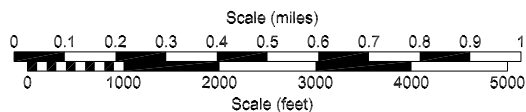
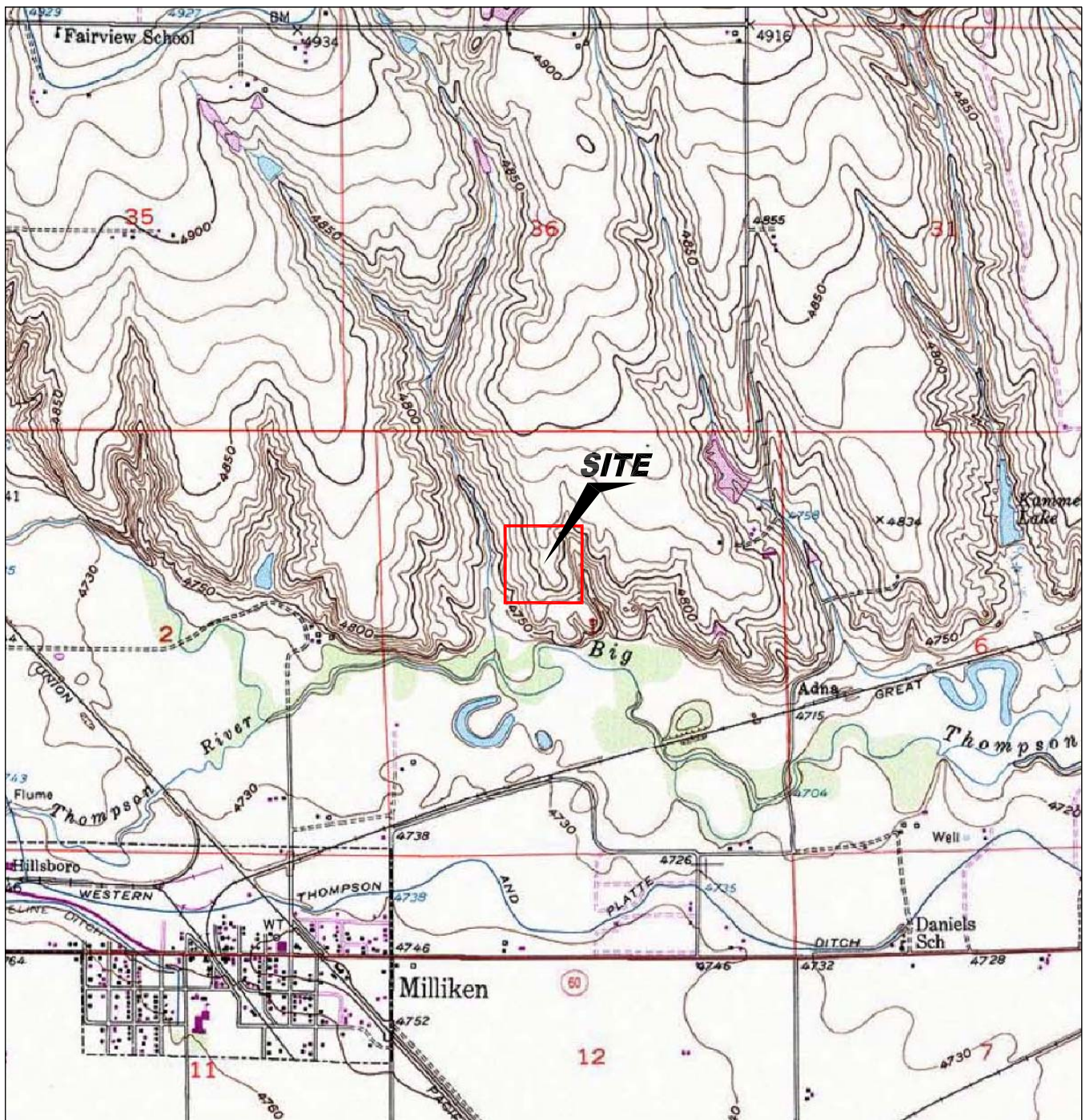
TABLE

TABLE 1
SUMMARY OF SOIL CHEMISTRY DATA
NOBLE ENERGY INC.
BERNHARDT 4-1, WELD COUNTY, COLORADO
FREMONT PROJECT NO. C014-049

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
1-5'	5	7/1/2014	Sidewall	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
2-5'	5	7/1/2014	Sidewall	Pass	1	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
3-6'	6	7/1/2014	Floor	Pass	9	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
4-6'	6	7/2/2014	Floor	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
5-5'	5	7/2/2014	Sidewall	Pass	1	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
6-5'	5	7/7/2014	Sidewall	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
7-6'	6	7/7/2014	Sidewall	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
8-6'	6	7/8/2014	Sidewall	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
9-5'	5	7/8/2014	Sidewall	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
10-5'	5	7/10/2014	Sidewall	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
11-5'	5	7/10/2014	Sidewall	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
12-6'	6	7/10/2014	Floor	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
13-6'	6	7/11/2014	Floor	Pass	0	<0.01	<0.01	<0.01	<0.01	<0.01	<50	<50
14-5'	5	7/11/2014	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 Bernhardt/Bernhardt State/Hull
SE NW Section 1, T4N, R67W
Weld County, Colorado

Project No.
C014-049

Prepared by

Drawn by
JMA

Date
7/14/14

Reviewed by

Filename
14049T





LEGEND

	FENCE LINE
	CONTAINMENT WALL
	ABOVE GROUND STORAGE TANK

Figure 2
SITE MAP

Noble Bernhardt/Bernhardt State/Hull
SE NW Section 1, T4N, R67W
Weld County, Colorado

Project No. C014-049	Prepared by	Drawn by JMA	
Date 7/14/14	Reviewed by	Filename 14049Q	



LEGEND

— FENCE LINE
— CONTAINMENT WALL

FORMER

FORMER FACILITY



SOIL SAMPLE LOCATION

7/1/14	
5'	
B	<0.01
T	<0.01
E	<0.01
X	<0.01
G	<50
D	<50

NA

DATE SAMPLED
SAMPLE DEPTH (ft)
BENZENE (mg/kg)
TOLUENE (mg/kg)
ETHYLBENZENE (mg/kg)
TOTAL XYLENES (mg/kg)
TPH-GRO (mg/kg)
TPH-DRO (mg/kg)
NOT ANALYZED

Figure 3

EXCAVATION/SAMPLE LOCATIONS

Noble Bernhardt/Bernhardt State/Hull
SE NW Section 1, T4N, R67W
Weld County, Colorado

Project No.
C014-049

Prepared by

Drawn by
JMA

Date
10/6/14

Reviewed by

Filename
14049Q



APPENDIX A

LABORATORY DOCUMENTATION

Test Report



July 2, 2014

Client: Fremont Environmental / Noble Energy

Project: Bernhardt 1-1

Lab ID: 1701

Date Samples Received: 7/2/2014

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

Chain of Custody

eANALYTICS
LABORATORY

[illegible]

eANALYTICS

L A B O R A T O R Y

Client: Fremont Environmental / Noble Energy Lab ID: 1701

Project: Bernhardt 1-1

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				
1-5' Sidewall	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/01/14	07/02/14	1701	1
2-5' Sidewall	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/01/14	07/02/14	1701	2
3-6' Floor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/01/14	07/02/14	1701	3
4-6' Floor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/02/14	07/02/14	1701	4
5-5' Sidewall	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/02/14	07/02/14	1701	5

eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

eANALYTICS
LABORATORY

Client: Fremont Environmental / Noble Energy

Lab ID: 1701

Project: Bernhardt 1-1

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
1-5' Sidewall	89	109	100	96	07/01/14	07/02/14	1701 1
2-5' Sidewall	109	109	108	101	07/01/14	07/02/14	1701 2
3-6' Floor	95	97	86	104	07/01/14	07/02/14	1701 3
4-6' Floor	94	91	98	90	07/02/14	07/02/14	1701 4
5-5' Sidewall	86	102	100	99	07/02/14	07/02/14	1701 5

eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

Test Report



July 8, 2014

Client: Fremont Environmental / Noble Energy

Project: Bernhardt 1-1

Lab ID: 1740

Date Samples Received: 7/8/2014

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

eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

Chain of Custody

eANALYTICS
LABORATORY

Chain of Custody Form

eANALYTICS LABORATORY

1767 Rocky Mountain Avenue Loveland CO 80538

Phone: (970) 667-6975

Fax: (970) 669-0941

www.eAnalyticsLab.com

CLIENT INFORMATION

(*New Clients please fill out completely)

Company: Fremont Environmental

Project: Bernhard H I-I C014-049

Project Manager: Paul Henchan

Sampler: Mark T

Phone/Email: 303-956-8714

Address: P.O. Box 1289
Wellington CO 80549

ANALYSIS INFORMATION

(Select analysis by checking box on corresponding sample line)

Lab ID	Sample Name	Sampling Date/Time	Number of Containers	Matrix (S) Soil (W) Water (V) Vapor (O) Other	BTEX (EPA 8260)	BTEX Naphthalene (EPA 8260)	TPH - GRO/DRO (EPA 8260/8015)	SAR (US Dept of Ag Method 20B) EC (US Dept of Ag Method 3) pH (EPA 9045D)	Other Analysis
1	6-5'	7-8 AM / PM	1 S			X X			
2	7-6'	7-8 AM / PM	1 S			X X			
3	8-6'	7/8 AM / PM	1 S			} }			
4	9-5'	7/8 AM / PM	1 S			} }			
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							
		AM / PM							

Comments:

Turnaround Time (Business Days)

TAT begins when sample is received by eANALYTICS

☐ Normal (5-10 Days)
☐ 3 Day (1.25x)
☐ 2 Day (1.5x)
☒ 1 Day (2x)
☐ Next Bus Morning (Noble Pricing)

For eANALYTICS Use

Samples Received Intact Yes / No

Received Within Temperature Range (2-6°C) Yes / No

Sample Preservative CS None Acid Other

Record of Custody

Relinquished by: [Signature]
Company: FREMONT ENVIRONMENTAL

Received by:

Company:

Relinquished by:

Company:

Received by: [Signature]

Company: eANALYTICS

Date: 7/8

Time: 1:00 PM

Date:

Time:

Date:

Time:

Date: 7/8/14

Time: 10:00 AM

Work # 1740

eANALYTICS: Environmental testing made Easy

Page 2 of 2

eANALYTICS
LABORATORY

Client: Fremont Environmental / Noble Energy Lab ID: 1740

Project: Bernhardt 1-1

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				
6-5'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/08/14	07/08/14	1740	1
7-6'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/08/14	07/08/14	1740	2
8-6'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/08/14	07/08/14	1740	3
9-5'	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/08/14	07/08/14	1740	4

eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

eANALYTICS
L A B O R A T O R Y

Client: Fremont Environmental / Noble Energy

Lab ID: 1740

Project: Bernhardt 1-1

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
6-5'	96	97	111	108	07/08/14	07/08/14	1740 1
7-6'	86	94	101	93	07/08/14	07/08/14	1740 2
8-6'	101	106	93	90	07/08/14	07/08/14	1740 3
9-5'	90	89	107	104	07/08/14	07/08/14	1740 4

eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

eANALYTICS

LABORATORY

Client: Fremont Environmental / Noble Energy Lab ID: 1740

Project: Bernhardt 1-1

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	98	100	93	97	94	96	90	07/08/14	LCS 1740 1
(70-130%)									
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 50	< 50	07/08/14	MB 1740 1
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		

eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538