

FREMONT ENVIRONMENTAL INC.

March 18, 2014

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

Subject: **Ground Water Monitoring Report**
 Evans Industrial Park #2
 NWSE Sec 30, T5N, R65W
 API # 05-123-16656
 Weld County, Colorado
 Fremont Project No. C013-066
 Facility ID# 248854

Dear Mr. Evans:

Enclosed please find a copy of the above referenced Ground Water Monitoring Report for the Evans Industrial Park #2 site in Weld County, Colorado. The enclosed report describes monitoring and sampling efforts to assess ground water quality at 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

GROUND WATER MONITORING REPORT

**NOBLE ENERGY INC.
EVANS INDUSTRIAL PARK #2
WELD COUNTY, COLORADO
FREMONT PROJECT NO. C013-066
FACILITY #248854**

Prepared by:

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

March 18, 2014

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GROUND WATER MONITORING REPORT

NOBLE ENERGY INC.

EVANS INDUSTRIAL PARK #2

WELD COUNTY, COLORADO

FREMONT PROJECT NO. C013-066

FACILITY #248854

1.0 INTRODUCTION

The purpose of this document is to present ground water quality data collected at the Evans Industrial Park #2 site in Weld County, Colorado. Impacted soil and ground water were identified at this location due to a release from the facility's water vault. Ten monitoring wells were installed at this site in November 2013 to delineate the magnitude and extent of subsurface impacts.

2.0 BACKGROUND INFORMATION

2.1 Site Location

The Evans Industrial Park #2 facility is located approximately one mile south of Evans, Colorado in Weld County as shown on Figure 1. The site includes one storage tank as well as separation and metering equipment.

The facility is located in a light industrial area $\frac{1}{4}$ mile southeast of the intersection of 44th Street and Industrial Parkway. The location is further described as the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of section 30, township 5N, range 65W. A Site Map is included as Figure 2. This facility is located immediately north of the South Platte River.

2.2 Site History

The site is a natural gas production and oil storage facility for the Evans Industrial Park #2 natural gas well. This well was drilled in 1993 to a depth of approximately 7,210 feet. Soil impacts were recently identified at the facility during replacement of the produced water vault.

Limited excavation of impacted soil adjacent to the water vault was conducted. Ground water was present in the excavation at a depth of approximately three feet. In November 2013, ten monitoring wells were installed to delineate the magnitude and extent of subsurface impacts.

3.0 GROUND WATER MONITORING ACTIVITIES

3.1 Ground Water Level Measurements

Ground water levels were measured in nine of the ten monitoring wells on February 17, 2014 in accordance with the Sampling Plan included in Appendix A. Monitoring well MW-1 could not be located during this sampling event. The data are summarized in Table 1.

Water table contours inferred from the February 2014 data are illustrated on Figure 3. Based on these data, ground water is inferred to flow to the southeast. The water table gradient was calculated at approximately 0.003 feet per foot (ft/ft) for the February 2014 data.

3.2 Ground Water Sampling and Analysis

Ground water samples were collected from nine of the ten monitoring wells on February 17, 2014 to monitor the magnitude and extent of ground water impacts at the site. The ground water samples were submitted to eAnalytics Laboratory in Loveland, Colorado

for analyses of benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA Method 8260C. This ground water chemistry data is illustrated on Figure 4.

The laboratory data indicated that the BTEX constituents were all below their respective Colorado Oil and Gas Conservation Commission (COGCC) limits as well as the laboratory's detection limits.

The ground water analytical data are summarized in Table 1. A copy of the laboratory reports, quality control data, and chain-of-custody documentation are presented in Appendix B.

4.0 DISCUSSION

A site investigation was conducted at the Evans Industrial Park #2 location as a result of a release that occurred at the produced water vault. Ten monitoring wells were installed in November 2013 to define the magnitude and extent of soil and ground water impacts.

The data collected from the monitoring wells in February 2014 indicates that the ground water flow direction is to the southeast. In addition, the laboratory data indicates that the ground water quality in all of the monitoring wells is below the COGCC Table 910-1 limits. These data are shown on Figure 4 and Table 1.

Noble will sample the ground water at this site on a quarterly basis to evaluate the BTEX concentrations relative (COGCC's) Table 910-1 requirements. After four consecutive quarters of COGCC-compliant BTEX concentrations, Noble will request closure of this site.

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.**



Paul V. Henehan, P.E.

Senior Consultant

3/18/14
Date_____

TABLE

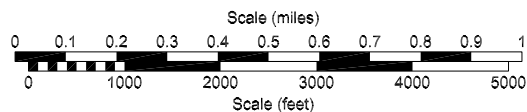
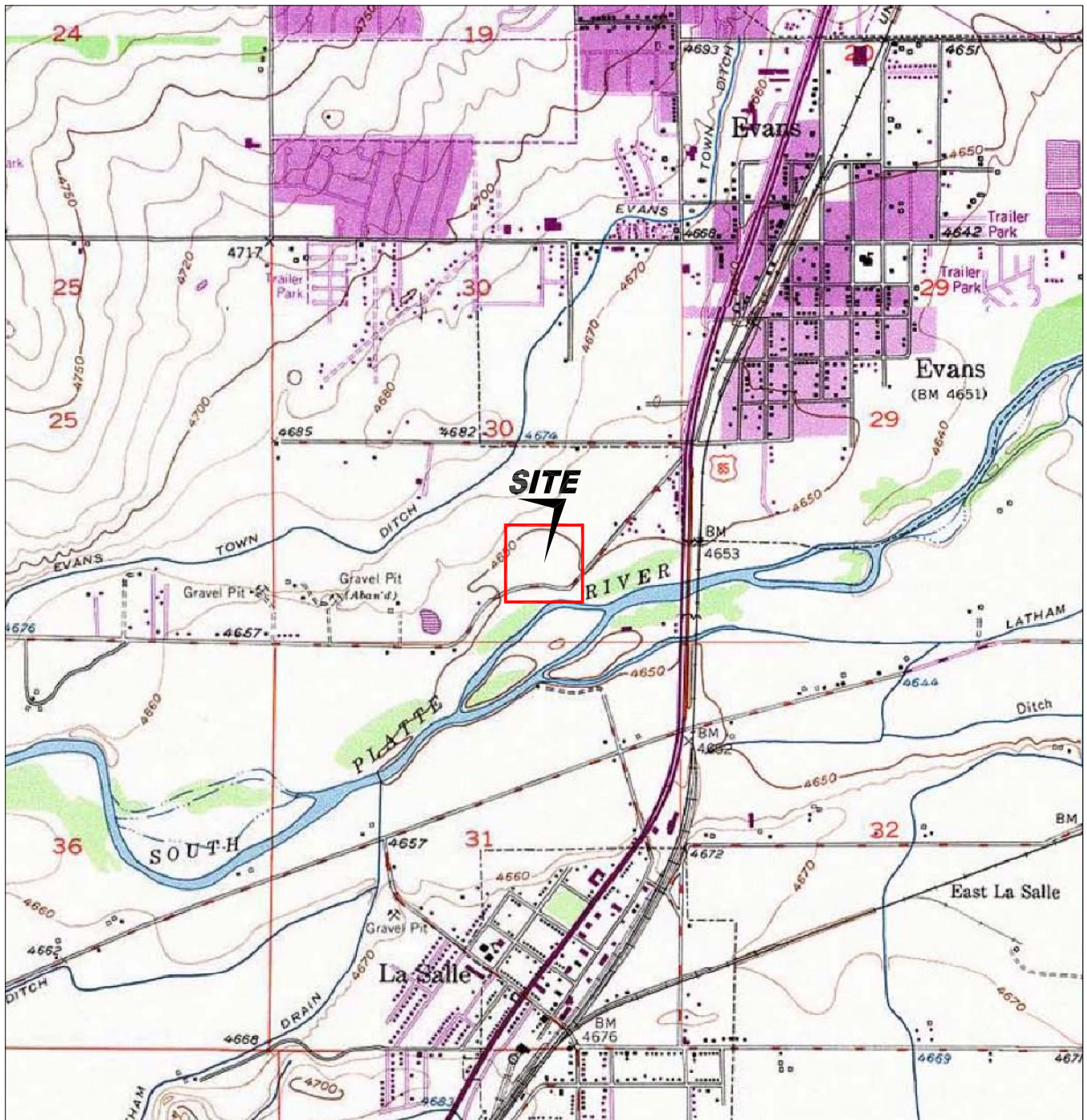
TABLE 1
SUMMARY OF GROUND WATER ELEVATION DATA AND CHEMISTRY DATA
NOBLE ENERGY INC.
EVANS INDUSTRIAL #1, WELD COUNTY, COLORADO
FREMONT PROJECT NO. C013-066

SAMPLE LOCATION	DATE	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	TOC ELEVATION (feet)	DEPTH TO GROUND WATER (ft)	GROUND WATER ELEVATION (ft)	FREE PRODUCT THICKNESS (ft)
MW-1	11/14/13	<1.0	<1.0	<1.0	<1.0	100.00	4.09	95.91	NP
	02/17/14	NF	NF	NF	NF		NF	NF	NF
MW-2	11/14/13	<1.0	<1.0	<1.0	<1.0	99.56	3.63	95.93	NP
	02/17/14	<1.0	<1.0	<1.0	<1.0		4.73	94.83	NP
MW-3	11/14/13	<1.0	<1.0	<1.0	<1.0	98.82	3.12	95.70	NP
	02/17/14	<1.0	<1.0	<1.0	<1.0	99.51	4.82	94.69	NP
MW-4	11/14/13	23.6	1.4	380	4854	98.86	3.13	95.73	NP
	02/17/14	<1.0	<1.0	40.9	695	99.43	4.80	94.63	NP
MW-5	11/14/13	<1.0	<1.0	<1.0	<1.0	99.21	3.63	95.58	NP
	02/17/14	<1.0	<1.0	<1.0	<1.0		4.68	94.53	NP
MW-6	11/14/13	<1.0	<1.0	<1.0	<1.0	98.73	3.33	95.40	NP
	02/17/14	<1.0	<1.0	<1.0	<1.0		4.30	94.43	NP
MW-7	11/14/13	<1.0	<1.0	<1.0	<1.0	98.86	3.45	95.41	NP
	02/17/14	<1.0	<1.0	<1.0	<1.0		4.45	94.41	NP
MW-8	11/14/13	<1.0	<1.0	<1.0	<1.0	99.04	3.31	95.73	NP
	02/17/14	<1.0	<1.0	<1.0	<1.0		4.48	94.56	NP
MW-9	11/14/13	<1.0	<1.0	<1.0	<1.0	98.96	3.54	95.42	NP
	02/17/14	<1.0	<1.0	<1.0	<1.0		4.46	94.50	NP
MW-10	11/14/13	<1.0	<1.0	<1.0	<1.0	98.44	3.18	95.26	NP
	02/17/14	<1.0	<1.0	<1.0	<1.0		4.18	94.26	NP
Table 910-1 Limits		5	560	700	1,400				

Bold face values exceed the COGCC limits

NP - No Free Product

FIGURES



USGS 7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1
SITE LOCATION MAP

Noble Evans Industrial Park
NW SE Section 30, T5N, R65W
Evans, Colorado

Project No.
C013-066

Prepared by

Drawn by
JMA

Date
10/29/13

Reviewed by

Filename
13066T





LEGEND







-  MONITORING WELL
-  FENCE LINE
-  BERM
-  ABOVE GROUND STORAGE TANK
-  SOIL SAMPLE LOCATION

Figure 2
SITE MAP

Noble Evans Industrial Park
NW SE Section 30, T5N, R65W
Evans, Colorado

Project No. C013-066	Prepared by	Drawn by JMA	
Date 1/13/14	Reviewed by	Filename 13066R	



LEGEND

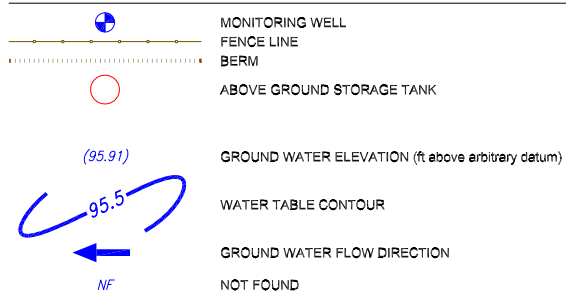


Figure 3
INFERRED GROUNDWATER CONTOUR
FEBRUARY 17, 2014

Noble Evans Industrial Park
 NW SE Section 30, T5N, R65W
 Evans, Colorado

Project No.
C013-066

Prepared by

Drawn by
JMA

Date
3/4/14

Reviewed by

Filename
13066R





LEGEND

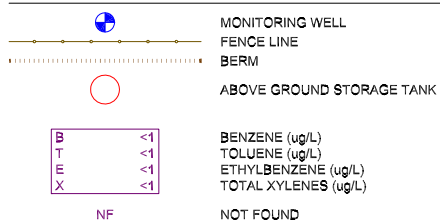


Figure 4
GROUND WATER CHEMISTRY MAP
FEBRUARY 17, 2014

Noble Evans Industrial Park
NW SE Section 30, T5N, R65W
Evans, Colorado

Project No.
C013-066

Prepared by

Drawn by
JMA

Date
3/4/14

Reviewed by

Filename
13066R



APPENDIX A

SAMPLING PLAN

SAMPLING METHODS AND PROCEDURES

Water Level Measurements

All ground water level measurements will be obtained using an electric measuring device, which indicates when a probe is in contact with ground water. Measurements will be obtained by lowering the device into the well until the water surface had been encountered, and by measuring the distance from the top of the inside riser pipe to the probe. All of the measurements will be recorded to the nearest 0.01 ft. To minimize cross-contamination, the water level indicator will be decontaminated with isopropyl alcohol and distilled water between each well.

Monitoring Well Sampling

All monitoring wells were sampled from the “cleanest” to the “most contaminated” according to the protocols listed below.

Field Protocol

- Step 1 Measure water level in each well.
- Step 2 Purge each monitoring well by evacuating a minimum of three well bore volumes using a disposable polyethylene bailer.
- Step 3 Collect water samples using a disposable polyethylene bailer.
- Step 4 Cool samples to approximately 4°C for transportation.
- Step 5 Store water samples and transport to a specific laboratory, following all documentation and chain-of-custody procedures.

Upon completion of ground water sampling, a chain-of-custody log will be completed. Chain-of-custody records include the following information: project, project number, shipped by, shipped to, suspected hazard, sampling point, location, field identification number, date collected, sample type, number of containers, analysis required, and sampler's signature.

The chain-of-custody records will be shipped with the samples to the laboratory. Upon arrival at the laboratory the samples will be checked in and signed by the appropriate laboratory personnel. Laboratory identification numbers will be noted on the chain-of-custody record. Upon completion of the laboratory analysis, the completed chain-of-custody record will be returned to the project manager.

Analytical Methods

The following list identifies the various chemical constituents and analytical methods which will be used for their quantification.

<u>Chemical Parameter</u>	<u>Method</u>
Benzene, Toluene, Ethylbenzene and Total Xylenes (BTEX)	EPA Method – 8260B

APPENDIX B

LABORATORY DOCUMENTATION

Test Report

eANALYTICS LABORATORY

February 21, 2014

Client: Fremont Environmental / Noble Energy

Project: Evans Industrial

Lab ID: 756

Date Samples Received: 2/17/2014

Number of Samples: 9

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,



Christopher Dieken
Quality Assurance Manager



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

eANALYTICS
LABORATORY

Chain of Custody Form

[illegible]

WO # 756

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: Fremont Environmental / Noble Energy Lab ID: 756

Project: Evans Industrial

Analysis: Volatile Organics Method: EPA8260

Sample Name	Benzene ug/L	Toluene ug/L	Ethyl- benzene ug/L	Total Xylenes ug/L	Date Sampled	Date Analyzed	Lab ID
MW-7	< 1.0	< 1.0	< 1.0	< 1.0	02/17/14	02/19/14	756 1
MW-8	< 1.0	< 1.0	< 1.0	< 1.0	02/17/14	02/19/14	756 2
MW-5	< 1.0	< 1.0	< 1.0	< 1.0	02/17/14	02/19/14	756 3
MW-4	< 1.0	< 1.0	40.9	695	02/17/14	02/19/14	756 4
MW-2	< 1.0	< 1.0	< 1.0	< 1.0	02/17/14	02/19/14	756 5
MW-3	< 1.0	< 1.0	< 1.0	< 1.0	02/17/14	02/19/14	756 6
MW-9	< 1.0	< 1.0	< 1.0	< 1.0	02/17/14	02/19/14	756 7
MW-6	< 1.0	< 1.0	< 1.0	< 1.0	02/17/14	02/19/14	756 8
MW-10	< 1.0	< 1.0	< 1.0	< 1.0	02/17/14	02/19/14	756 9

eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

eANALYTICS
LABORATORY

Client: Fremont Environmental / Noble Energy

Lab ID: 756

Project: Evans Industrial

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
MW-7	99	89	108	88	02/17/14	02/19/14	756 1
MW-8	102	103	106	102	02/17/14	02/19/14	756 2
MW-5	94	95	109	92	02/17/14	02/19/14	756 3
MW-4	90	98	92	99	02/17/14	02/19/14	756 4
MW-2	91	93	106	101	02/17/14	02/19/14	756 5
MW-3	99	91	94	92	02/17/14	02/19/14	756 6
MW-9	94	97	88	96	02/17/14	02/19/14	756 7
MW-6	87	102	91	86	02/17/14	02/19/14	756 8
MW-10	99	95	102	86	02/17/14	02/19/14	756 9

eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538

eANALYTICS
LABORATORY

Client: Fremont Environmental / Noble Energy Lab ID: 756

Project: Evans Industrial

Analysis: Volatile Organics Method: EPA8260

Sample Name	Benzene	Toluene	Ethyl- benzene	Total Xylenes	Date Analyzed	Lab ID	
	% Rec	% Rec	% Rec	% Rec			
Laboratory Control Sample	90	101	95	89	02/19/14	LCS	756 1
(70-130%)							
Method Blank	< 1.0	< 1.0	< 1.0	< 1.0	02/19/14	MB	756 1
	ug/L	ug/L	ug/L	ug/L			

eAnalytics Laboratory

1767 Rocky Mountain Avenue Loveland CO 80538