

REMEDIATION SUMMARY REPORT

SCHMIDT 30-11G, 12G TANK BATTERY WELD COUNTY, COLORADO

APRIL 2009

Prepared for:

**NOBLE ENERGY, INC.
Platteville, Colorado**



REMEDICATION SUMMARY REPORT
SCHMIDT 30-11G, 12G TANK BATTERY
WELD COUNTY, COLORADO

APRIL 2009

Prepared for:

NOBLE ENERGY, INC.
804 Grand Avenue
Platteville, Colorado 80651

Prepared by:

LT ENVIRONMENTAL, INC.
4600 West 60th Avenue
Arvada, Colorado 80003
(303) 433-9788



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EXECUTIVE SUMMARY

This report was prepared by LT Environmental, Inc. (LTE), on behalf of Noble Energy, Inc. (Noble), to document remediation activities at the Schmidt 30-11G, 12G Tank Battery (Site).

The Site is located 0.8 miles southeast of the intersection of Weld County Road (WCR) 42 and WCR 37 near Platteville, Colorado. The surrounding area consists primarily of agricultural property. The legal description of the Site is the northeast quarter of the southwest quarter of Section 30, Township 4 North, Range 65 West of the Sixth Principal Meridian, in Weld County, Colorado (Figure 1).

The scope of work for this project included mitigation of petroleum hydrocarbon impacts following the identification of a tank release. This work included the excavation/removal of hydrocarbon impacted soils, confirmation sampling and analysis, documentation, and health and safety monitoring. The Site is bordered to the northeast by an irrigation ditch, and by agricultural land on all other sides.

Noble contractors began excavating impacted soil at the Site on February 2, 2009. LTE personnel were onsite February 3, 2009 for oversight activities, directing soil removal from the excavated area, and application of the groundwater amendment. Impacted soils were hauled off to the Noble Land Treatment Facility and replaced with clean structural fill from Varra Companies, Inc. of Greeley, Colorado. A total volume of 1,524 cubic yards of impacted soil was excavated and removed during this project. During excavation activities, LTE personnel were onsite to collect confirmation soil samples from the perimeter wall of the excavation. Following completion of source removal activities, an activated carbon remediation amendment was installed in the base of the excavation to mitigate any residual hydrocarbons.

Based on field indicators and the analytical results of the confirmation soil wall samples collected following excavation activities, the remaining soil has been remediated to below the Colorado Oil and Gas Conservation Commission (COGCC) standard for petroleum hydrocarbons.

LTE will install performance groundwater monitoring wells to perform post-remediation sampling and determine if groundwater impact exists at the Site. The locations of the performance groundwater monitoring wells will be determined after Noble contractors complete the tank battery construction. The wells will be used to monitor groundwater conditions until site closure status is achieved from the COGCC. Well sampling results will be presented in a post-remediation well installation and groundwater monitoring report.

SECTION 1.0

INTRODUCTION

This report was prepared by LT Environmental, Inc. (LTE) for Noble Energy, Inc. (Noble) to document excavation activities at the Schmidt 30-11G, 12G Tank Battery (Site) (Figure 1). The purpose of this project was to remove hydrocarbon impacted soils and groundwater from the Site.

1.1 SITE DESCRIPTION

The Site is located 0.8 mile southeast of the intersection of Weld County Road (WCR) 42 and WCR 37 near Platteville, Colorado. The surrounding area consists primarily of agricultural property. The legal description of the Site is the northeast quarter of the southwest quarter of Section 30, Township 4 North, Range 65 West of the Sixth Principal Meridian, in Weld County, Colorado (Figure 1). It is located at an elevation of approximately 4,808 feet above mean sea level.

Soils at the Site consist of brown, clayey sand from the ground surface to approximately 3 feet below ground surface (bgs). Fine to coarse grained sand was encountered from 3 feet bgs to approximately 14 feet bgs. Groundwater at the Site is approximately 8 feet bgs.

Topography at the Site is generally flat, while the local slope and groundwater flow direction are west to northwest. The Site is bordered to the northwest by an irrigation ditch, and by agricultural land on all other sides.

1.2 SCOPE OF WORK

The scope of work for this remediation project included the removal of impacted soils and the installation of a groundwater amendment. Impacted soils were hauled off to the Noble Land Treatment Facility and replaced with clean fill. A groundwater amendment was installed in the base of the excavation to reduce the potential for groundwater impact resulting from residual hydrocarbons.

During onsite excavation activities, Noble and LTE personnel conducted field screening of soils, soil confirmation sampling, oversight of the excavation, health and safety monitoring, installation of the groundwater amendment, and documentation activities.

A summary of field activities, analytical results from soil sampling activities, and conclusions is presented in the subsequent sections.

SECTION 2.0

SUMMARY OF FIELD ACTIVITIES

2.1 EXCAVATION ACTIVITIES

On February 2, 2009 and February 3, 2009, Noble contractors removed impacted soils. The groundwater amendment was installed February 4, 2009. When LTE personnel arrived onsite February 3, 2009, Noble contractors had already excavated to the north, east, and west of the tank battery. Excavation on February 3, 2009 proceeded to the south as work progressed. LTE personnel conducted field screening of organic vapor concentrations using a photoionization detector (PID), collected confirmation soil samples, and documented excavation activities. Photographs of excavation activities are included as Appendix A.

The dimensions of the final excavation were approximately 90 feet long and 55 feet wide. The total depth of the excavation ranged from approximately 8 feet to 14 feet bgs, dependent on the impacted intervals. A total volume of 1,524 cubic yards of impacted soil was excavated and transported offsite to the Noble Land Treatment Facility.

Ten soil samples were collected from the smear zone along the walls of the excavation, and three soil samples were collected from the base of the excavation. Each sample was field-screened for organic vapor concentrations with a PID to determine if additional excavation was required. Once PID measurements indicated that impacted soil had been removed, a confirmation sample was collected for submittal to an analytical laboratory. Figure 2 represents the excavation extent and the locations of the soil samples collected in the excavation.

A total of thirteen samples (SS01 through SS13) were collected from the excavation. The soil samples were submitted to Origins Laboratory, Inc. (Origins) of Denver, Colorado for analysis of Total Volatile Hydrocarbons – Gasoline Range Organics (TVH-GRO) by United States Environmental Protection Agency (EPA) modified Method 8015.

After collecting confirmation samples, the excavation was backfilled with clean fill. Fill material was supplied by Varra Companies, Inc. (Varra) of Greeley, Colorado.

2.2 GROUNDWATER AMENDMENT APPLICATION

Shallow groundwater was observed at the Site at approximately 8 feet bgs. To reduce the potential for any further groundwater impact resulting from residual hydrocarbons, 600 pounds of the groundwater amendment were applied to the entire extent of the base of the excavation.

The remediation amendment is activated carbon inoculated with electron acceptors (nitrate and sulfate) and nutrients (phosphorus and nitrogen) designed to biodegrade petroleum hydrocarbons.

2.3 GROUNDWATER MONITORING

Groundwater monitoring wells will be installed at the Site to be used as performance monitoring indicators to determine if impacted groundwater exists at the Site. The monitoring wells will be used to monitor groundwater conditions until site closure status is achieved from the COGCC. Well installation and sampling results will be presented under separate cover.

SECTION 3.0

ANALYTICAL RESULTS

Soil samples were collected to define the extent of the excavation and confirm that impact above regulatory standards was removed. Ten confirmation soil samples were collected from the smear zone along the walls of the excavation, and three soil samples were collected from the base of the excavation. Soil sample locations and analytical results are illustrated on Figure 2. Soil samples were sent to Origins for analysis of TVH-GRO.

Analytical results indicate TVH-GRO was not detected above the COGCC standard of 500 milligrams per kilogram (mg/kg) or the laboratory method detection limit for twelve of the thirteen samples collected. Soil sample SS10 exhibited a TVH-GRO concentration of 73.9 mg/kg, which is below the COGCC standard. Soil analytical results are summarized on Table 1. Copies of the laboratory analytical reports are included as Appendix B.

Future groundwater monitoring will be conducted to determine if residual groundwater impact exists. Groundwater well installation and monitoring analytical results from planned quarterly groundwater monitoring events will be submitted under separate cover.

SECTION 4.0

SUMMARY AND CONCLUSIONS

February 2, 2009 through February 3, 2009, Noble contractors excavated and removed 1,524 cubic yards of impacted soil from the excavation.

Evidence of impact to the subsurface was observed during excavation activities at depths ranging from 4 feet to 14 feet bgs. LTE conducted field-screening of organic vapor concentrations, collection of soil confirmation samples for laboratory analysis from the excavated area, application of the groundwater amendment, health and safety monitoring, and field documentation.

Impacted soils were excavated and transported to the Noble Land Treatment Facility and replaced with clean fill from Varra.

LTE collected soil samples following completion of the excavation activities. Analytical results from soil samples collected along all four walls of the excavation indicate that the petroleum impacted soils had been removed to below the COGCC standard.

To prevent any future impact from residual hydrocarbons, 600 pounds of a hydrocarbon degrading amendment were applied to the excavation base.

LTE is in the process of scheduling groundwater monitoring well installation activities at the Site. LTE personnel will oversee the installation of the monitoring wells, which will be used to conduct groundwater performance monitoring at the Site. A summary of the monitoring well installation and groundwater analytical results will be included with the first quarterly groundwater monitoring report.



TABLE



TABLE 1

**SOIL ANALYTICAL RESULTS
SCHMIDT 30-11G, 12G
WELD COUNTY, COLORADO
NOBLE ENERGY, INC.**

Sample ID (depth in feet)	Date Sampled	TVH-GRO (mg/kg)
SS01 (7')	3/3/2009	<50
SS02 (8')	3/3/2009	<50
SS03 (4')	3/3/2009	<50
SS04 (4')	3/3/2009	<50
SS05 (4')	3/3/2009	<50
SS06 (8')	3/3/2009	<50
SS07 (4')	3/3/2009	<50
SS08 (6')	3/3/2009	<50
SS09 (7')	3/3/2009	<50
SS10 (7')	3/3/2009	73.9
SS11 (14')	3/3/2009	<50
SS12 (6')	3/3/2009	<50
SS13 (6')	3/3/2009	<50

COGCC Standard

500

Notes:

ft. bgs - feet below ground surface

mg/kg - milligrams per kilogram

< indicates result is less than the stated laboratory method detection limit

TVH-GRO - Total Volatile Hydrocarbons - Gasoline Range Organics

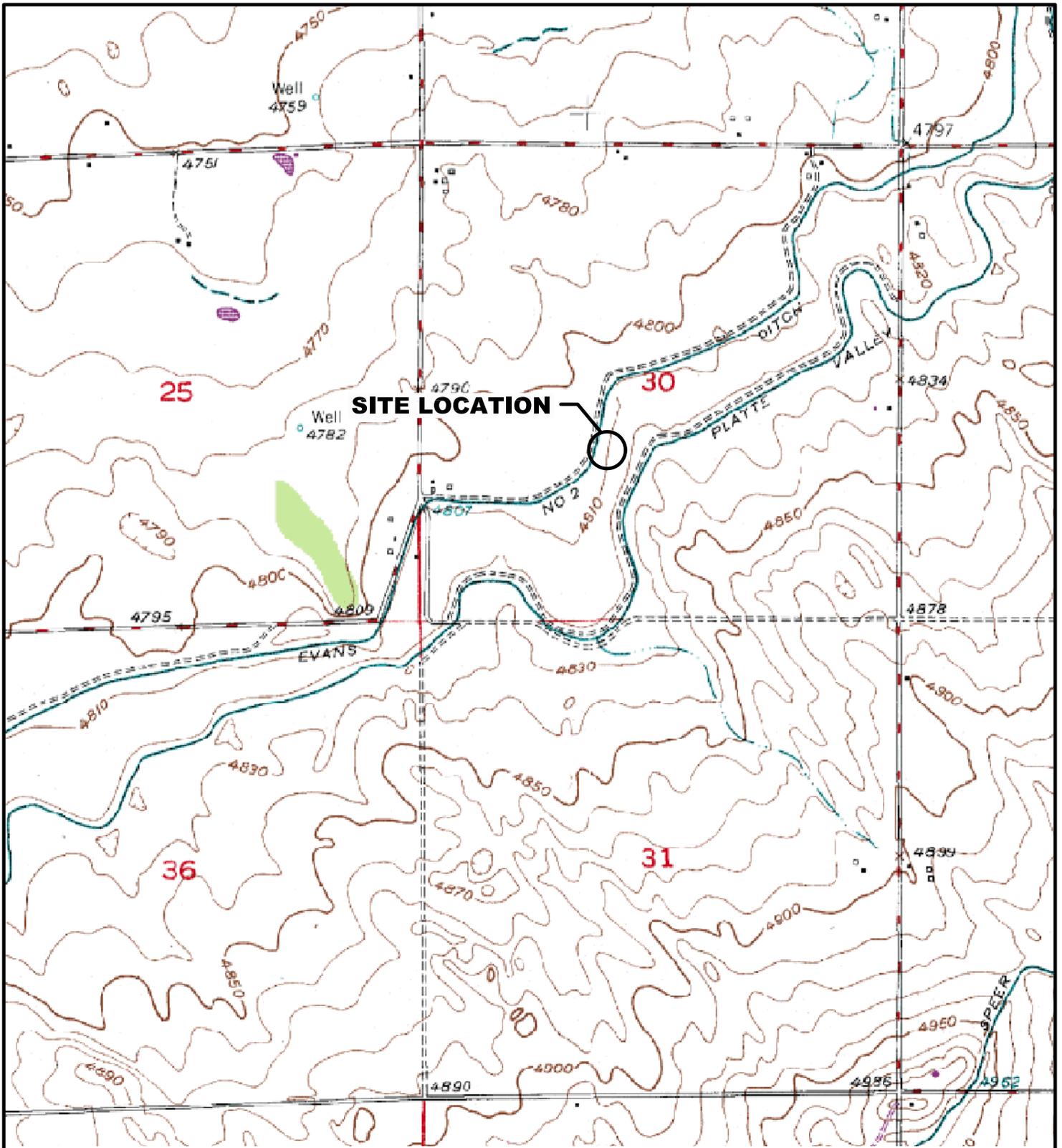
TVH-GRO by EPA Method 8015M

COGCC - Colorado Oil & Gas Conservation Commission



FIGURES





LEGEND

○ SITE LOCATION

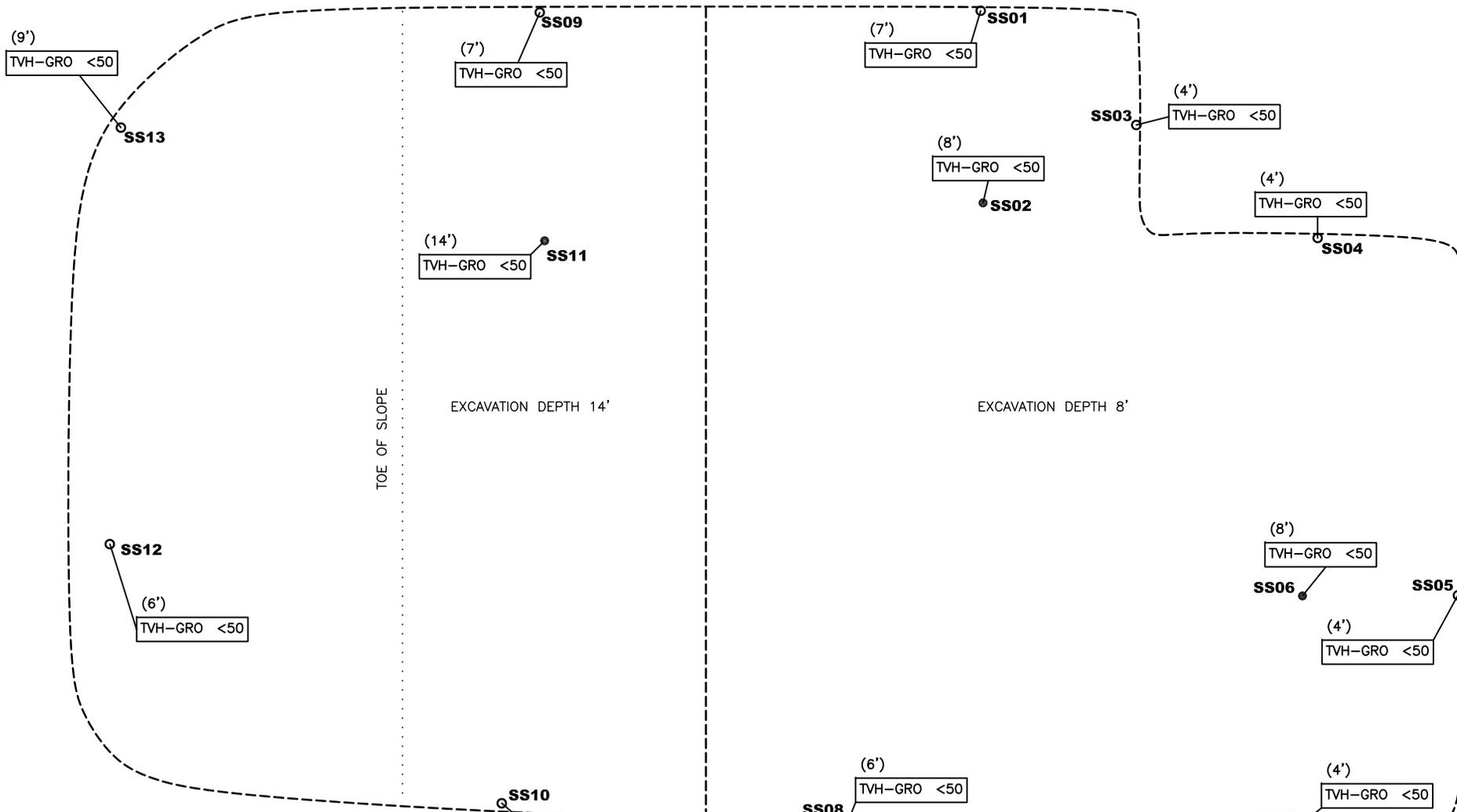


0 375 750 1500
FEET

FIGURE 1
SITE LOCATION MAP
SCHMIDT 30-11G, 12G
WELD COUNTY, CO
NOBLE ENERGY, INC.



SOURCE: TOPOZONE.COM
USGS 7.5' QUADRANGLE
(NAD27)



LEGEND

- SS01** ○ SOIL SAMPLE WALL LOCATION
- SS02** ● SOIL SAMPLE FLOOR LOCATION

----- EXTENT OF EXCAVATION

(SAMPLE DEPTH IN FEET)

TVH-GRO TOTAL VOLATILE HYDROCARBONS-GASOLINE RANGE ORGANICS

ANALYTICAL RESULTS ARE REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg)

SAMPLES COLLECTED 3/3/09



FIGURE 2
SOIL SAMPLE LOCATIONS MAP
 SCHMIDT 30-11G, 12G
 WELD COUNTY, CO
 NOBLE ENERGY, INC.



APPENDIX A
SITE PHOTOGRAPHS



SCHMIDT 30-11G, 12G TANK BATTERY



Photograph 1: Excavation of impacted soils in southwest corner. View is southwest.



Photograph 2: Excavation of impacted soils on the west wall. View is west.

APPENDIX B
LABORATORY ANALYTICAL REPORT





4640 Pecos Street | Unit C | Denver, Colorado 80211
303.433.1322 Phone 303.265.9645 Fax

March 04, 2009

LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Dodek
Project Number: NEP0902
Project: Noble - Schmidt 30-11G, 12G

Attached are the analytical results for Noble - Schmidt 30-11G, 12G received by Origins Laboratory, Inc. 3/3/2009 4:35:00PM. Please let us know if you have any questions, or if we can help with anything at all.

A handwritten signature in black ink, appearing to read "Noelle E Doyle", is written over a light gray rectangular background.

Laboratory Manager
Noelle E Doyle

The analytical results in the following report were analyzed under the guidelines of EPA Methods specified in SW-846. The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. This laboratory report is intended solely for the above addressee and it is only to be used and or reproduced in its entirety.

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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Dodek
Project Number: NEP0902
Project: Noble - Schmidt 30-11G,
12G

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
SS 01 (7')	X903006-01	Soil	3/3/2009 8:10:00AM	03/03/2009 16:35
SS 02 (8')	X903006-02	Soil	3/3/2009 8:42:00AM	03/03/2009 16:35
SS 03 (4')	X903006-03	Soil	3/3/2009 8:45:00AM	03/03/2009 16:35
SS 04 (4')	X903006-04	Soil	3/3/2009 8:47:00AM	03/03/2009 16:35
SS 05 (4')	X903006-05	Soil	3/3/2009 8:49:00AM	03/03/2009 16:35
SS 06 (8')	X903006-06	Soil	3/3/2009 8:51:00AM	03/03/2009 16:35
SS 07 (4')	X903006-07	Soil	3/3/2009 8:53:00AM	03/03/2009 16:35
SS 08 (6')	X903006-08	Soil	3/3/2009 8:55:00AM	03/03/2009 16:35
SS 09 (7')	X903006-09	Soil	3/3/2009 9:05:00AM	03/03/2009 16:35
SS 10 (7')	X903006-10	Soil	3/3/2009 9:45:00AM	03/03/2009 16:35
SS 11 (14')	X903006-11	Soil	3/3/2009 11:30:00AM	03/03/2009 16:35
SS 12 (6')	X903006-12	Soil	3/3/2009 12:45:00PM	03/03/2009 16:35
SS 13 (9')	X903006-13	Soil	3/3/2009 2:05:00PM	03/03/2009 16:35

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.

Noelle E Doyle, Laboratory Manager



LT Environmental, Inc.
 4600 West 60th Avenue
 Arvada CO 80003

Brian Dodek
 Project Number: NEP0902
 Project: Noble - Schmidt 30-11G,
 12G

Handwritten: X903006

page 1 of 2



originslaboratory.com

Client: LT E
 Address: LT E
 Telephone Number: ON FILE
 E-Mail Address: ON FILE

Project Manager: BDD
 Project Name: Schmidt 30-11G, 12G
 Project Number: NEP0902
 Samples Collected by: TED

Sample ID - Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO ₃	Other -	Other -	Groundwater	Soil			Air - Summa Canister #
SS 01 (7')	3/3/09	8:10	1	X									1 Please run
SS 02 (8')	3/3/09	8:42	1										2
SS 03 (4')	3/3/09	8:45	1										3 08, 10, 13
SS 04 (4')	3/3/09	8:47	1										4
SS 05 (4')	3/3/09	8:49	1										5 first and
SS 06 (8')	3/3/09	8:51	1										6 call w/
SS 07 (4')	3/3/09	8:53	1										7 results
SS 08 (6')	3/3/09	8:55	1										8 thenes!
SS 09 (7')	3/3/09	8:58	1										9
SS 10 (7')	3/3/09	9:00	1										10
Relinquished by: <u>SSC</u>				Date	Time	Received by: <u>[Signature]</u>				Date	Time	Temperature Upon Receipt: <u>0.8C</u>	
Relinquished by: <u>[Signature]</u>				Date	Time	Received by: <u>[Signature]</u>				Date	Time	Turn Around Time: <u>24-hr</u>	
				Date	Time					Date	Time	Standard	

4640 North Pecos Street | Unit C, Denver, Colorado 80211 | Laboratory - 303.433.1322 | Fax - 303.265.9645

Origins Laboratory, Inc.

Handwritten signature: Noelle E Doyle

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Brian Dodek
Project Number: NEP0902
Project: Noble – Schmidt 30–11G,
12G

SS 01 (7')
X903006–01 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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Origins Laboratory, Inc.

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Project: Noble – Schmidt 30–11G,
12G

SS 02 (8')
X903006–02 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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Project: Noble – Schmidt 30–11G,
12G

SS 03 (4')
X903006–03 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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Origins Laboratory, Inc.

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Project Number: NEP0902
Project: Noble – Schmidt 30–11G,
12G

SS 04 (4')
X903006–04 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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Project: Noble – Schmidt 30–11G,
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SS 05 (4')
X903006–05 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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SS 06 (8')
X903006–06 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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SS 07 (4')
X903006–07 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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12G

SS 08 (6')
X903006–08 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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Project: Noble - Schmidt 30-11G,
12G

SS 09 (7')
X903006-09 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6-C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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SS 10 (7')
X903006–10 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	79.3	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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Project: Noble – Schmidt 30–11G,
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SS 11 (14')
X903006–11 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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Origins Laboratory, Inc.

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Brian Dodek
Project Number: NEP0902
Project: Noble – Schmidt 30–11G,
12G

SS 12 (6')
X903006–12 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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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.

Noelle E Doyle, Laboratory Manager

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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Dodek
Project Number: NEP0902
Project: Noble – Schmidt 30–11G,
12G

SS 13 (9')
X903006–13 (Soil)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

Gasoline Range Organics (GRO) by EPA 8015M

Gasoline (C6–C10)	ND	50.0	mg/kg	1	9C03002	03/03/2009	03/04/2009
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 12G

Extractable Petroleum Hydrocarbons by 8015M – Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9C03002 – Default Prep GC–Semi										
Blank (9C03002–BLK1)					Prepared: 03/03/2009 Analyzed: 03/04/2009					
Gasoline (C6–C10)	ND	50.0	mg/kg							
LCS (9C03002–BS1)					Prepared: 03/03/2009 Analyzed: 03/04/2009					
Gasoline (C6–C10)	573	50.0	mg/kg	500		115	65–135			
Matrix Spike (9C03002–MS1)					Source: X903006–01 Prepared: 03/03/2009 Analyzed: 03/04/2009					
Gasoline (C6–C10)	598	50.0	mg/kg	500	ND	120	65–135			
Matrix Spike Dup (9C03002–MSD1)					Source: X903006–01 Prepared: 03/03/2009 Analyzed: 03/04/2009					
Gasoline (C6–C10)	607	50.0	mg/kg	500	ND	121	65–135	1.57	25	

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Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

Origins Laboratory, Inc.

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