

# Savage and Savage *Environmental*

*practical solutions for environmental issues*

4610 Haystack Drive  
Windsor, Colorado 80550

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savageandsavage@earthlink.net



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## Transmittal

**To:** Ryan Hawkins  
**Company:** Noble Energy, Inc.  
**Address:** 804 Grand Avenue  
**City, State, Zip:** Platteville, CO 80651

**From:** Edith Savage  
**Company:** Savage and Savage, Inc.  
**Project:** Betz PC G09-22D, Wetland Delineation  
and Corps Concurrence  
**Phone:** 970-674-8080  
**Fax:** 970-674-8088  
**Date:** August 6, 2011

Attached for your review is the Betz PC G09-22D wetland delineation and Corps concurrence request. Upon your approval I will submit this package to the Corps.

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September 7, 2011

Terry McKee  
U.S. Army Corps of Engineers  
9307 South Wadsworth Blvd.  
Littleton, Colorado 80128-6901

**RE: Concurrence Request for Noble Energy Production, Inc.'s  
Betz PC G09-22D Well Site, Weld County, Colorado  
Corps File No. NWO-2010-1405-DEN**

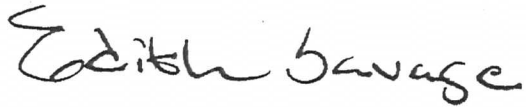
Dear Mr. McKee:

Savage and Savage conducted a wetland delineation within the proposed Noble Energy, Betz PC G09-22D well site on August 9, 2011. This delineation was conducted in order to determine the presence and extent of wetlands within the proposed drill site. Hydrophytic vegetation was identified within three of the sample locations, however hydric soil and wetland hydrology were not identified within these sample sites (Sample Points 001, 003, 004). Hydrophytic vegetation, hydric soil, and wetland hydrology were identified within Sample Point 002. Wetlands are present along the south end of the field.

The proposed drill site is located approximately 0.13 miles west of Weld County Roads 46 and 43. The latitude of the project site is 40.321019 degrees north and longitude is 104.661109 degrees west. The site is located within the SE $\frac{1}{4}$ SE $\frac{1}{4}$  of Section 9, Township 4 North, Range 65 West of the 6<sup>th</sup> Prime Meridian, Weld County, Colorado.

The Betz PC G09-22D drill pad will be approximately 2.8 acres and will be located outside the wetland depicted on the wetland delineation aerial photograph. We request the Corps concur with our conclusion that there are no wetlands located within the proposed Betz PC G09-22D drill pad. If you have any questions or require further information about this site please contact me.

Sincerely,

A handwritten signature in black ink that reads "Edith Savage". The signature is written in a cursive, flowing style.

Edith Savage  
Principal

attachment: Betz PC G09-22D Drill Site Wetland Delineation

c: Ryan Hawkins, Noble Energy, Inc.

**NOBLE ENERGY PRODUCTION, INC.  
BETZ PC G09-22D DRILL SITE  
WATERS OF THE UNITED STATES IDENTIFICATION  
AND WETLAND DELINEATION  
WELD COUNTY, COLORADO**



Prepared by: Savage and Savage, Inc.  
4610 Haystack Drive  
Windsor, CO 80550  
970 674 8080

September 2011



## **TABLE OF CONTENTS**

	<u>Page</u>
INTRODUCTION	1.
STUDY METHODS	1.
PROJECT DESCRIPTION	2.
SITE DESCRIPTION	2.
RESULTS/CONCLUSION	3.
LITERATURE CITED	4.
FIGURES	5.
APPENDIX	12.

## **FIGURES**

1. Noble Energy Betz PC G09-22D Well General Location Map
2. Betz PC G09-22D Sample Point 1. Facing West
3. Betz PC G09-22D Sample Point 2. Facing West
4. Betz PC G09-22D Sample Point 3. Facing West
5. Betz PC G09-22D Sample Point 4. Facing West
6. Betz PC G09-22D Wetland Delineation (South Area)

## **APPENDIX**

U.S. Army Corps of Engineers Great Plains – Interim Version Data Sheets

## INTRODUCTION

Savage and Savage conducted a wetland delineation within the proposed Betz PC G09-22D drill site for Noble Energy Production, Inc. on August 9, 2011. The proposed drill site is located approximately 0.13 miles west of Weld County Roads 46 and 43, and is accessed by taking U.S. Highway 85 south from Greeley to La Salle (Main Street), South on Main Street to Todd Avenue (Weld County Road 50), east on Weld County Road 50 for approximately 2.25 miles to Weld County Road 43, south on Weld County Road 43 to the intersection of County Roads 43 and 46, west approximately 0.13 miles, then north onto an oil and gas access road. The latitude of the project site is 40.321019 degrees north and longitude is 104.661109 degrees west. The average elevation of the project site is 4710 feet. The site is located within the SE $\frac{1}{4}$ SE $\frac{1}{4}$  of Section 9, Township 4 North, Range 65 West of the 6<sup>th</sup> Prime Meridian, Weld County, Colorado (Figure 1).

## STUDY METHODS

A wetland delineation was conducted in accordance with the requirements of the U.S. Army Corps of Engineers Wetlands Delineation Manual and Interim Supplement (USACE, 1987, 2008). To determine the areas subject to Corps jurisdiction, three criteria were evaluated: (1) evidence of a hydrologic regime reflecting saturation or periodic inundation by surface or ground water of sufficient duration and frequency, (2) soils which are considered hydric by classification or field characteristics indicating anaerobic conditions, and (3) a prevalence of vegetation typically adapted to areas of wetland hydrology and soils.

At four sample points within the proposed drill site the three wetland criteria were evaluated. Dominant individual plant species were identified, and their wetland indicator status was assessed (USFWS, 1988). Evidence of the hydrologic regime was collected and evaluated. A soil test pit was dug using a core auger to approximately 20 inches from the soil surface. Soil horizons were inspected and described using texture, soil color (Munsell, 1992), and moisture. Observations were recorded on the attached USACE

Great Plains – Interim Version approved data sheet (Figures 2 – 5 depict the sample points).

## **PROJECT DESCRIPTION**

Proposed temporary disturbance will include construction of a drill pad that is approximately 2.8 acres. Permanent disturbance will include one fenced well head located on the drill pad remnant. The existing tank battery will be expanded for this project.

## **SITE DESCRIPTION**

The significant topographic feature in the vicinity of the site is the Lower Latham Reservoir that is located approximately 1.25 miles northeast of the drill site and the Behrens Reservoir that is approximately 0.5 miles west of the drill site. The proposed disturbance area is a flat field that is used for grazing cattle.

The field is lower in elevation than the surrounding fields. Pivot irrigation is located to the south and upgradient of the project site. Some wetland vegetation is evidence of increased surface water runoff to this site.

One dominant soil map unit was identified in the area of the proposed project site. According to the Soil Survey of Weld County, Southern Part (1980), Loup-Boel loamy sands (0 to 3 percent slopes) are located within the area. This map unit is a nearly level map unit.

The Boel soil is deep and somewhat poorly drained and formed in stratified sandy alluvium. Typically the surface layer is grayish brown loamy sand about 14 inches thick. The water table is usually about 24 to 36 inches below the surface. Boel soil is not defined by the U.S. Army Corps of Engineers as hydric. On-site observation of soils within the site confirmed the presence of this soil map unit within the field.

Dominant plant species within the field are inland saltgrass (*Distichlis spicata*), three-square (*Scirpus Americanus*), Kentucky bluegrass (*Poa pratensis*), and meadow foxtail (*Hordeum jubatum*). Dominant plant species with the wet meadow wetland include meadow foxtail and three-square.

## RESULTS/CONCLUSION

Savage and Savage conducted a wetland delineation at the proposed Noble Energy Production Betz PC G09-22D well site on August 9, 2011. This delineation was conducted in order to determine the presence and extent of wetlands within the proposed drill site. Hydrophytic vegetation was identified within three of the sample locations, however hydric soil and wetland hydrology were not identified within these sample sites (Sample Points 001, 003, 004). Hydrophytic vegetation, hydric soil, and wetland hydrology were identified within Sample Point 002. Wetlands are present along the south end of the field. (Figure 6).

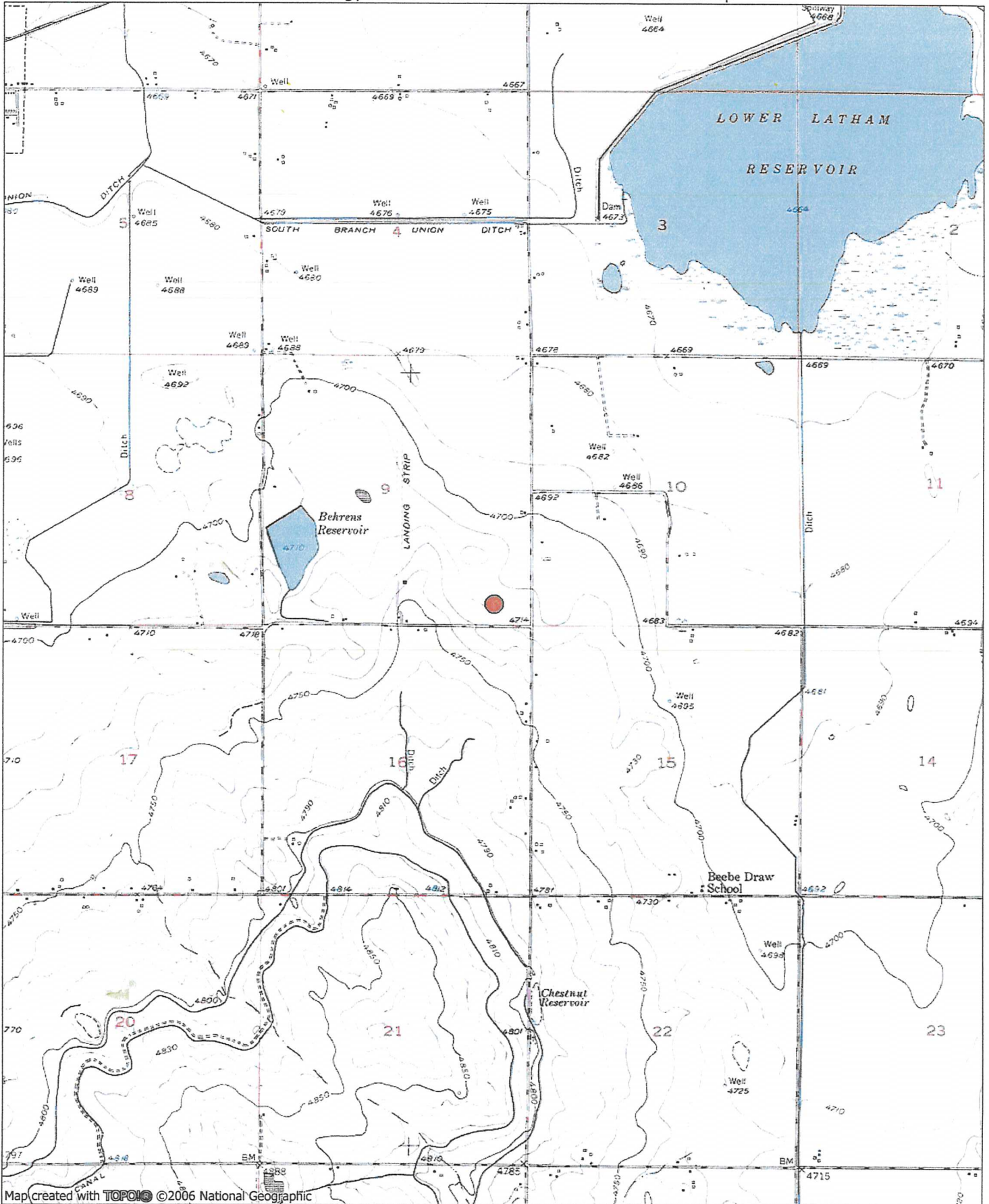


## LITERATURE CITED

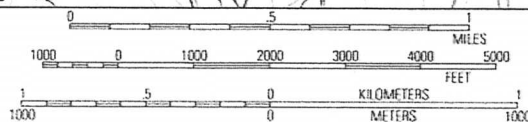
- Killmorgen Instruments Corp. 1992. Munsell® Soil Color Charts. Newburg, NW.
- Munshower, Frank F. 1991. Perennial Grasses for Revegetation of Disturbed Lands in the Northern Great Plains and the Intermountain Region. Reclamation Research Unit, Montana State University, Bozeman, Montana.
- U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi.
- U.S. Army Corps of Engineers. 2008. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region, ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble, ERDC/EL TR-08-12. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- U.S. Department of Agriculture Soil Conservation Service. 1980. Soil Survey of Weld County, Colorado, Southern Part.
- U.S. Fish and Wildlife Service. 1988. National List of Plant Species that Occur in Wetlands: Central Plains (Region 5). U.S. Department of Interior, Fish and Wildlife Service Research and Project, Biological Report 88(26.5), Washington, D.C.

## FIGURES

# Noble Energy Betz PC G09-22D Well General Location Map



Map created with TOPO! © 2006 National Geographic



TN MN  
9 1/2°  
09/06/11

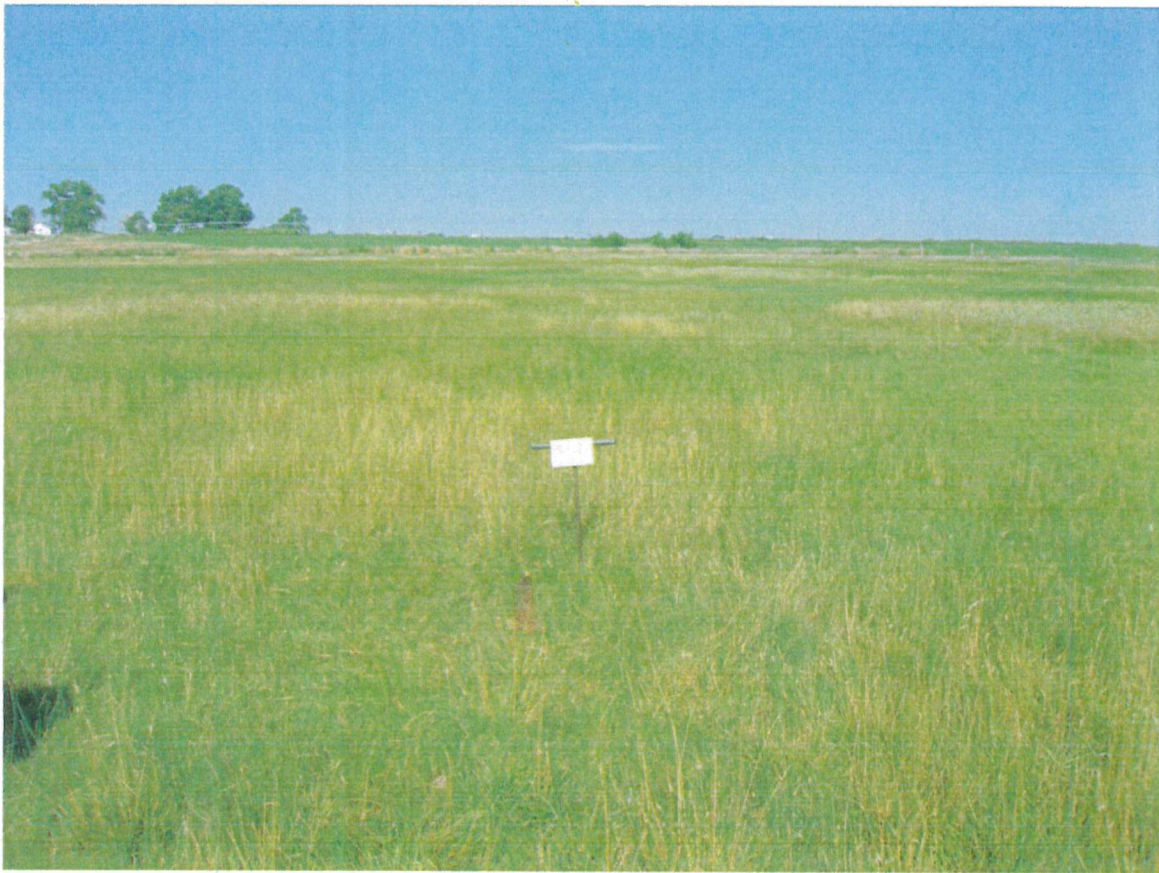


**Figure 2. Betz PC G09-22D Sample Point 1. Facing West**





**Figure 3. Betz PC G09-22D Sample Point 2. Facing West**



**Figure 4. Betz PC G09-22D Sample Point 3. Facing West**

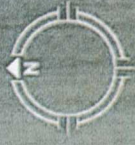




**Figure 5. Betz PC G09-22D Sample Point 4. Facing West**



Noble Energy Betz PC G09-22 D Wetland Delineation (South Area)



Drill Pad Location

004

003

001

002

Wetlands

Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
© 2011 Google  
Image © 2011 DigitalGlobe

367 ft

G0922D

Google™  
© 2007



## APPENDIX

1. Locality: BETZ PCG09-22D City/County: WAD Sampling Date: AVG 9. 2011  
 2. Plant Owner: NOBLE ENERGY State: CO Sampling Point: 001  
 3. Investigator(s): N. S. SAVAGE / E. A. SAVAGE Section, Township, Range: SEC 9, T4N, R65W  
 4. Form (hillslope, terrace, etc.): FLAT FIELD Local relief (concave, convex, none): (none) Slope (%): <1  
 5. Region (LRR): \_\_\_\_\_ Lat: \_\_\_\_\_ Long: \_\_\_\_\_ Datum: \_\_\_\_\_  
 6. Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

Irophytic Vegetation Present?      Yes _____ No <u>X</u> Iric Soil Present?                      Yes _____ No <u>X</u> Land Hydrology Present?            Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland?                      Yes _____ No <u>X</u>
marks: 30' W OF TANK FARM FENCE 75' S OF TANK FARM N BOUNDARY TANK FARM 30' WIDE FROM RD ADDITIONAL VEGETATION & SOIL PRESENCE DUE TO ADJACENT IRRIGATION ONLY	

Great Plains – Interim Version

## SOIL

Sampling Point: 001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>		
0-2"	7.5YR 2.5/1	95	NONE			CLAY LOAM	
2-11"	7.5YR 4/3	95	NONE			CLAYEY SAND	
11-20"	7.5YR 4/3	95	NONE			SANDY CLAY	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<sup>3</sup> Indicators of hydrophytic vegetation and
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	wetland hydrology must be present,
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> (MLRA 72 & 73 of LRR H)	unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No ☒

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

<u>Primary Indicators (minimum of one required; check all that apply)</u>		<u>Secondary Indicators (minimum of two required)</u>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> (where tilled)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> (where not tilled)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)

**Field Observations:**

Surface Water Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Water Table Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	
Saturation Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	

(includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: BETZ PCG09-22D City/County: WELD Sampling Date: AUG 9, 2011  
 Applicant/Owner: NOBLE ENERGY State: CO Sampling Point: 002  
 Investigator(s): MS SAVAGE / EA SAVAGE Section, Township, Range: SEC 9, TAN, R6SW  
 Landform (hillslope, terrace, etc.): FLAT FIELD Local relief (concave, convex, none): (none) Slope (%): <1  
 Subregion (LRR): \_\_\_\_\_ Lat: \_\_\_\_\_ Long: \_\_\_\_\_ Datum: \_\_\_\_\_  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: <u>200' E OF TANK FARM FENCE, 75' SOUTH OF TANK FARM N BOUNDARY</u>		

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>N/A</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>2</u> (A)  Total Number of Dominant Species Across All Strata: <u>2</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Indicators: ___ Dominance Test is >50% ___ Prevalence Index is ≤3.0 <sup>1</sup> ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Sapling/Shrub Stratum (Plot size: <u>N/A</u> )				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <u>X</u> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Remarks:
Herb Stratum (Plot size: <u>10'x10'</u> )				
1. <u>SCIRPUS AMERICANUS</u>	<u>30</u>	<u>Y</u>	<u>OBL</u>	
2. <u>HORDEUM jubatum</u>	<u>45</u>	<u>Y</u>	<u>FACW</u>	
3. <u>BROMUS inermis</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	Remarks:
4. <u>CIRSILIUM arvense</u>	<u>3</u>	<u>N</u>	<u>FAC</u>	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	Remarks:
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
_____ = Total Cover				Remarks:
Woody Vine Stratum (Plot size: <u>N/A</u> )				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				Remarks:
% Bare Ground in Herb Stratum <u>10%</u>				
Remarks:				
Remarks:				



Sampling Point: 002

## HYDROLOGY

Great Plains – Interim Version

# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: BETZ PC G09-22D City/County: WAB Sampling Date: AUG 9, 2011  
 Applicant/Owner: NOBLE ENERGY State: CO Sampling Point: 003  
 Investigator(s): MS SAVAGE / IEA SAVAGE Section, Township, Range: S10, T4N, R6SW  
 Landform (hillslope, terrace, etc.): FLAT FIELD Local relief (concave, convex, none): (none) Slope (%): <1  
 Subregion (LRR): \_\_\_\_\_ Lat: \_\_\_\_\_ Long: \_\_\_\_\_ Datum: \_\_\_\_\_  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	
Remarks: <u>50' WEST OF PROPOSED DRILL SITE FENCE (SW CORNER)</u> <u>PROPOSED DRILL SITE 165' WIDE FROM ROAD</u>		

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
= Total Cover				Hydrophytic Vegetation Indicators: ___ Dominance Test is >50% ___ Prevalence Index is ≤3.0 <sup>1</sup> ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Sapling/Shrub Stratum (Plot size: _____)	_____	_____	_____	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
= Total Cover				Hydrophytic Vegetation Present? Yes <u>X</u> No _____
Herb Stratum (Plot size: <u>10'x10'</u> )	_____	_____	_____	
1. <u>Dactylis spicata</u>	<u>30</u>	<u>Y</u>	<u>NT(FA)</u>	
2. <u>Scirpus americanus</u>	<u>10</u>	<u>Y</u>	<u>OBL</u>	
3. <u>Hordeum jubatum</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>	
4. <u>Poa pratensis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	Remarks:
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
= Total Cover				Remarks:
Woody Vine Stratum (Plot size: _____)	_____	_____	_____	
1. _____	_____	_____	_____	Remarks:
2. _____	_____	_____	_____	
% Bare Ground in Herb Stratum <u>15</u>	_____	_____	_____	Remarks:
= Total Cover				

## SOIL

Sampling Point: 003

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features			Loc <sup>2</sup>	Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>			
0-4"	7.5YR 2.5/1	95	NONE				CLAY LOAM	
4-18"	7.5YR 4/3		NONE				CLAYEY SAND	
18-24"	7.5YR 4/3		NONE				SANDY CLAY	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils<sup>3</sup>:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	(LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<sup>3</sup> Indicators of hydrophytic vegetation and
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	wetland hydrology must be present,
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	(MLRA 72 & 73 of LRR H)	unless disturbed or problematic.

Restrictive Layer (if present):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No ☒

Remarks:

## HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (minimum of two required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	(where tilled)
<input type="checkbox"/> Drift Deposits (B3)	(where not tilled)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_

Water Table Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_

Saturation Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)Wetland Hydrology Present? Yes \_\_\_\_\_ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: BETZ PC 609-22D City/County: WELD Sampling Date: Aug 9, 2011  
 Applicant/Owner: NOBLE ENERGY State: CO Sampling Point: 004  
 Investigator(s): MS SAVAGE / EA SAVAGE Section, Township, Range: 5E, 9, TAN, R65W  
 Landform (hillslope, terrace, etc.): FLAT FIELD Local relief (concave, convex, none): (none) Slope (%): <1  
 Subregion (LRR): \_\_\_\_\_ Lat: \_\_\_\_\_ Long: \_\_\_\_\_ Datum: \_\_\_\_\_  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes _____ No <u>X</u>	
Remarks: <u>300' SOUTH OF PASTURE FENCE, 50' WEST OF PROPOSED DRILL PAD BOUNDARY FENCE; ~ 100' WEST OF EXISTING DRILL HEAD (290' SOUTH OF PASTURE FENCE) PROPOSED DRILL PAD 420' (N-S),</u>	

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>N/A</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>1</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____				
				<b>Prevalence Index worksheet:</b>
Sapling/Shrub Stratum (Plot size: <u>N/A</u> ) _____ = Total Cover				Total % Cover of: _____ Multiply by: _____
1. _____				OBL species <u>0</u> x 1 = _____
2. _____				FACW species <u>1</u> x 2 = <u>2</u>
3. _____				FAC species <u>45</u> x 3 = <u>135</u>
4. _____				FACU species <u>7</u> x 4 = <u>28</u>
5. _____				UPL species <u>0</u> x 5 = _____
				Column Totals: <u>53</u> (A) _____ (B)
Herb Stratum (Plot size: <u>10'X10'</u> ) _____ = Total Cover				Prevalence Index = B/A = <u>3.1</u>
1. <u>Distichlis spicata</u>	<u>45</u>	<u>Y</u>	<u>NO (FAC)</u>	<b>Hydrophytic Vegetation Indicators:</b> <u>X</u> Dominance Test is >50% _____ Prevalence Index is ≤3.0 <u>(NO)</u> _____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) _____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Ra. pratensis</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	
3. <u>Hurdia jubatum</u>	<u>1</u>	<u>N</u>	<u>FACW</u>	
4. <u>Dactylis glomerata</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
Woody Vine Stratum (Plot size: <u>N/A</u> ) <u>53</u> = Total Cover				<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____
1. _____				
2. _____				
% Bare Ground in Herb Stratum <u>15%</u> _____ = Total Cover				
Remarks:				

Sampling Point: 004

## HYDROLOGY

Great Plains – Interim Version