Savage and Savage ***Environmental***

practical solutions for environmental issues

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savageandsavage@earthlink.net

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 SE¼SE¼ of Section 9, Township 4 North, Range 65 West of the 6th 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,

Edith Savage

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

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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 SE¼SE¼ of Section 9, Township 4 North, Range 65 West of the 6th 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.

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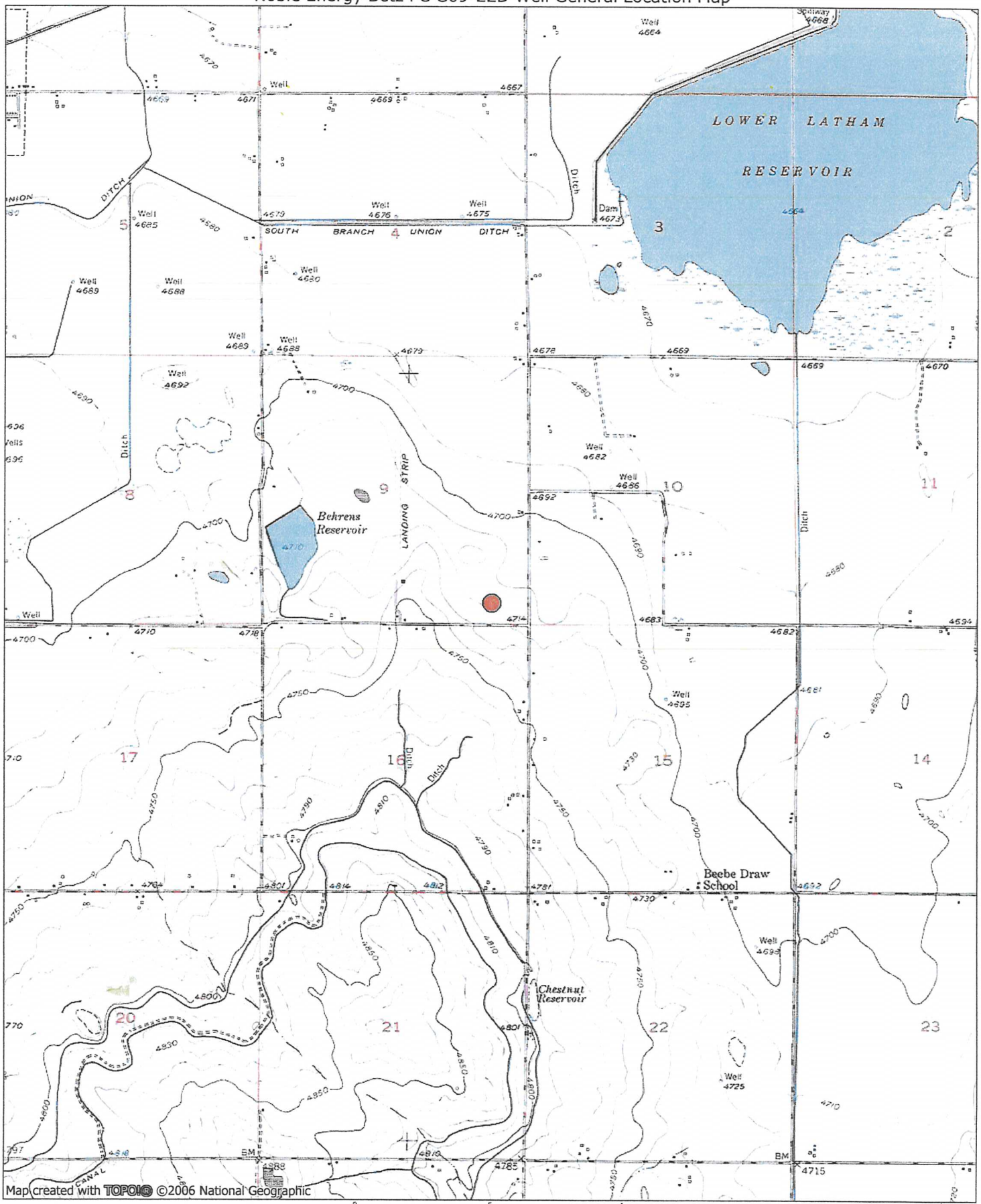
U.S. Army Corps of Engineers. 2008. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region, ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble, ERDC/EL TR-08-12. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

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



NATIONAL GEOGRAPHIC

0 .5 1 MILES

1000 0 1000 2000 3000 4000 5000 FEET

1 .5 0 .5 1 KILOMETERS

1000 0 1000 METERS

TN MN

9½°

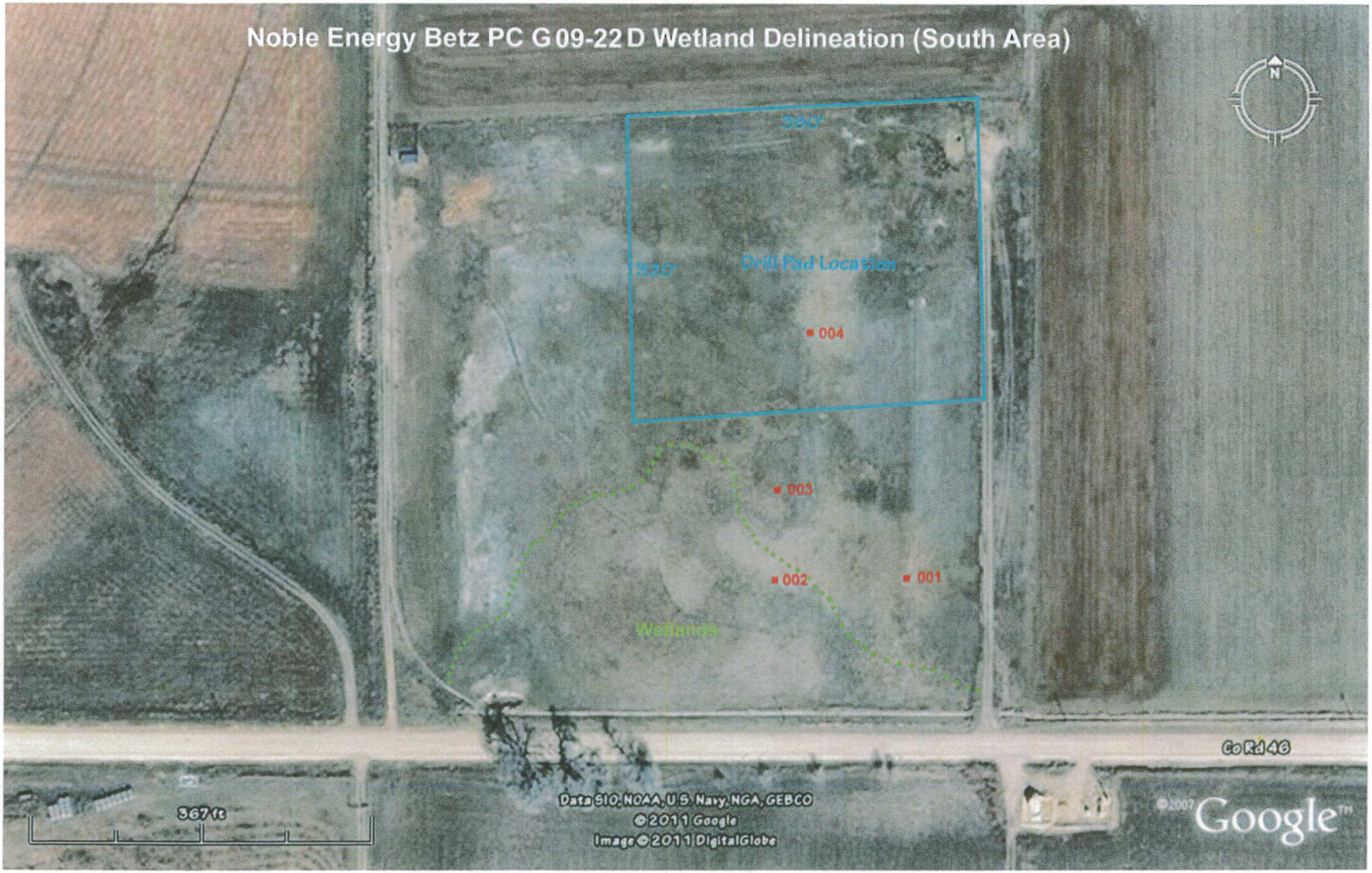
09/06/11

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 G 09-22 D Wetland Delineation (South Area)
N
300'
320'
Drill Pad Location
004
003
002
001
Wetlands
Co Rd 46
367 ft
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2011 Google
Image © 2011 DigitalGlobe
© 2007 Google

APPENDIX

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: BETZ PC-GC9-22D City/County: WELD Sampling Date: AUG 9, 2011

Applicant/Owner: NOBLE ENERGY State: CO Sampling Point: 001

Investigator(s): MS SAVAGE / EA SAVAGE Section, Township, Range: SEC 9, T4N, R65W

Landform (hillslope, terrace, etc.): FLAT FIELD Local relief (concave, convex, (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 X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks: 30' W OF TANK FARM FENCE
75' S OF TANK FARM N BOUNDARY
TANK FARM 30' WIDE FROM RD.
TRANSITIONAL VEGETATION & SOIL, PRESENCE DUE TO ADJACENT IRRIGATION ONLY

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 10'X10')			
1. Scirpus americanus	40	Y	OBL
2. Hordeum jubatum	2	N	FACW
3. Poa pratensis	25	Y	FACU
4. Melilotus alba	2	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	69 = Total Cover		
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	69 = Total Cover		

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species 40	x 1 =	40
FACW species 2	x 2 =	4
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species 27	x 5 =	135
Column Totals: 69 (A)		179 (B)

Prevalence Index = B/A = 2.6

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 001

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

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

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

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 G09-22D 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, T4N, R65W

Landform (hillslope, terrace, etc.): FLAT FIELD Local relief (concave, convex, 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 X No _____	Is the Sampled Area within a Wetland? Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: 200' E OF TANK FARM FENCE, 75' SOUTH OF TANK FARM N BOUNDARY

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 10'X10')			
1. Scirpus americanus	30	Y	OBL
2. Hordeum jubatum	15	Y	FACW
3. Bromus inermis	2	N	FACU
4. Cirsium arvense	3	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	45	x 2 =	90
FAC species	3	x 3 =	9
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	80 (A)		137 (B)

Prevalence Index = B/A = 1.7

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 002

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3"	7.5YR 2.5/1	95	NONE				CLAY LOAM	
3-21+"	7.5YR 3/2	95	NONE				SANDY LOAM	

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

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes X 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 G09-22D City/County: WELD Sampling Date: AUG 9, 2011
Applicant/Owner: NOBLE ENERGY State: CO Sampling Point: 003
Investigator(s): MS SAVAGE / EA SAVAGE Section, Township, Range: SEC 9, T4N, R65W
Landform (hillslope, terrace, etc.): FLAT FIELD Local relief (concave, convex, 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 X No _____
Hydric Soil Present? Yes _____ No X
Wetland Hydrology Present? Yes _____ No X
Is the Sampled Area within a Wetland? Yes _____ No X

Remarks: 50' WEST OF PROPOSED DRILLSITE FENCE (SW CORNER)
PROPOSED DRILL SITE 165' WIDE FROM ROAD

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
_____ = Total Cover			
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
_____ = Total Cover			
Herb Stratum (Plot size: 10'X10')			
1. Distichlis spicata	30	Y	NI (FAC)
2. Scirpus americanus	10	Y	OBL
3. Hordeum jubatum	10	Y	FACW
4. Poa pratensis	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
55 = Total Cover			
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
_____ = Total Cover			

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	10	x 2 =	20
FAC species	30	x 3 =	90
FACU species	5	x 4 =	20
UPL species	_____	x 5 =	_____
Column Totals:	55 (A)		140 (B)

Prevalence Index = B/A = 2.5

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 003

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

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

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): _____

Water Table Present? Yes ____ No ____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

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: SEC 9, T4N, R65W
Landform (hillslope, terrace, etc.): FLAT FIELD Local relief (concave, convex, (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 X	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks: 200' 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),

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 10'X10')			
1. Distichlis spicata	45	Y	NI (FAC)
2. Poa pratensis	2	N	FACU
3. Hordeum jubatum	1	N	FACW
4. Dactylis glomerata	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	53 = Total Cover		
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 15%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 0	x 1 =
FACW species 1	x 2 = 2
FAC species 45	x 3 = 135
FACU species 7	x 4 = 28
UPL species 0	x 5 =
Column Totals: 53 (A)	(B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
___ Prevalence Index is ≤3.0 (NO)
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 004

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	7.5YR 2.5/1	95	NONE				SANDY LOAM	
4-23+"	7.5YR 4/3	95	NONE				SANDY LOAM	

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

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

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- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
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- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

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

Remarks: