

Savage and Savage *Environmental*

practical solutions for environmental issues

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February 27, 2012

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
Olson USX 029-20D and Nanda USX 029-18D and 21D Well Pad,
Weld County, Colorado**

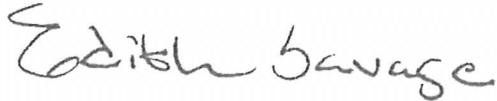
Dear Mr. McKee:

Savage and Savage conducted a wetland delineation within the proposed Noble Energy, Olson USX 029-20D and Nanda USX 029-18D and 21D well pad on February 22, 2012. This delineation was conducted in order to determine the presence and extent of wetlands within the proposed drill site. Hydrophytic vegetation, hydric soil, and wetland hydrology were not identified at Sample Points 001 and 002, or within the proposed disturbance envelope. Wetlands were not present within the proposed well pad.

The proposed well pad is located southeast of the intersection of Weld County Roads 42 and 15 in Weld County, Colorado. The latitude of the project site is 40.28906 degrees North and longitude is 104.92128 degrees West. The site lies within Section 29, Township 4 North, Range 67 West of the 6th Prime Meridian, Weld County, Colorado.

The Olson USX 029-20D and Nanda USX 029-18D and 21D well pad will be approximately 2.0 acres. The proposed well pad is not located within a wetland. We request the Corps concur with our conclusion that there are no wetlands located within the proposed Olson USX 029-20D and Nanda USX 029-18D and 21D well site. 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: Olson USX 029-20D and Nanda USX 029-18D and 21D Well Pad
Wetland Delineation

c: Matthew Campbell, Noble Energy, Inc.

**NOBLE ENERGY, INC.
OLSON USX 029-20D AND NANDA USX 029-18D AND 21D WELL PAD
WATERS OF THE UNITED STATES IDENTIFICATION
AND WETLAND DELINEATION
WELD COUNTY, COLORADO**



Prepared by: Savage and Savage, Inc.
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970 674 8080

February 2012

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

INTRODUCTION

Savage and Savage conducted a wetland delineation for the proposed Olson USX 029-20D and Nanda USX 029-18D and 21D well pad for Noble Energy, Inc. on February 22, 2012. The proposed well pad is located southeast of the intersection of Weld County Roads 42 and 15 in Weld County, Colorado (Figure 1.). From the intersection of U.S. Highway I-25 and State Highway 60, the site is accessed by traveling east on State Highway 60 to Weld County Road 15, south on Weld County Road 15 for approximately 3.1 miles, then east at a homestead onto an undeveloped road for approximately 0.25 miles to the site. The latitude of the project site is 40.28906 degrees North and longitude is 104.92128 degrees West. The average elevation of the project site is 4928 feet. The site lies within Section 29, Township 4 North, Range 67 West of the 6th Prime Meridian, Weld County, Colorado.

STUDY METHODS

A wetland delineation was conducted within the boundary of the proposed disturbance site 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 two sample points within the proposed disturbance envelope 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. Soil test pits were 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 sheets.

PROJECT DESCRIPTION

Proposed temporary disturbance will include construction of one drill pad that is approximately 2.0 acres in size within the investigated disturbance envelope. Permanent disturbance will include two fenced well heads located on the drill pad remnant.

SITE DESCRIPTION

The dominant hydrologic and topographic feature in the area is an unnamed ditch located south of the proposed pad site. The unnamed ditch is an arm of the Hillsboro Ditch. The site is surrounded on the north and east by agricultural fields; the south by the unnamed ditch and the west by a homestead.

According to the Soil Survey of Weld County, Northern Part, Nunn clay loam (1 to 3 percent slopes) is located within the northwest portion of the well pad and Kim loam (3 to 5 percent slopes) is located within the southeast portion of the well pad.

Nunn clay loam is well drained and is located on terraces and smooth plains. It formed in mixed alluvium and eolian deposits. The surface layer is grayish brown clay loam about nine inches thick. The subsoil is light brownish gray clay loam about 14 inches thick. The upper part of the substratum is brownish gray clay loam, the lower part is brown sandy loam to a depth of approximately 60 inches (USDA, 1980). Nunn clay loam is not defined by the U.S. Army Corps of Engineers as hydric (USACE, 1987).

Kim loam is a deep well-drained soil on smooth plains and alluvial fans. This soil is formed in mixed aeolian and parent sediment from a number of sources. The surface layer is typically a brown and pale brown loam to 10 inches in thickness. The upper 28 inches of the underlying material is pale brown loam with pale brown fine sandy loam to a depth of 60 inches (USDA, 1980). The U.S. Army Corps of Engineers does not list Kim loam as hydric (USACE, 1987). On-site observation of soils within the site confirmed the presence of this soil map unit at Sample Points 001 and 002.

During our site visit the vegetation on the northwest half of the drill pad was identified as agricultural field. Vegetation on the southeast half of the drill pad, located above and along the unnamed ditch, consists of tall wheatgrass (*Agropyron elongatum*), orchardgrass (*Dactylis glomerata*), and Kentucky bluegrass (*Poa pratensis*). These grasses were likely seeded in the area for pasture and range purposes. (Figures 2 and 3.)

The topography of the site is relatively flat and slopes gently toward the unnamed ditch. Although the proposed well pad is located along a ditch, the site consists of upland vegetation with no soil or hydrologic component indicative of jurisdictional wetlands.

RESULTS/CONCLUSION

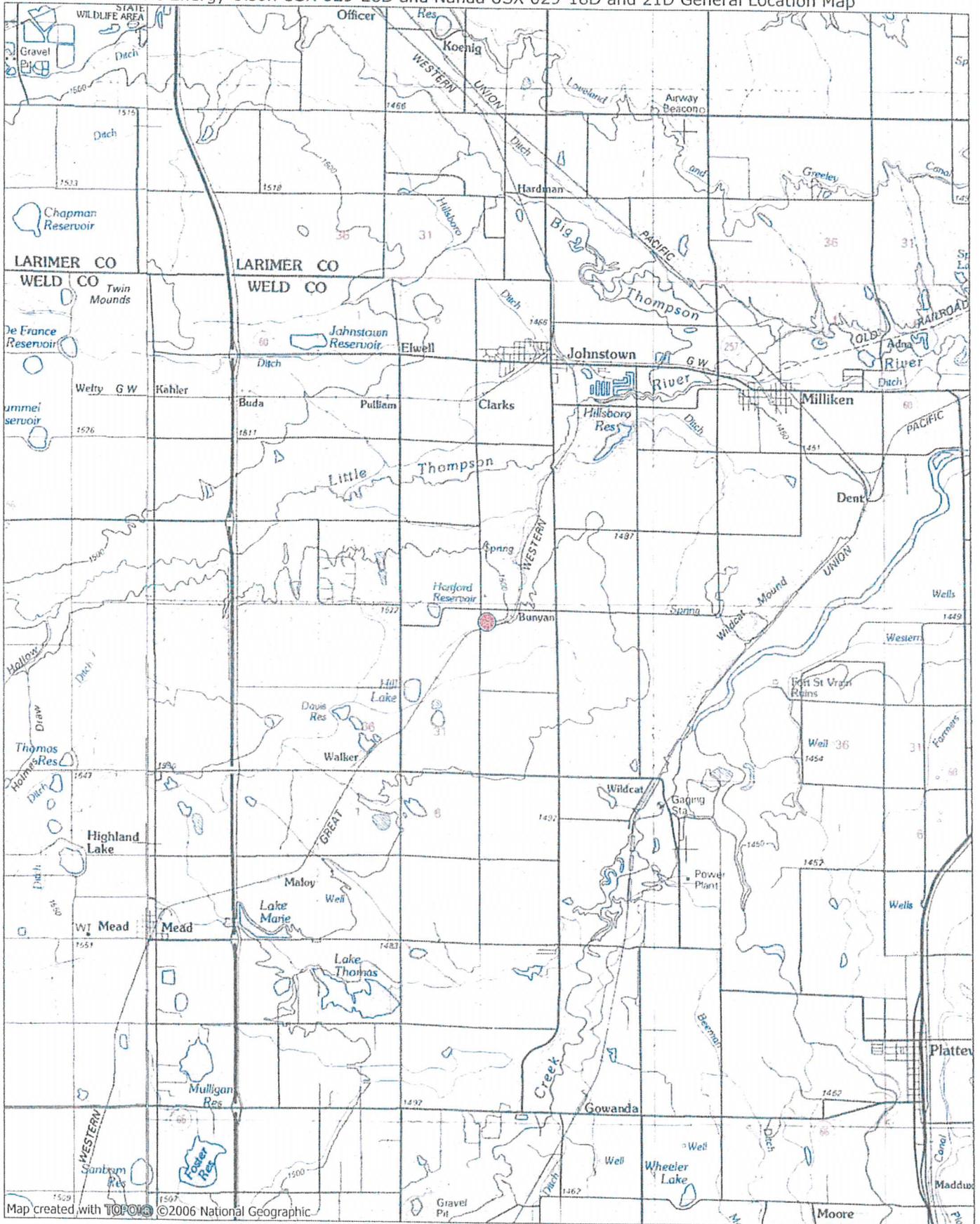
Savage and Savage conducted a wetland delineation at the proposed Noble Energy, Inc. Olson USX 029-20D and Nanda USX 029-18D and 21D well pad on February 22, 2012. This delineation was conducted in order to determine the presence and extent of wetlands at the well pad. Uplands are present in the hayfield and along the unnamed ditch. There are no wetlands present within the proposed well pad site. (Figure 4.)

LITERATURE CITED

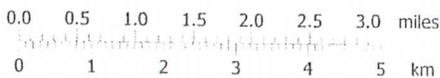
- Killmorgen Instruments Corp. 1992. Munsell® Soil Color Charts. Newburg, NW.
- U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi.
- U.S. Army Corps of Engineers. 2008. 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 Olson USX 029-20D and Nanda USX 029-18D and 21D General Location Map



Map created with TOPOGIS ©2006 National Geographic



TN MN
 9 1/2°
 02/24/12



Figure 2. Sample Point 001 – Facing East



Figure 3. Sample Point 002 – Facing East

**Noble Energy Olson USX 029-20D and Nanda USX 029-18D & 21D
Well Pad Wetland Map**



60R42

60R41B



M 001 B 002

60R3

Google

© 2012 Google
Image: U.S. Geological Survey
Data: EO, NOAA, U.S. Navy, NGA, GEBCO



APPENDIX

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: OLSEN/NANDA City/County: WELD Sampling Date: FEB 23, 2012
 Applicant/Owner: NOBLE ENERGY State: CO Sampling Point: 001
 Investigator(s): E.A. SAVAGE Section, Township, Range: S29, T4N, R67W
 Landform (hillslope, terrace, etc.): BROAD SWALE Local relief (concave, convex, none): _____ Slope (%): <1%
 Subregion (LRR): _____ Lat: 40.2894° N Long: 104.9212° W Datum: _____
 Soil Map Unit Name: KIM LOAM 3-5% SLOPES 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> | |
| Welland Hydrology Present? Yes _____ No <u>X</u> | |

Remarks:

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. _____ | _____ | _____ | _____ | |
| 3. _____ | _____ | _____ | _____ | |
| 4. _____ | _____ | _____ | _____ | |
| = Total Cover | | | | Total Number of Dominant Species Across All Strata: <u>3</u> (B) |
| Sapling/Shrub Stratum (Plot size: <u>N/A</u>) | _____ | _____ | _____ | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33%</u> (A/B) |
| 1. _____ | _____ | _____ | _____ | Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____ |
| 2. _____ | _____ | _____ | _____ | |
| 3. _____ | _____ | _____ | _____ | |
| 4. _____ | _____ | _____ | _____ | |
| 5. _____ | _____ | _____ | _____ | |
| = Total Cover | | | | 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. |
| Herb Stratum (Plot size: <u>10'x10'</u>) | _____ | _____ | _____ | |
| 1. <u>Agropyron elongatum</u> | <u>10</u> | <u>YES</u> | <u>FAC</u> | |
| 2. <u>Dactylis glomerata</u> | <u>10</u> | <u>YES</u> | <u>FACU</u> | |
| 3. <u>Poa pratensis</u> | <u>10</u> | <u>YES</u> | <u>FACU</u> | |
| 4. _____ | _____ | _____ | _____ | |
| 5. _____ | _____ | _____ | _____ | |
| 6. _____ | _____ | _____ | _____ | |
| 7. _____ | _____ | _____ | _____ | |
| 8. _____ | _____ | _____ | _____ | |
| 9. _____ | _____ | _____ | _____ | |
| 10. _____ | _____ | _____ | _____ | |
| = Total Cover | | | | Hydrophytic Vegetation Present? Yes _____ No <u>X</u> |
| Woody Vine Stratum (Plot size: <u>N/A</u>) | _____ | _____ | _____ | |
| 1. _____ | _____ | _____ | _____ | |
| 2. _____ | _____ | _____ | _____ | |
| = Total Cover | | | | |
| % Bare Ground in Herb Stratum <u>100</u> | _____ | _____ | _____ | |
| 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 | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|----|----------------|---|-------------------|------------------|------------------------------|---------|
| | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | | |
| 1-224" | 7.5YR 4/2 | 95 | NONE | | | | CLAYEAM MOST DUE TO E.N.O.W. | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

- Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) **NONE**
- | | | |
|--|--|--|
| <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) | ³ 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: **NONE**

- Primary Indicators (minimum of one required; check all that apply)
- | | | |
|--|---|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> (where not tilled) | <input type="checkbox"/> (where filled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | <input type="checkbox"/> FAC-Neutral Test (D5) |
| | | <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? (includes capillary fringe) Yes _____ No Depth (inches): _____

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: OLSON/NANDA City/County: WELD Sampling Date: FEB 27, 2012
 Applicant/Owner: NOBLE ENERGY State: CO Sampling Point: 002
 Investigator(s): P.A. SAVAGE Section, Township, Range: S29, TAN, R67 W
 Landform (hillslope, terrace, etc.): BROAD SWALE Local relief (concave, convex, none): _____ Slope (%): < 1%
 Subregion (LRR): _____ Lat: 40.28096° N Long: 104.92128° W Datum: _____
 Soil Map Unit Name: KIM LAMA 3-5% SLOPES NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes 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 <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/> | Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> |
| Remarks: _____ _____ _____ | |

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) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33%</u> (A/B) |
| 2. _____ | _____ | _____ | _____ | |
| 3. _____ | _____ | _____ | _____ | |
| 4. _____ | _____ | _____ | _____ | |
| _____ = Total Cover | | | | Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____ |
| Sapling/Shrub Stratum (Plot size: <u>N/A</u>) | | | | |
| 1. _____ | _____ | _____ | _____ | |
| 2. _____ | _____ | _____ | _____ | |
| 3. _____ | _____ | _____ | _____ | |
| _____ = Total Cover | | | | |
| Herb Stratum (Plot size: <u>10' X 10'</u>) | | | | |
| 1. <u>Agropyron elongatum</u> | <u>10</u> | <u>Y</u> | <u>FAC</u> | |
| 2. <u>Dactylis glomerata</u> | <u>15</u> | <u>Y</u> | <u>FACU</u> | |
| 3. <u>Poa pratensis</u> | <u>10</u> | <u>Y</u> | <u>FACU</u> | |
| 4. _____ | _____ | _____ | _____ | |
| 5. _____ | _____ | _____ | _____ | |
| 6. _____ | _____ | _____ | _____ | |
| 7. _____ | _____ | _____ | _____ | |
| 8. _____ | _____ | _____ | _____ | |
| 9. _____ | _____ | _____ | _____ | |
| 10. _____ | _____ | _____ | _____ | |
| _____ = Total Cover | | | | |
| Woody Vine Stratum (Plot size: <u>N/A</u>) | | | | |
| 1. _____ | _____ | _____ | _____ | |
| 2. _____ | _____ | _____ | _____ | |
| _____ = Total Cover | | | | |
| % Bare Ground in Herb Stratum <u>55</u> | | | | |
| _____ = Total Cover | | | | |
| 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 | | Redox Features | | | Texture | Remarks |
|----------------|---------------|----|----------------|---|-------------------|-----------|-------------------|
| | Color (moist) | % | Color (moist) | % | Type ¹ | | |
| 1-21" | 7.5YR4/2 | 95 | NONE | | | CLAY W/AM | MOIST DUE TO SNOW |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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

| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils ³ : |
|---|--|---|
| <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 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) | ³ Indicators of hydrophytic vegetation and welland hydrology must be present, unless disturbed or problematic. |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No

Remarks:

HYDROLOGY

| Wetland Hydrology Indicators: <u>NONE</u> | | |
|--|---|---|
| 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 filled) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | | <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? (includes capillary fringe) Yes _____ No Depth (inches): _____

Wetland Hydrology Present? Yes _____ No

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

Remarks: