# United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Great Plains Regional Office
115 Fourth Avenue S.E.
Aberdeen, South Dakota 57401

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IN REPLY REFER TO:
DESCRM
MC-208

MAR 15 2010

**MEMORANDUM**

TO: Superintendent, Fort Berthold Agency

FROM: ACTING Regional Director, Great Plains Region

SUBJECT: Environmental Assessment and Finding of No Significant Impact

In compliance with the regulations of the National Environmental Policy Act (NEPA) of 1969, as amended, for two proposed exploratory wells by Petro-Hunt, LLC on *Fort Berthold #148-95-22D-15-1H and Fort Berthold #148-95-27A-34-1H* on the Fort Berthold Reservation, an Environmental Assessment (EA) has been completed and a Finding of No Significant Impact (FONSI) has been issued.

All the necessary requirements of the National Environmental Policy Act have been completed. Attached for your files is a copy of the EA, FONSI and Notice of Availability. The Council on Environmental Quality (CEQ) regulations require that there be a public notice of availability of the FONSI (1506.6(b)). Please post the attached notice of availability at the Agency and Tribal buildings for 30 days.

If you have any questions, please call Marilyn Bercier, Regional Environmental Scientist, Division of Environment, Safety and Cultural Resources Management, at (605) 226-7656.

Attachment

cc: Marcus Levings, Chairman, Three Affiliated Tribes (with attachment)
Perry "No Tears" Brady, THPO (with attachment)
Roy Swalling, Bureau of Land Management (with attachment)
Jonathon Shelman, Corps of Engineers (with attachment)

# Finding of No Significant Impact
## Petro-Hunt, LLC

## Two Bakken Exploratory Oil Wells:
## Fort Berthold #148-95-22D-15-1H
## Fort Berthold #148-95-27A-34-1H

### Fort Berthold Indian Reservation
### Dunn County, North Dakota

The U.S. Bureau of Indian Affairs (BIA) has received a proposal for two oil/gas wells, access roads and related infrastructure on the Fort Berthold Indian Reservation to be located in Section 27, Township (T) 148 North (N), Range (R) 95 West (W), Dunn County and Section 27, T148N, R95W, Dunn County. Associated federal actions by BIA include determinations of effect regarding cultural resources, approvals of leases, rights-of-way and easements, and a positive recommendation to the Bureau of Land Management regarding the Applications for Permit to Drill.

The potential of the proposed actions to impact the human environment is analyzed in the attached Environmental Assessment (EA), as required by the National Environmental Policy Act. Based on the recently completed EA, I have determined that the proposed projects will not significantly affect the quality of the human environment. No Environmental Impact Statement is required for any portion of the proposed activities.

This determination is based on the following factors:

1. Agency and public involvement was solicited and environmental issues related to the proposal were identified.

2. Protective and prudent measures were designed to minimize impacts to air, water, soil, vegetation, wetlands, wildlife, public safety, water resources, and cultural resources. The remaining potential for impacts was disclosed for both the proposed action and the No Action alternative.

3. Guidance from the U.S. Fish and Wildlife Service has been fully considered regarding wildlife impacts, particularly in regard to threatened or endangered species.

4. The proposed actions are designed to avoid adverse effects to historic, archaeological, cultural and traditional properties, sites and practices. Compliance with the procedures of the National Historic Preservation Act is complete.

5. Environmental justice was fully considered.

6. Cumulative effects to the environment are either mitigated or minimal.

7. No regulatory requirements have been waived or require compensatory mitigation measures.

8. The proposed projects will improve the socio-economic condition of the affected Indian community.

Regional Director

3/15/10
Date

# ENVIRONMENTAL ASSESSMENT

**United States Department of the Interior**
**Bureau of Indian Affairs**

**Great Plains Regional Office**
**Aberdeen, South Dakota**

**Cooperating Agency:**

**Bureau of Land Management**

**North Dakota State Office**
**Dickinson, North Dakota**

**Petro-Hunt, LLC**

**Two Bakken Formation Exploratory Oil Wells:**

**Fort Berthold #148-95-22D-15-1H**
**Fort Berthold #148-95-27A-34-1H**

**Fort Berthold Indian Reservation**

**March 2010**

For information contact:
Bureau of Indian Affairs, Great Plains Regional Office
Division of Environment, Safety and Cultural Resource Management
115 4th Avenue SE, Aberdeen, South Dakota 57401 (605) 226-7656

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# 1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

## 1.1 INTRODUCTION

Petro-Hunt, LLC (Petro-Hunt) has acquired the leases and is proposing to drill two horizontal oil and gas wells, in the form of a dual pad, on the Fort Berthold Indian Reservation (Reservation) to evaluate, and possibly develop, the commercial potential of natural resources. The development has been proposed on land held in trust by the United States in Dunn County, North Dakota. The Bureau of Indian Affairs (BIA) is the surface management agency for potentially affected tribal land and individual allotments. The BIA manages lands held in title by the tribe and tribal members to subsurface mineral rights. Developments have been proposed in a location that targets specific areas within in the Middle Bakken Dolomite member of the Bakken Formation, a known oil reserve. The following proposed oil wells, shown in Figure 1, will be located within the Reservation in which the majority of the external boundaries are located above the Bakken Formation (Figures 1 and 2).

- Fort Berthold #148-95-22D-15-1H, NW1/4 NE1/4, Section 27, Township (T) 148 North (N), Range (R) 95 West (W), Dunn County, North Dakota
- Fort Berthold #148-95-27A-34-1H, NE1/4 NE1/4, Section 27, T148N, R95W, Dunn County, North Dakota

A new access road will be constructed to facilitate the construction and operation of each proposed well. The well pad will be constructed to accommodate drilling activities and well operations. Pits constructed for drilled cuttings will be used during drilling operations and reclaimed once operations have ceased. Should any of the proposed wells result in long-term commercial production, supporting facilities may be constructed on site. All components (e.g., access road, well pad, supporting facilities) will be reclaimed upon final abandonment unless formally transferred with federal approval to either the BIA or the landowner. The proposed wells are exploratory; should they prove productive, further exploration of surrounding areas is possible. This environmental assessment (EA) addresses the potential impacts associated with the construction and possible long-term operation of the above-listed wells and directly related infrastructure and facilities. Further oil and gas exploration and development will require additional National Environmental Policy Act (NEPA) analysis and federal actions.

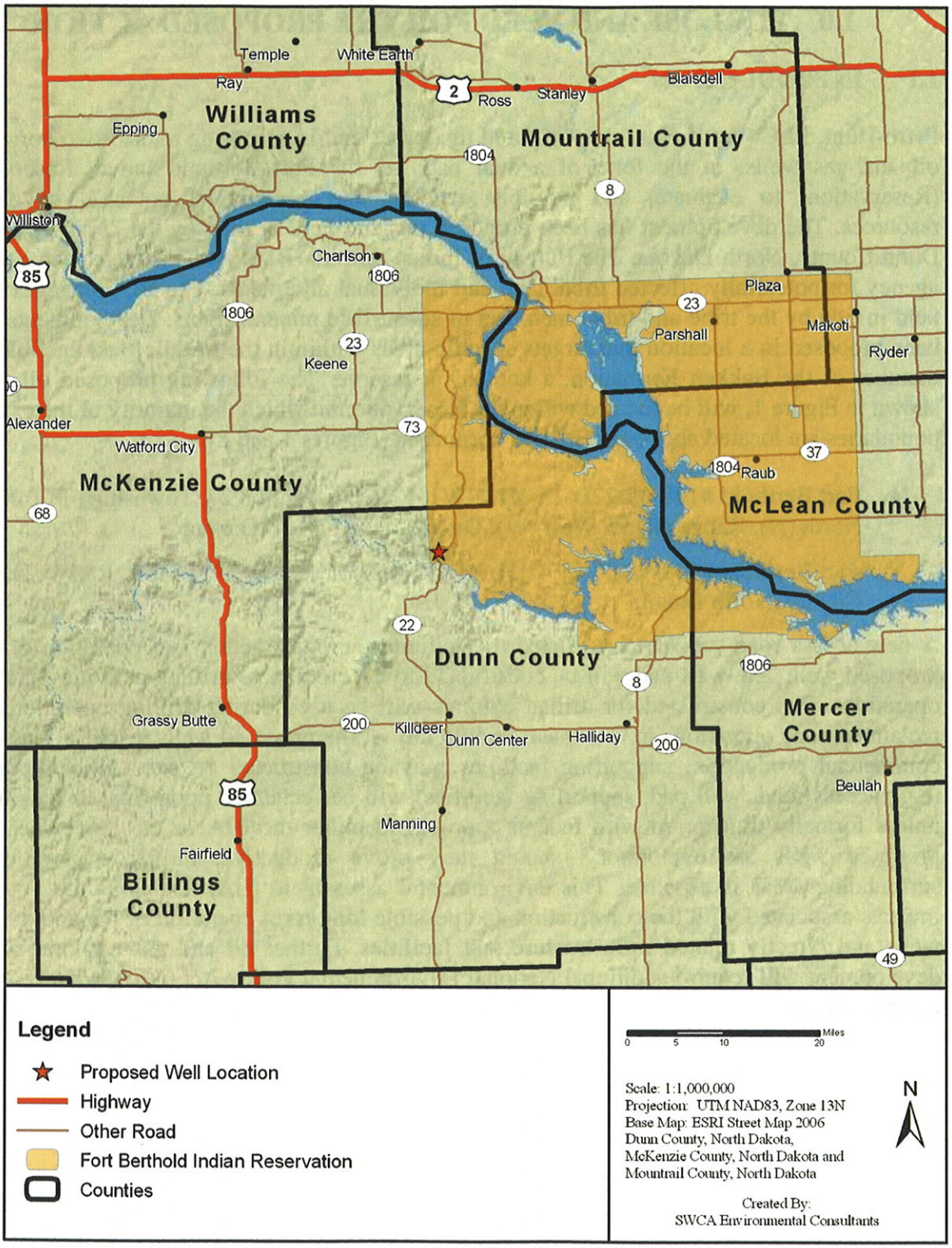



**Figure 1. Location of the project area in Dunn County, ND.**

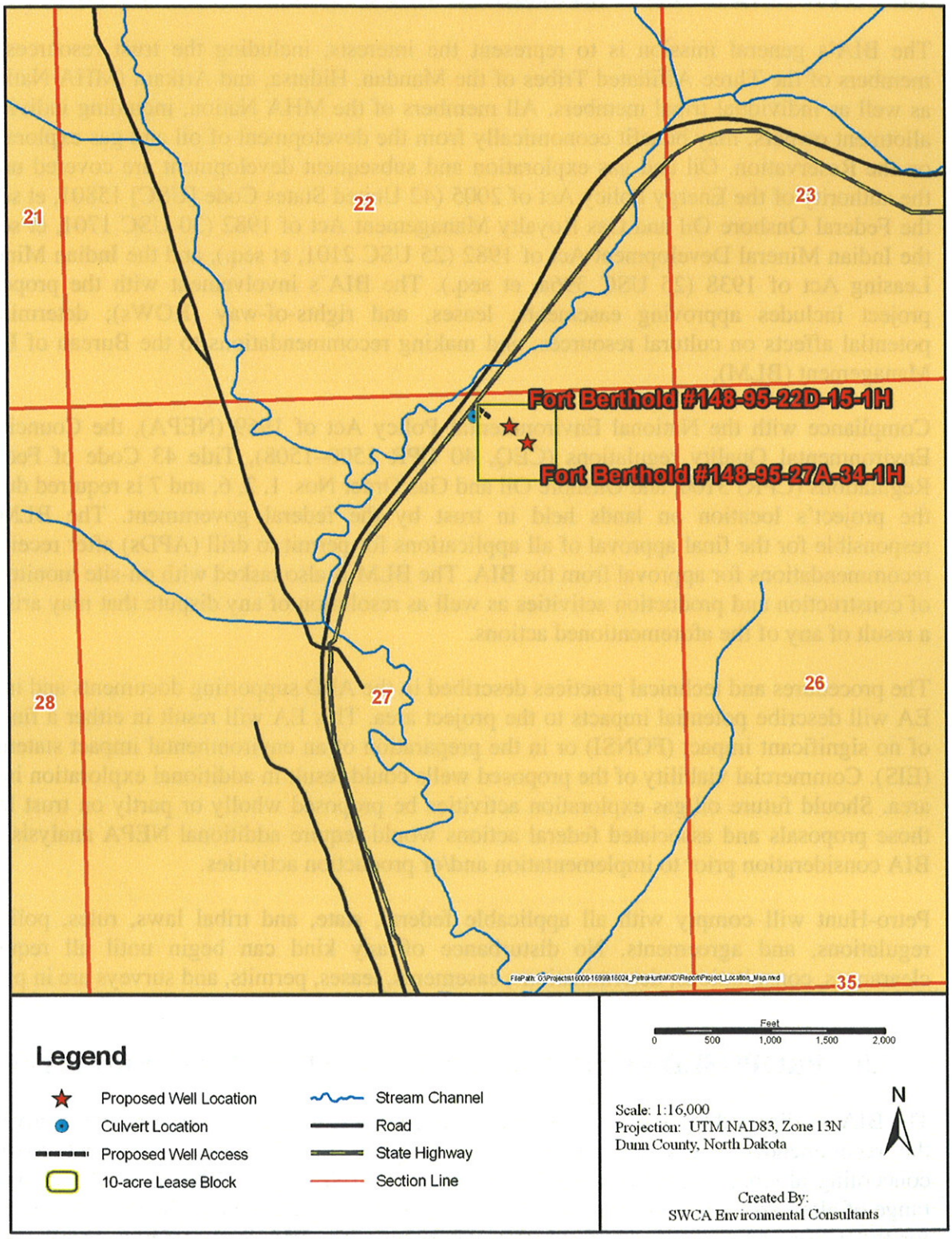



**Figure 2. Proposed well location showing 10-acre lease block.**

## 1.2 FEDERAL AND OTHER RELEVANT REGULATIONS AND AUTHORITIES

The BIA's general mission is to represent the interests, including the trust resources, of members of the Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara (MHA Nation), as well as individual tribal members. All members of the MHA Nation, including individual allotment owners, may benefit economically from the development of oil and gas exploration on the Reservation. Oil and gas exploration and subsequent development are covered under the authority of the Energy Policy Act of 2005 (42 United States Code [USC] 15801, et seq.), the Federal Onshore Oil and Gas Royalty Management Act of 1982 (30 USC 1701, et seq.), the Indian Mineral Development Act of 1982 (25 USC 2101, et seq.), and the Indian Mineral Leasing Act of 1938 (25 USC 396a, et seq.). The BIA's involvement with the proposed project includes approving easements, leases, and rights-of-way (ROWs); determining potential affects on cultural resources; and making recommendations to the Bureau of Land Management (BLM).

Compliance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality regulations (CEQ, 40 CPR 1500–1508), Title 43 Code of Federal Regulations (CFR) 3100, and Onshore Oil and Gas Order Nos. 1, 2, 6, and 7 is required due to the project's location on lands held in trust by the federal government. The BLM is responsible for the final approval of all applications for permit to drill (APDs) after receiving recommendations for approval from the BIA. The BLM is also tasked with on-site monitoring of construction and production activities as well as resolution of any dispute that may arise as a result of any of the aforementioned actions.

The procedures and technical practices described in the APD supporting documents and in the EA will describe potential impacts to the project area. This EA will result in either a finding of no significant impact (FONSI) or in the preparation of an environmental impact statement (EIS). Commercial viability of the proposed wells could result in additional exploration in the area. Should future oil/gas exploration activities be proposed wholly or partly on trust land, those proposals and associated federal actions would require additional NEPA analysis and BIA consideration prior to implementation and/or production activities.

Petro-Hunt will comply with all applicable federal, state, and tribal laws, rules, policies, regulations, and agreements. No disturbance of any kind can begin until all required clearances, consultations, determinations, easements, leases, permits, and surveys are in place.

# 2.0 PROPOSED ACTION AND THE NO ACTION ALTERNATIVE

The BIA, as directed by NEPA, must "study, develop, and describe appropriate alternatives to the recommended course of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources..." (NEPA Sec 102[2][e]). Developing a range of alternatives allows for exploration of options designed to meet the purpose and need for the action. Along with the No Action Alternative, the BIA is considering the Proposed Action.

## 2.1 THE NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed project (including the well pad, wells, and access road) would not be constructed, drilled, installed, or operated. The BIA would not approve easements, leases, or ROWs for the proposed locations and the BLM would not approve the APD. No impacts would occur as a result of this project to the following critical elements: air quality, public health and safety, water resources, wetland/riparian habitat, threatened and endangered species, soils, vegetation and invasive species, cultural resources, socioeconomic conditions, and environmental justice. There would be no project-related ground disturbance, use of hazardous materials, or trucking of product to collection areas. Surface disturbance, deposition of potentially harmful biological material, and traffic levels would not change from present levels. Under the No Action Alternative, the MHA Nation, tribal members, and allottees would not have the opportunity to realize potential financial gains from the discovery and resulting development of resources at these well locations.

## 2.2 THE PROPOSED ACTION

This document analyzes the potential impacts of two exploratory oil and gas wells with varied surface and mineral estates located in the southwest portions of the Reservation in Dunn County. Sites were chosen by Petro-Hunt in consultation with tribal and BIA resource managers to provide information for future development. Well site locations underwent a pre-clearance process that included surveys for cultural, archaeological, and natural (i.e., biological and physical) resources. The proposed wells would test the commercial potential of the Middle Bakken Dolomite member of the Bakken Formation.

### 2.2.1 Field Camps

A few personnel would be housed in self-contained trailers for a very short period of time. Long-term housing is not proposed. Most personnel, both construction and drilling, would commute to the site. Human waste would be collected on-site in portable toilets and trailers and transported off site to a state-approved wastewater treatment facility. All other solid waste would be contained in enclosed containers and transported to, and disposed of at, state-approved facilities.

### 2.2.2 Access Road

Up to 238.83 feet of new access road would be constructed. A maximum disturbed ROW width of 66 feet for the access road would result in up to 0.362 acre of new surface disturbance. Signed agreements would be in place allowing road construction across affected private and allotted land surfaces, and any applicable approach permits and/or easements would be obtained prior to any construction activity.

Construction would follow road design standards outlined in the BLM Gold Book (BLM and U.S. Forest Service [USFS] 2007). At a minimum, 6 inches of topsoil would be removed from the access road corridors. This stockpiled topsoil would then be placed on the outside slopes of the ditches following road construction. The ditches would be reseeded as quickly as possible using a seed mixture determined by the BIA. Care would be taken during road construction to avoid disturbing or disrupting any buried utilities that may exist near State

Highway (SH) 22. The access road would be surfaced with a minimum of 4 inches of aggregate if the site were to be established as a commercial production site. Also, the roadway would remain in use for the life of the well(s). Details of road construction are addressed in the APD. A diagram of typical road cross sections is shown in Figure 3.

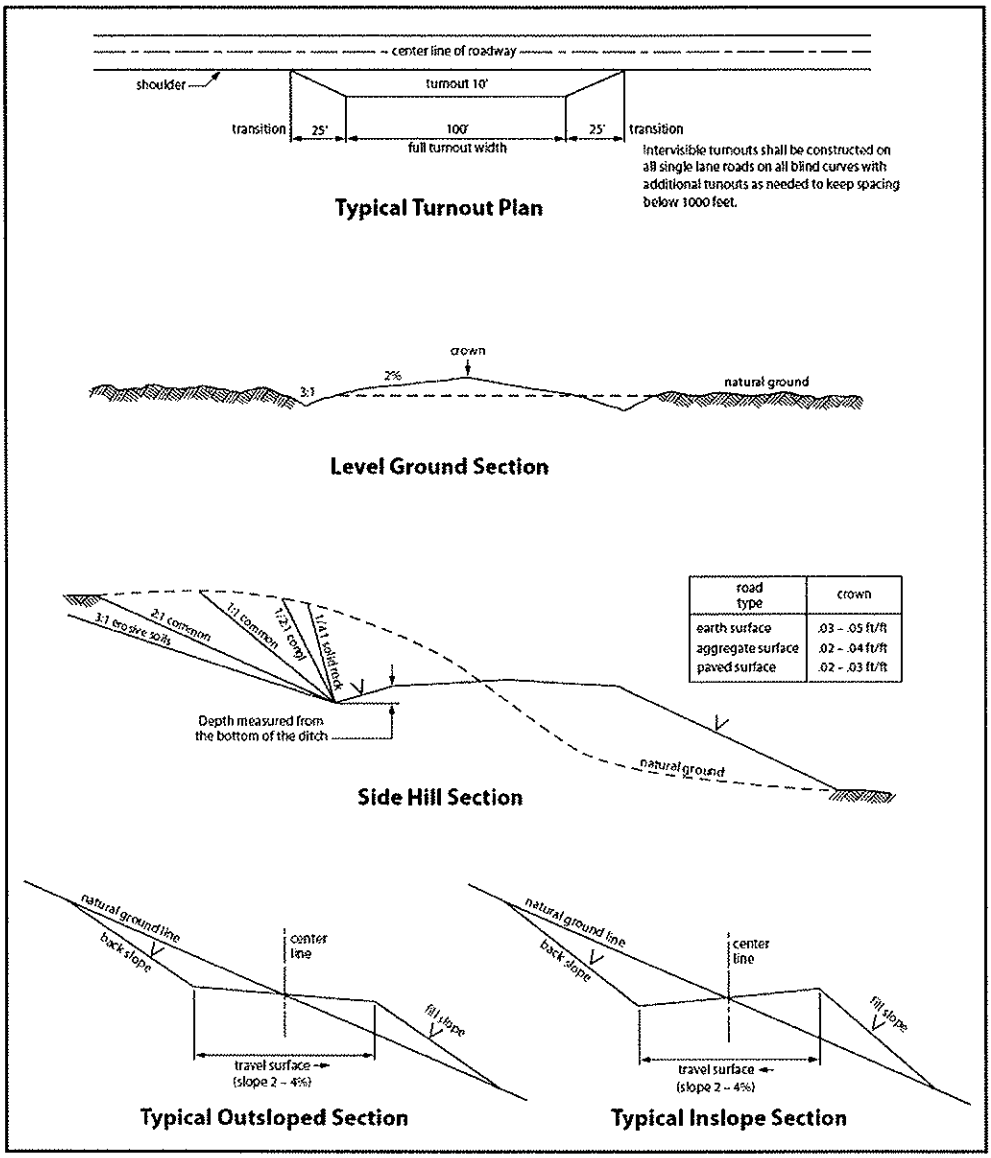



**Figure 3. Typical road cross sections (BLM and USFS 2007).**

### 2.2.3 Well Pad

The proposed dual well pad would include a leveled area (pad) used for the drilling equipment. The pad would be stripped of topsoil and vegetation and then graded. The topsoil would be stockpiled and stabilized with a cover crop until it could be used to reclaim the disturbed area. The subsoils would be used in the construction of the pad and the finished pad would be graded to ensure that water drains away from the pad. A diversion ditch would be constructed to channel any precipitation run-off around the east-northeast edge of the well

pad. Precipitation will travel west-northwest to an ephemeral channel which will then transport run-off south. Additional erosion control best management practices (BMPs) would be implemented and could include soil surface protection methodologies and sediment capture features.

Total surface disturbance would be approximately 6.59 acres including 2.17 acres of cut-and-fill slopes, stockpiled topsoil, and reserve pit backfill. Details of pad construction and reclamation can be found in the APD.

### 2.2.4 Drilling

After securing mineral leases, Petro-Hunt submitted the Notice of Staking (NOS) to the BLM on the following dates:

- Fort Berthold #148-95-22D-15-1H (January 18, 2010)
- Fort Berthold #148-95-27A-34-1H (January 18, 2010)

The BIA's office in New Town, North Dakota, received copies of the NOS from the BLM North Dakota Field Office. Construction will begin when the BIA completes the NEPA process and the APDs are then approved by the BLM.

Rig transport and on-site assembly would take approximately five days for each well; a typical drill rig is shown in Figure 4. Drilling would require approximately 35 days to reach target depth, using a rotary drilling rig rated for drilling to approximately 30,000 feet. For the first 2,200 feet drilled, a freshwater-based mud system with non-hazardous additives would be used to minimize contaminant concerns. Water would be obtained from a commercial source for this drilling stage, using approximately 50 gallons of water per foot of hole drilled.

After setting and cementing the near-surface casing, an oil-based mud system (80% to 85% diesel fuel and 15% to 20% water) would be used to drill to the 7-inch casing point. Oil-based drilling fluids reduce the potential for hole sloughing while drilling through water-sensitive formations (shales). Approximately 9,000 gallons of water and 25,000 gallons of diesel fuel per well would be used to complete vertical drilling. The lateral reach of the borehole would be drilled using approximately 85,000 gallons of fresh water as mud and adding polymer sweeps as necessary to clean the hole.

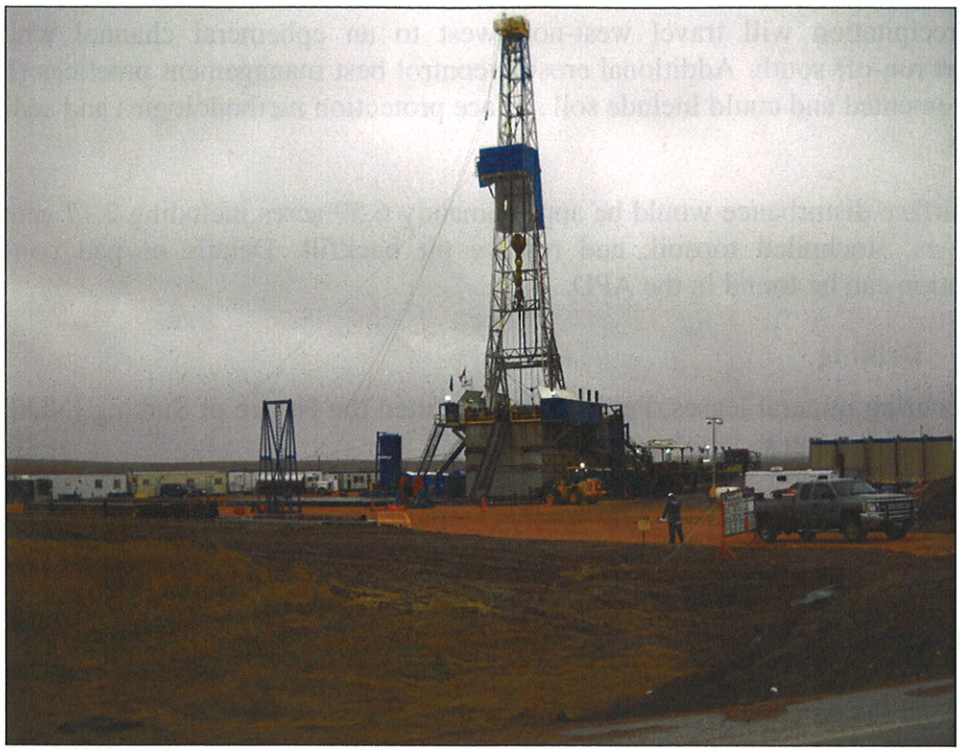


**Figure 4. Typical drilling rig (Ruffo 2009).**

### 2.2.5 Casing and Cementing

Surface casing would be set at an approximate depth of 2,500 feet and cemented back to the surface during drilling, in order to ensure the isolation of any potential near-surface freshwater aquifers the project area. The Pierre Formation would be encountered at a depth of approximately 1,500 feet. Production casing would be cemented from approximately 10,800 feet deep to a depth of about 4,000 feet in order to isolate the hydrocarbon zone present in the Dakota Formation below a depth of 5,000 feet. Casing and cementing operations would be conducted in full compliance with Onshore Oil and Gas Order No. 2 (43 CFR 3160).

### 2.2.6 Completion Activities

A completion rig unit would be moved on-site following the conclusion of drilling and casing activities. Approximately 30 days is usually required, at the proposed well depths, to clean out the well bore, pressure test the casing, perforate and fracture the horizontal portion of the hole, and run production tubing for commercial production. The typical procedure for fracturing a target formation to increase production includes pumping a mixture of sand and a carrier (e.g., water and/or nitrogen) downhole under extreme pressure. The resulting fractures are propped open by the sand, increasing the capture zone of the well and subsequently maximizing the efficient drainage of the field. After fracturing, the well is "flowed back" to the surface where fracture fluids are recovered and disposed of in accordance with North Dakota Industrial Commission (NDIC) rules and regulations.

### 2.2.7 Commercial Production

If drilling, testing, and production support commercial production from either of the two proposed wells, additional equipment would be installed, including a pumping unit at the well head, a vertical heater/treater, tanks (usually 400-barrel steel tanks), and a flare pit (Figure 5). An impervious dike sized to hold 100% of the capacity of the largest tank plus one full day's production would surround the tanks and the heater/treater. Load out lines would be located inside the diked area, and a heavy screen-covered drip barrel would be installed under the outlet. A metal access staircase would protect the dike and support flexible hoses used by tanker trucks. For all above-ground facilities not subject to safety requirements, the BIA would choose a paint color recommended by the BLM or the Rocky Mountain Five-State Interagency Committee, which would blend with the natural color of the landscape. Commercial production would be discussed more fully in subsequent NEPA analyses.

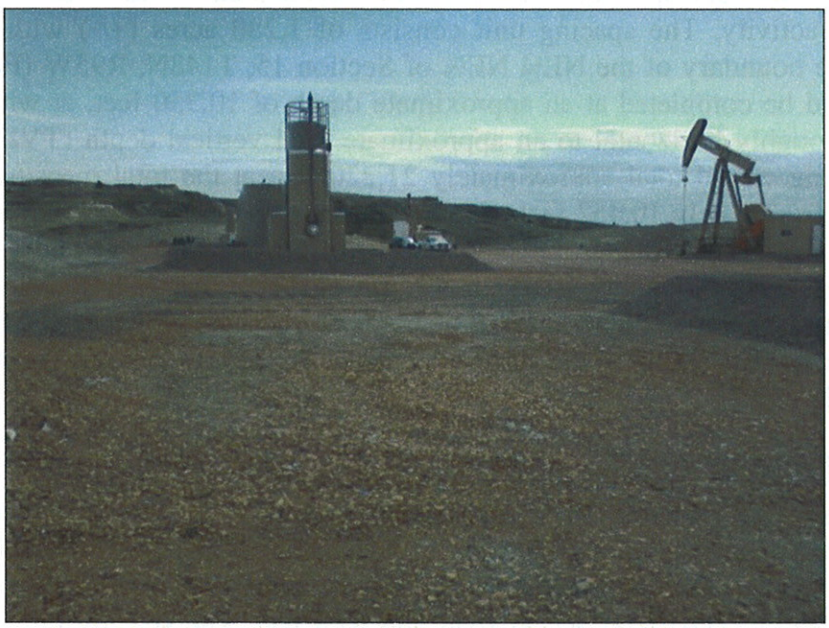


**Figure 5. Typical producing oil well pad (Sobotka 2008).**

Oil from the Fort Berthold #148-95-22D-15-1H and Fort Berthold #148-95-27A-34-1H dual well pad would be collected in tanks installed on location and periodically trucked to an existing oil terminal for sales. Any produced water would be captured in tanks and periodically trucked to an approved disposal site. The frequency of trucking activities for both oil and produced water would depend upon volumes and rates of production. The duration of production operations cannot be reliably predicted, but some oil wells have pumped for more than 100 years. The operator estimates that each well would yield approximately 260 barrels of oil per day and 25 barrels of water during the first year of production. After the first year, the operator estimates production would decrease to approximately 145 barrels of oil per day and 15 barrels of water. Produced water is mostly recovered frac fluids and is expected to become minimal after two years.

Large volumes of gas are not expected from these locations. Small volumes would be flared in accordance with Notice to Lessees 4A and adopted NDIC regulations, which prohibit unrestricted flaring for more than the initial year of operation (North Dakota Century Code [NDCC] 38-08-06.4).

### 2.2.8 Construction Details at Individual Sites

#### 2.2.8.1 Fort Berthold #148-95-22D-15-1H

The proposed Fort Berthold #148-95-22D-15-1H well site, seen in Figure 6, is located approximately 9 miles southwest of Mandaree, North Dakota, in the NW¼ NE¼ of Section 27, T148N, R95W, Dunn County, North Dakota. A new access road approximately 238.83 feet long would be constructed from the well site to SH 22 (Figure 7). Construction of the new road would disturb approximately 0.362 acre and the proposed well pad would disturb approximately 6.59 acres; In total 6.95 acres of surface area would be disturbed as a result of construction activity. The spacing unit consists of 1,280 acres (+/-) with the bottom hole located at the boundary of the NE¼ NE¼ of Section 15, T148N, R95W (Figure 8). Vertical drilling would be completed at an approximate depth of 10,350 feet, at which point drilling would turn roughly horizontal to an approximate total vertical depth (TVD) of 10,769 feet. The drill string would total approximately 21,220 feet at the total measured depth (TMD), including approximately 10,452 feet of lateral reach into the Middle Bakken Formation. The drilling terminus is located approximately 550 feet from the north line and 1,300 feet from the east line (FEL), approximately 10,451 feet north of the surface hole location. No setback on the 7-inch casing point would be required. That is, 7-inch casing will be set upon crossing into Section 22 at 447 feet north of the surface location. The lateral will remain at least 1,220 FEL of Sections 22 and 15.

#### 2.2.8.2 Fort Berthold #148-95-27A-34-1H

The proposed Fort Berthold #148-95-27A-34-1H well site, seen in Figures 9 and 10, is located approximately 9 miles southwest of Mandaree, North Dakota, in the NE¼ NE¼ of Section 27, T148N, R95W, Dunn County, North Dakota. This well site will use the Fort Berthold #148-95-22D-15-1H access road and well pad. The spacing unit consists of 1,280 acres (+/-) with the bottom hole located at the boundary of the SW¼ and SE¼ of the SE¼ of Section 34, T148N, R95W (Figure 11). Vertical drilling would be completed at approximately 10,350 feet, at which point drilling would turn roughly horizontal to a TVD of 10,729 feet. The drill string would total approximately 20,129 feet TMD, including approximately 9,400 feet of lateral reach into the Middle Bakken Formation. The drilling target is located approximately 550 feet from the south line and 1,320 feet FEL, approximately 9,400 feet south and 77 feet east of the surface hole location. The lateral will remain at least 1,220 feet FEL of Sections 27 and 34.

**Figure 6. View of the dual well pad location, facing west.**

**Figure 7. View of the access road location, facing east.**

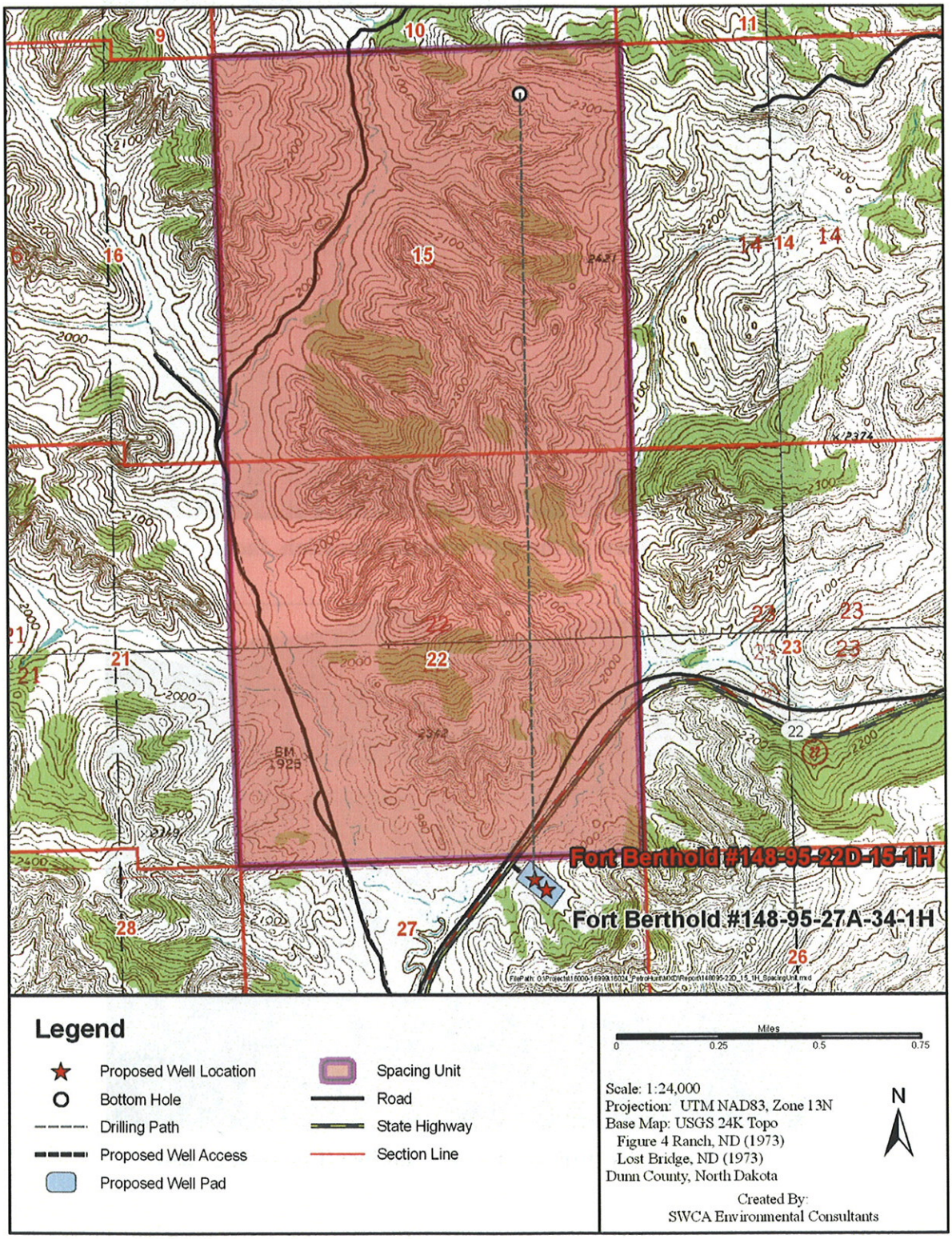



**Figure 8. Fort Berthold #148-95-22D-15-1H spacing unit.**

**Figure 9. View of the dual pad location, facing north.**

**Figure 10. View of the dual well pad location, facing southwest.**

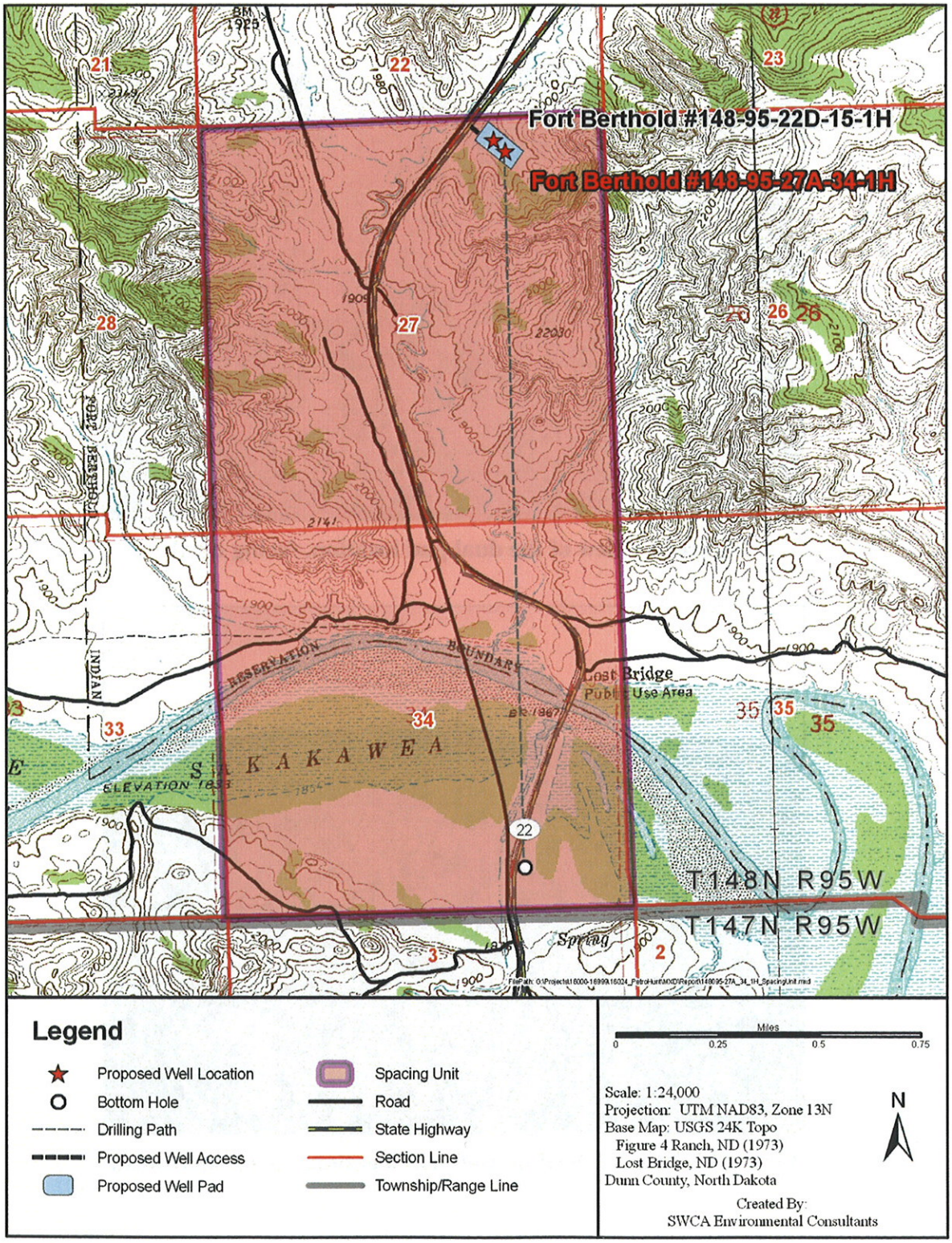



**Figure 11. Fort Berthold #148-95-27A-34-1H spacing unit.**

### 2.2.9 Reclamation

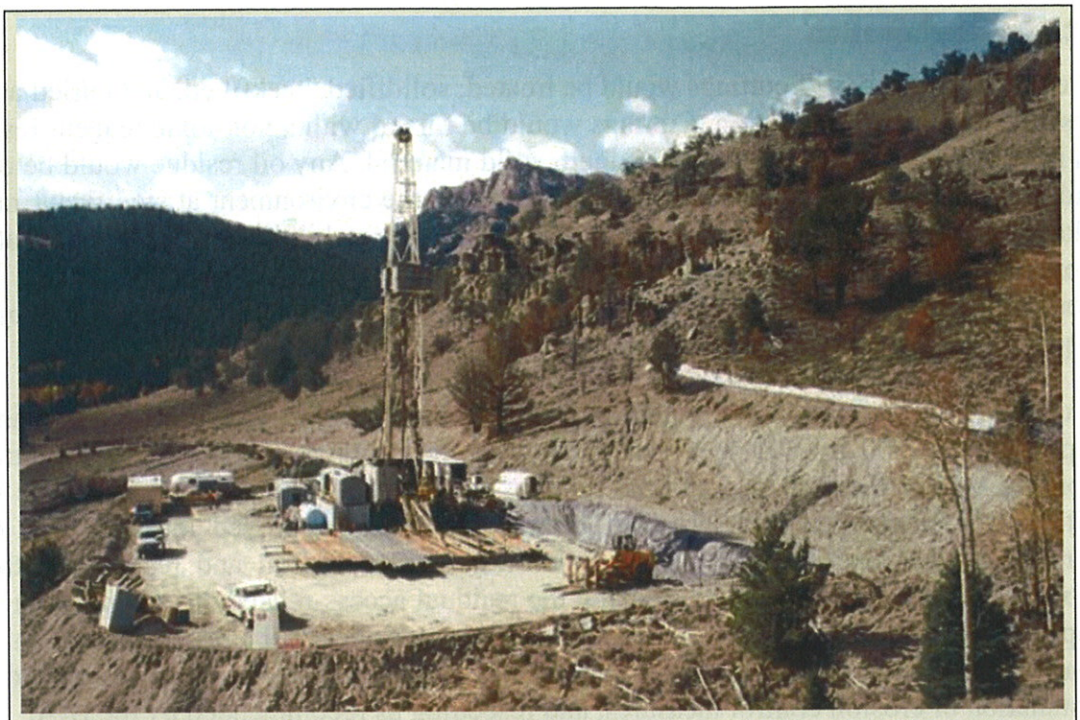
The reserve pit and drill cuttings would be treated, solidified, backfilled, and buried as soon as possible after well completion. Cuttings would be mixed with a non-toxic reagent resulting in an irreversible reaction to produce an inert, solid material. Any oil residue would be dispersed and captured, preventing coalescence and release to the environment at significant rates. The alkaline nature of the stabilized material also chemically stabilizes various metals that may be present, primarily by converting them into less soluble compounds. The treated material would then be buried in the reserve pit, and overlain by at least 4 feet of overburden as required by adopted NDIC regulations.

If commercial production equipment is installed, the well pad would be reduced in size to approximately 300 by 200 feet, and the rest of the original pad would be reclaimed. The working area of the well pad and the running surface of the access road would be surfaced with scoria or crushed rock obtained from a previously approved location. The outslope portions of the road would be covered with stockpiled topsoil and reseeded with a seed mixture determined by the BIA, reducing the residual access-related disturbance to a width of approximately 28 feet. Other interim reclamation measures to be accomplished in the first year would include reduction of the cut-and-fill slopes, redistribution of stockpiled topsoil, installation of erosion control measures, and reseeding as recommended by the BIA.

Final reclamation would occur either in the very short term if the proposed wells are commercially unproductive, or later upon final abandonment of commercial operations. All disturbed areas would be reclaimed, reflecting the BIA view of oil and gas exploration and production as temporary intrusions on the landscape. All facilities would be removed, well bores would be plugged with cement, and dry hole markers would be set. The access road and work areas would be leveled or backfilled as necessary, scarified, recontoured, and reseeded. Exceptions to these reclamation measures might occur if the BIA approves assignment of an access road either to the BIA roads inventory or to concurring surface allottees. Figure 12 shows an example of reclamation (BLM and USFS 2007).

## 2.3 BIA-PREFERRED ALTERNATIVE

The BIA-preferred alternative is to complete all administrative actions and approvals necessary to authorize or facilitate oil and gas developments at the two proposed well locations.



**The well pad and access road are constructed to the minimum size necessary to safely conduct drilling and completion operations.**

**The well pad and access road have been recontoured back to the original contour, the topsoil respread, and the site revegetated.**

**Figure 12. Example of reclamation from the BLM Gold Book (BLM and USFS 2007).**

# 3.0 THE AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

The Reservation is the home of the MHA Nation. Located in west-central North Dakota, the Reservation encompasses more than one million acres, of which almost half are held in trust by the United States for either the MHA Nation or individual allottees. The remainder of the land is owned in fee simple title, sometimes by the MHA Nation or tribal members, but usually by non-Indians. The Reservation occupies portions of six counties, including Dunn, McKenzie, McLean, Mercer, Mountrail, and Ward. In 1945, the Garrison Dam was completed, inundating much of the Reservation. The remaining land was divided into three sections near Lake Sakakawea, an impoundment of the Missouri River upstream of the Garrison Dam.

The proposed wells and access road are geologically situated in the Williston Basin, where the shallow structure consists of sandstones, silts, and shales dating to the Tertiary period (65 to 2 million years ago), including the Sentinel Butte and Golden Valley formations. The underlying Bakken Formation is a well-known source of hydrocarbons; its middle member is targeted by the proposed project. Although earlier oil/gas exploration activity in the Reservation was limited and commercially unproductive, recent economic changes and technological advances now make accessing oil in the Bakken Formation feasible.

The Reservation is within the Northwestern Great Plains Ecoregion, which consists of four level 4 ecoregions: 1) the Missouri Coteau Slope north of Lake Sakakawea; 2) the River Breaks; 3) the Little Missouri River Badlands; and 4) the Missouri Plateau south and west of Lake Sakakawea (Bryce et al. 1998). Elevations of the glaciated, gently rolling landscape range from a normal pool elevation of 1,838 feet at Lake Sakakawea to more than 2,600 feet on Phaelan's Butte near Mandaree. Annual precipitation on the plateau averages between 15 and 17 inches. Mean temperatures fluctuate between -3 and 21 degrees Fahrenheit (°F) in January and between 55°F and 83°F in July, with 95 to 130 frost-free days each year (Bryce et al. 1998; High Plains Regional Climate Center 2008).

The proposed wells and spacing units are in a rural area consisting of badlands formations with shrubs and pasture land interspersed between buttes. The landscape has been previously disturbed by dirt trails and gravel and paved roadways. Two residences are within 1 mile of the proposed well sites, the closest being 2,967.5 feet northwest of Fort Berthold #148-95-22D-15-1H (Table 1).

**Table 1. Distance and Direction from Proposed Wells to Nearest Home.**

| Proposed Well | Feet to Nearest Home | Direction to Nearest Home |
|---|---|---|
| Fort Berthold #148-95-22D-15-1H | 2,967.5 | Northwest |
| Fort Berthold #148-95-27A-34-1H | 3,183.3 | Northwest |

The broad definition of the human and natural environment under NEPA leads to the consideration of the following elements: air quality, public health and safety, water resources, wetland/riparian habitat, threatened and endangered species, soils, vegetation and invasive species, cultural resources, socioeconomic conditions, and environmental justice. Potential impacts to these elements are analyzed for both the No Action Alternative (described in Section 2.1) and the Proposed Action. Impacts may be beneficial or detrimental, direct or indirect, and short-term or long-term. This EA also analyzes the potential for cumulative impacts, and ultimately makes a determination as to the significance of any impacts. In the absence of significant negative consequences, it should be noted that a significant benefit from the project does *not* in itself require preparation of an EIS.

## 3.1 AIR QUALITY

### 3.1.1 Introduction

The federal Clean Air Act (CAA), as amended in 1990, established national ambient air quality standards for criteria pollutants to protect public health and welfare. It also set standards for cancer-causing compounds, regulated emissions that cause acid rain, and required federal permits for large sources. National standards have been established for ozone, carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matter (PM), and lead. These standards were set for pervasive compounds that are generally emitted by industry or motor vehicles. Standards for each pollutant meet specific public health and welfare criteria; thus they are called the "criteria pollutants." Some states have adopted more stringent standards for criteria pollutants, or have chosen to adopt new standards for other pollutants. For instance, North Dakota has a standard for hydrogen sulfide that the Environmental Protection Agency (EPA) does not.

### 3.1.2 Atmospheric Stability and Dispersion, and Pollutant Concentrations

The quantity of pollutant emissions in an area and the degree to which these pollutants disperse directly affects resulting concentrations (and hence affects health). Pollutant dispersion, in turn, is directly affected by atmospheric stability. Atmospheric stability determines the amount of vertical and horizontal air exchange, or mixing, that can occur within a given air basin. Restricted mixing and low wind speeds characterize a high degree of atmospheric stability. These conditions are characteristic of temperature inversions. The height of the inversion determines the mixing volume trapped below.

Three types of temperature inversions typically occur that affect air quality: subsidence, katabatic, and radiation. A subsidence inversion occurs when a mass of aloft high-pressure (cold) air slowly sinks toward the surface. This causes the air underneath to heat as it is compressed. These subsiding layers are more stable than they were at their original higher altitudes. These inversions break up when a low-pressure front moves into the area and causes turbulence.

Katabatic inversions occur when air cooling at higher elevations (e.g., hills) slides, because it is more dense, down into valleys. This cool air in turn lifts warmer air, creating a strong boundary layer. If pollutants are emitted into the air near the surface after this inversion forms, there will be little vertical mixing until the inversion breaks. Katabatic inversions

typically break when the sun warms the earth's surface and allows warmer air to float up through the boundary layer, thus creating vertical mixing.

Radiation inversions form when the lowest levels of the atmosphere are cooled by contact with the earth's surface, which cools by emitting radiation. Factors that help a radiation inversion form include calm winds, dry air, clear skies, long nights, and moist ground surface. Radiation inversions often occur in winter after rainstorms. They are often marked by strong surface fog. Like katabatic inversions, these inversions typically break up when the sun's energy penetrates to the surface, causing vertical mixing to occur.

The winds and unstable air conditions experienced during the passage of storms result in low pollutant concentrations and excellent visibility. Between winter storms, high pressure and light winds allow cold, moist air to pool on the valley floors and in low areas. This creates strong low-level temperature inversions and very stable air conditions. This situation can lead to foggy conditions. If acidic compounds such as sulfur dioxide are present, the fog may become acidic as chemicals adsorb onto water droplets. Fog measurements in some areas of the western United States have found acid levels the same as table vinegar (pH 3.5).

Conditions favorable to fog formation are also conditions favorable to high concentrations of CO and particulate matter with particles 2.5 microns or smaller ($PM_{2.5}$). Maximum CO concentrations tend to occur on clear, cold nights when a strong surface inversion is present and large quantities of emissions are occurring. The water droplets in fog, however, can act as a sink for CO and nitrogen oxide (NOx), temporarily lowering pollutant concentrations. At the same time, though, fog can also help in the formation of secondary particulates such as ammonium sulfate. These secondary particulates are believed to be a significant contributor of high winter $PM_{2.5}$ levels.

### 3.1.3 Greenhouse Gas Emissions and Climate Change

Carbon dioxide ($CO_2$) is the primary greenhouse gas (GHG), responsible for approximately 90 percent of radiative forcing (the rate of energy change as measured at the top of the atmosphere; this can be positive [warmer] or negative [cooler]). To simplify discussion of the various GHGs, the term "equivalent $CO_2$, or $CO_2e$" has been developed. $CO_2e$ is the amount of carbon dioxide that would cause the same level of radiative forcing as a unit of one of the other GHGs. For example, 1 ton of methane ($CH_4$) has a $CO_2e$ of 22 tons; therefore, 22 tons of $CO_2$ would cause the same level of radiative forcing as 1 ton of $CH_4$. Nitrous Oxide ($N_2O$) has a $CO_2e$ value of 310. Thus, control strategies often focus on the gases with the highest $CO_2e$ value. $CH_4$ is a common fugitive gas emission in oil and gas fields and is emitted at many phases of exploration and production.

According to the Center for Integrative Environmental Research at the University of Maryland (2008), climate change will affect North Dakota's climate significantly over time. North Dakota will experience an increase in the unpredictability of droughts, floods, and pests making it harder for farmers to remain economically viable in the agricultural industry. This damage to the agricultural community will subsequently be a detriment to the livestock industry. Additionally, due to reductions in the amount of available wildlife habitat, including

receding water levels, North Dakota's hunting, fishing, and tourism industries will be damaged.

### 3.1.4 Criteria Pollutants

**Ozone ($O_3$)** is a colorless gas with a pungent, irritating odor, and creates a widespread air quality problem in most of the world's industrialized areas. Ozone smog is not emitted directly into the atmosphere but is primarily formed through the reaction of hydrocarbons and nitrogen oxides in the presence of sunlight. Ozone's health effects can include reduced lung function; aggravated respiratory illness; and irritated eyes, nose, and throat. Chronic exposure can cause permanent damage to the alveoli of the lungs. Ozone can persist for many days after formation, and travel several hundred miles.

**Respirable particulate matter** is a class of compounds that can lodge deep in the lungs causing health problems. Based on extensive health studies, particulate matter is regulated under two classes: $PM_{10}$ describes particles 10 microns or smaller, and $PM_{2.5}$. Respirable particulate matter can range from inorganic wind-blown soil to organic and toxic compounds found in diesel exhaust. Toxic compounds such as benzene often find a route into the body via inhalation of fine particulate matter.

**Nitrogen dioxide ($NO_2$)** is a reddish-brown gas with an irritating odor. Primary sources include motor vehicles, industrial facilities, and power plants. In the summer months, nitrogen dioxide is a major component of photochemical smog. Nitrogen dioxide is an irritating gas that may constrict airways, especially of asthmatics, and increase the susceptibility to infection in the general population. Nitrogen dioxide is also involved in ozone smog production.

**Carbon monoxide (CO)** is a colorless, odorless gas that is a byproduct of incomplete combustion. Carbon monoxide concentrations typically peak nearest a source such as roadways or areas with high fireplace use, and decrease rapidly as distance from the source increases. Ambient levels are typically found during periods of stagnant weather, such as on still winter evenings with a strong temperature inversion. Carbon monoxide is readily absorbed into the body from the air. It decreases the capacity of the blood to transport oxygen, leading to health risks for unborn children and people suffering from heart and lung disease. The symptoms of excessive exposure are headaches, fatigue, slow reflexes, and dizziness.

**Sulfur dioxide ($SO_2$)** is a colorless gas with a strong, suffocating odor. Sulfur dioxide is produced by burning coal, fuel oil, and diesel fuel. Sulfur dioxide can trigger constriction of the airways, causing particular difficulties for asthmatics. Long-term exposure is associated with increased risk of mortality from respiratory or cardiovascular disease. Sulfur dioxide emissions are also a primary cause of acid rain and plant damage.

The federal and state governments have set standards based on set criteria for various air pollutants caused by human activity. Table 2 summarizes standards for these criteria pollutants.

**Table 2. Air Quality Standards and Monitored Data.**

| Pollutant | Averaging Period | NAAQS ($\mu g/m^3$) or (*ppm*) | Year | | |
|---|---|---|---|---|---|
| | | | 2006 | 2007 | 2008 |
| $SO_2$ (in ppm) | 24-hour | *0.14* | 0.011 | 0.011 | 0.009 |
| | Annual Mean | *0.03* | 0.002 | 0.002 | 0.002 |
| $PM_{10}$ (in $\mu g/m^3$) | 24-hour | 150 | 50 | 57 | 108 |
| | Annual Mean | 50 | 14 | 13 | 16 |
| $PM_{2.5}$ (in $\mu g/m^3$) | 24-hour | 35 | 18.9 | 13.5 | 16.4 |
| | Weighted Annual Mean | 15 | 6.3 | 6.6 | 6.7 |
| $NO_2$ (in ppm) | Annual Mean | *0.053* | 0.003 | 0.003 | 0.003 |
| $O_3$ (in ppm) | 1-hour | *0.12* | 0.076 | 0.076 | 0.069 |
| | 8-hour | *0.08* | 0.067 | 0.065 | 0.063 |

Source: EPA 2009. $\mu g/m^3$ = micrograms per cubic meter. ppm = parts per million
Note: For $PM_{2.5}$ the fourth-highest 24-hour value is reported per EPA attainment evaluation protocol.

### 3.1.5 Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are a class of compounds known to cause cancer, mutation, or other serious health problems. HAPs are usually a localized problem near an emission source. HAPs are regulated separately from criteria air pollutants. There are several hundred HAPs recognized by the EPA and the State of North Dakota. Health effects of HAPs may occur at exceptionally low levels; for many HAPs, it is not possible to identify exposure levels that do *not* produce adverse health effects. Major sources of toxic air contaminants include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), wood smoke, and motor vehicle exhaust. Unlike regulations for criteria pollutants, there are no ambient air quality standards for HAPs. Examples of HAPs found in gases released by oil field development and operation include benzene, toluene, xylene, and formaldehyde (BLM 2009). HAP emissions receive evaluation based on the degree of exposure that can cause risk of premature mortality, usually from cancer.

Risk assessments express premature mortality in terms of the number of deaths expected per million persons. The North Dakota Department of Health (NDDH) typically reviews projects and either requires an applicant to prepare a risk assessment or assign the state engineers to do the work. The state requires that maximum individual cancer risks be calculated using its adopted protocol (the Determination of Compliance in the state's Air Toxics Policy). For new sources emitting HAPs with known negative health effects, an applicant must demonstrate that the combined impact of new HAP emission does not result in a maximum individual cancer risk greater than $1 \times 10^{-5}$ (1 in 100,000).

### 3.1.6 Air Monitoring

The NDDH operates a network of monitoring stations around the state that continuously measure pollution levels. Industry also operates monitoring stations as required by the state. The data from all these stations is subject to quality assurance, and when approved, it is published on the Internet (available from the EPA and other sources). Monitoring stations near the project site include Watford City in McKenzie County, Dunn Center in Dunn

County, and Beulah in Mercer County. These stations are located west, south, and southeast of the proposed well sites, respectively. Criteria pollutants measured include $SO_2$, $PM_{10}$, $NO_2$, and $O_3$. Lead and carbon monoxide are not monitored by any of the three stations. Table 2 summarizes federal air quality standards and available air quality data from the three county study areas. The highest value at any of the three monitoring locations is shown for each year.

Note that North Dakota has separate state standards for several pollutants that are different from the federal criteria standards. These are:

- $SO_2$ (parts per million [ppm]) – 0.023 annual arithmetic mean, 0.099 24-hour concentration, and 0.273 one-hour concentration; and
- $H_2S$ (ppm) – 10 instantaneous, 0.20 one-hour, 0.10 24-hour, and 0.02 three-month arithmetic mean.

All other state criteria pollutant standards are the same as federal standards (shown in Table 2). North Dakota was 1 of 13 states that met standards for all federal criteria pollutants in 2008.

The CAA mandates prevention of significant deterioration (PSD) in the designated attainment areas. Class I attainment areas have national significance and include national parks greater than 6,000 acres, national monuments, national seashores, and federal wilderness areas larger than 5,000 acres that were designated prior to 1977. Theodore Roosevelt National Park, a Class I area that covers about 110 square miles in three units within the Little Missouri National Grassland, lies between Medora and Watford City and is roughly 30 to 40 miles west of the proposed well sites. All other parts of the state, including the Reservation, are classified as Class II, affording them a lower level of protection from significant deterioration.

### 3.1.7 Response to the Threat of Climate Change

The EPA has proposed an endangerment finding that would allow regulation of GHGs under the CAA. The first step is a regulation that requires sources emitting 25,000 tons or more $CO_2e$ to report their emissions. The EPA and the National Highway Traffic Safety Administration have increased corporate fuel economy standards to promote national energy security and reduce GHGs. Standards will equal 35 miles per gallon by 2020, with an estimated savings to drivers of $100 billion annually. Many U.S. states and foreign nations have adopted goals and actions to reduce GHGs to levels scientists forecast will allow the earth's climate to stabilize at 1 to 2 degrees Celsius above the current level. Additional regulation is currently being developed by Congress to roll back emissions to levels recommended by atmospheric scientists.

### 3.1.8 Project Emissions

Oilfield emissions encompass three primary areas: combustion, fugitive, and vented.

- Combustion emissions include $SO_2$, ozone precursors called volatile organic compounds (VOCs), GHGs, and HAPs. Sources include engine exhaust, dehydrators, and flaring.

- Fugitive emissions include criteria pollutants, Hydrogen sulfide ($H_2S$), VOCs, HAPs, and GHGs. Sources include equipment leaks, evaporation ponds and pits, condensate tanks, storage tanks, and windblown dust (from truck and construction activity).
- Vented emissions include GHGs, VOCs, and HAPs. Primary sources are emergency pressure relief valves and dehydrator vents.

Pad and road construction, drilling activities, and tanker traffic would generate emissions of criteria pollutants and HAPs. Primary emissions sources during drilling are diesel exhaust, wind-blown dust from disturbed areas and travel on dirt roads, evaporation from pits and sumps, and gas venting. Diesel emissions are being progressively controlled by the EPA in a nationwide program. This program takes a two-pronged approach. First, fuels are improving to the ultra-low sulfur standard, and second, manufacturers must produce progressively lower engine emissions.

### 3.1.9 Regulatory Emission Controls

Under the CAA, federal land management agencies have an affirmative responsibility to help protect air quality. The tribes, federal land managers, and the State of North Dakota can make emission controls part of a lease agreement. The proposed project is similar to other projects installed nearby with state approval. State policy for permitting new oil and gas wells is as follows: Any oil or gas well production facility that emits or has the potential to emit 250 tons per year or more of any air contaminant regulated under North Dakota code must comply with state permitting requirements. The discussion outlines requirements for control of emissions from treaters, separators, flares, tanks, and other on-site equipment.

The North Dakota Air Pollution Control Rules require that the owner/operator submit an oil/gas facility registration form. This form must include an analysis of any gas produced from the well. The following sources must register oil and gas wells with the NDDH:

1. Any oil and gas well that is/was completed or recompleted on or after July 1, 1987. The registration form must be submitted within 90 days of the completion or recompletion of the well.
2. The owner or operator of any oil or gas well shall inform the NDDH of any change to the information contained on the registration form for a particular well. The owner shall submit a new gas analysis if the composition or the volume of the gas produced from the well has changed from the previous analysis, and caused an increase of 10 tons per year or more in sulfur compounds.
3. North Dakota rules require that all new sources of $H_2S$ and VOCs be flared or treated in an equally effective manner. Flares must have an automatic igniter or pilot light. The stack height of flares will be sufficient to allow dispersion of the flared gas. The gas produced from the Bakken Formation is typically low in $H_2S$, so odors from fugitive gas leaks are not expected to be a problem.
4. Chapter 33-15.03.03 of the North Dakota Air Pollution Control Rules specifies that fugitive dust emissions greater than 40% opacity cannot leave the project site for more than one 6-minute period per hour. This applies to all construction and unpaved road emission sources.

### 3.1.10 Best Management Practices

Under the CAA, federal land management agencies have an affirmative responsibility to protect air quality. Tribes, federal land managers, and private entities can make emission controls part of a lease agreement. BMPs can be adopted for various portions of the lifecycle of an oil/gas well. BMPs fall into six general categories:

- transportation,
- drilling,
- unplanned or emergency releases,
- vapor recovery,
- inspection and maintenance, and
- monitoring and repair.

The BLM has developed a set of BMPs for oil and gas extraction. As documented in case studies, applying many of the recommended BMPs produced substantial savings and increased revenue from fixed assets. The leasing agent (e.g., BLM) will negotiate a set of BMPs with the applicant before final sale. These BMPs will be formally presented, in writing, to the NDDH as part of the oil/gas facility registration process. They will also remain specific to the land so that any transfer requires the new operator to meet or exceed the same standards for emission control.

## 3.2 WATER RESOURCES

### 3.2.1 Surface Water

As shown in Figure 13, no perennial waterbodies are located near the proposed project area. Given the topography of the individual sites over the project area, runoff occurs largely as sheet-flow. Runoff that concentrates near the proposed project area will flow via sheet-flow into a constructed diversion ditch, which will transport run-off around the north side of the well pad and into an ephemeral channel which drains south, parallel to SH 22. Run-off will be transported through the ephemeral drainage until its confluence with an unnamed intermittent stream to the southwest of the project area. Run-off will then travel south-southeast through the intermittent channel until its confluence with the Lower Little Missouri River (Figure 13). Run-off will be transported via the Lower Little Missouri River until it enters into Lake Sakakawea.

The proposed Fort Berthold #148-95-22D-15-1H and the proposed Fort Berthold #148-95-27A-34-1H wells will be located in the Lost Bridge subwatershed (hydrologic unit code [HUC] 101102050505) of the Burnt Creek Watershed (Figure 14). The Lost Bridge subwatershed is part of the Lower Little Missouri subbasin, Little Missouri basin, Little Missouri subregion, and Missouri region. Runoff from the well pad would flow to the northwest and into an unnamed ephemeral tributary of the Lower Little Missouri River (HUC 10110205001592) and travel approximately 2.6 miles until reaching perennial waters in the Lower Little Missouri River (Figure 13).

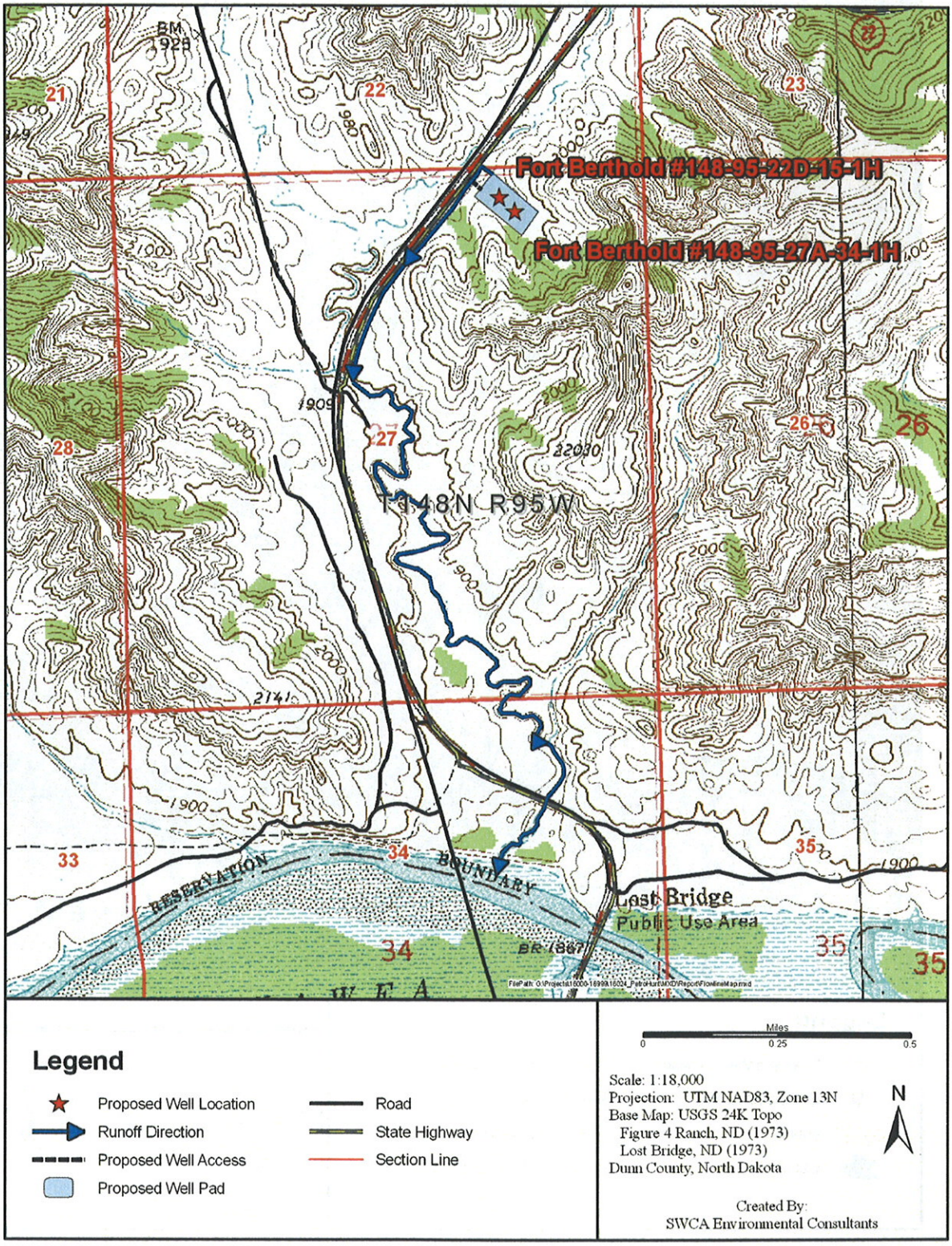



**Figure 13. Predicted water flow from the project area to the nearest perennial waterbody.**

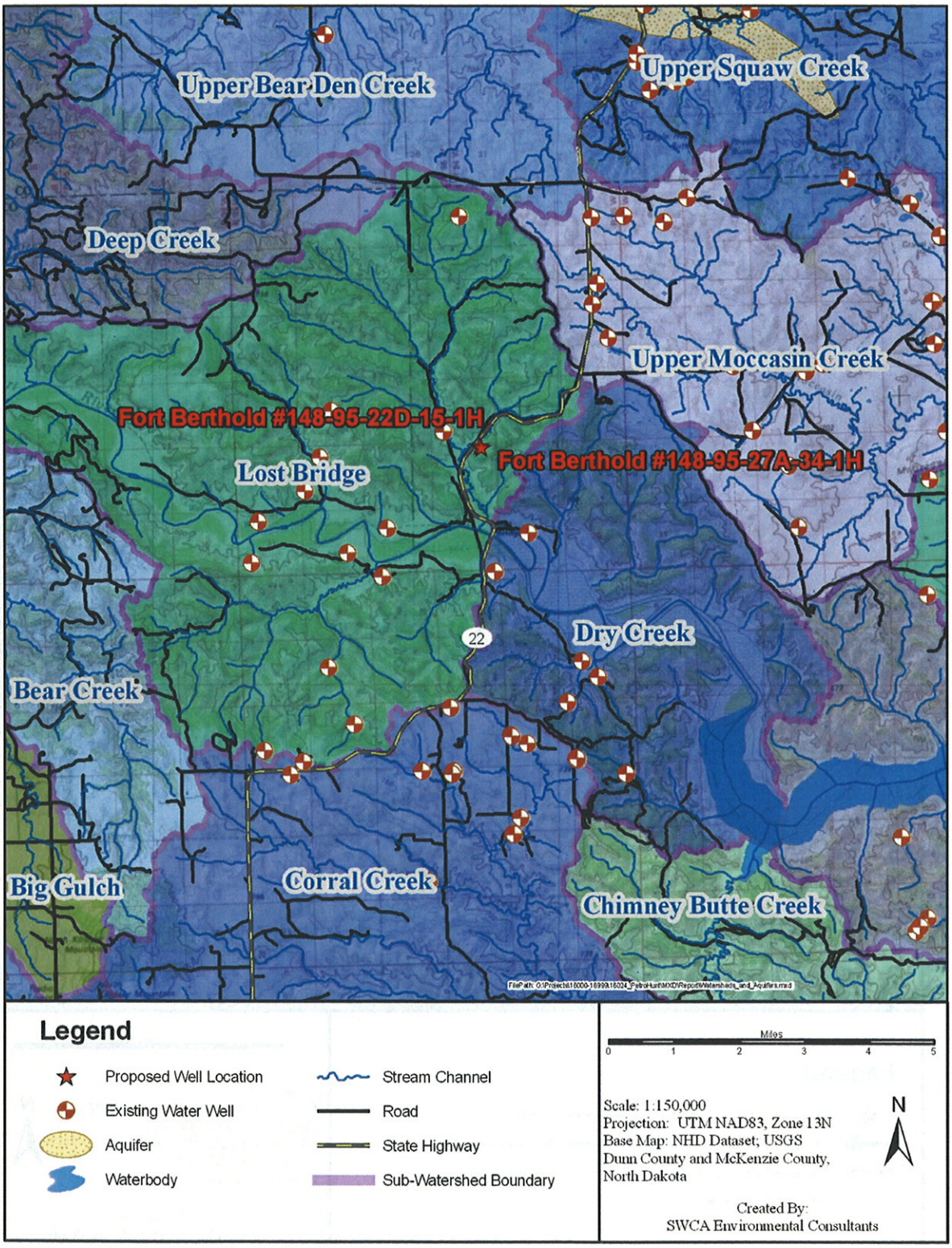



**Figure 14. Watersheds, aquifers, and existing water wells near the project area.**

The proposed project would be engineered and constructed to minimize or maintain normal concentrations of suspended solids (i.e., turbidity) in surface runoff, avoid disruption of drainages, and avoid direct impacts to surface water. No surface water would be used for well drilling operations. Any chemicals or potentially hazardous materials would be handled in accordance with the operator's spill prevention, control, and countermeasure plan. Provisions established under this plan would minimize potential impacts to any surface waters associated with an accidental spill.

### 3.2.2 Groundwater

Aquifers in the project area include, from deepest to most shallow, the Cretaceous Fox Hills and Hell Creek formations and the Tertiary Ludlow, Tongue River, and Sentinel Butte formations (Table 3). Several shallow aquifers related to post-glacial outwash composed of till, silt, sand, and gravel are located in Dunn and McKenzie counties. However, none are within the proposed project area (Figure 14). The shallow Sentinel Butte Formation, commonly used for domestic supply in the area, outcrops in Dunn County and meets standards of the NDDH (Croft 1985). Detailed analyses are available from the North Dakota Geological Survey, Bulletin 68, Part III, 1976.

**Table 3. Common Aquifers in the Proposed Project Area and Surrounding Region.**

| Period | Formation | | Depth Range (feet) | Thickness (feet) | Lithology | Water-Yielding Characteristics |
|---|---|---|---|---|---|---|
| Quaternary | Alluvium | | 0–40 | 40 | Silt, sand, and gravel | Maximum yield of 50 gal/min to individual wells from sand and gravel deposits. |
| Tertiary | Fort Union Group | Sentinel Butte | 0–670 | 0–670 | Silty, clay, sand and lignite | 5 to 100 gal/min in sandstone. 1 to 200 gal/min in lignite. |
| | | Tongue River | 140–750 | 350–490 | Silty, clay, sand and lignite | Generally less than 100 gal/min in sandstone. |
| | | Cannonball/ Ludlow | 500–1,150 | 550–660 | Fine- to medium-grained sandstone, siltstone, and lignite | Generally less than 50 gal/min in sandstone. |
| Cretaceous | Hell Creek | | 1,000–1,750 | 200–300 | Claystone, sandstone, and mudstone | 5 to 100 gal/min in sandstone. |
| | Fox Hills | | 1,100–2,000 | 200–300 | Fine- to medium-grained sandstone and some shale | Generally less than 200 gal/min in sandstone. Some up to 400 gal/min. |

Source: Croft (1985) and Klausing (1979). gal/min =gallons per minute

Review of electronic records of the North Dakota State Water Commission revealed 32 existing water wells within an approximate 5-mile boundary of the proposed project area (Table 4). Only one of these water wells is located within 1 mile of proposed project well pad. Water quality would be protected by drilling with freshwater to a point below the base of the Fox Hills Formation, implementing proper hazardous materials management, and using

appropriate casing and cementing. Drilling would proceed in compliance with Onshore Oil and Gas Order No. 2, *Drilling Operations* (43 CFR 3160).

Since none of the proposed project area lies within the boundaries of the post-glacial outwash aquifers, low porosity bedrock near the project wells would act as confining layers to prevent impacts to groundwater resources. Additionally, well completion methods would prevent cross contamination between aquifers or the introduction of hazardous materials into aquifers. The majority of the identified groundwater wells may have minimal hydrologic connections due to their respective distance from the project wells.

**Table 4. Existing Water Wells near the Project Area.**

| Well Number | Owner | Date Drilled | Section | Township/ Range | Type/Use | Depth (feet) | Aquifer | Nearest Well | Miles to Proposed Well |
|---|---|---|---|---|---|---|---|---|---|
| 147-095-03 AAB | J. Fettig | 1913 | 3 | 147N/95W | Unknown | 360 | Tongue River | 148-95-27A-34-1H | 1.9 |
| 147-095-04 BBA | Martin Kleeman | 1971 | 4 | 147N/95W | Stock | 1,348 | Hell Creek | 148-95-27A-34-1H | 2.5 |
| 147-095-08 BDC | G. Tabor | 1966 | 8 | 147N/95W | Stock | 1,490 | Fox Hills | 148-95-27A-34-1H | 4.1 |
| 147-095-12BCD | T. Sandvick | Unknown | 12 | 147N/95W | Stock | 400 | Tongue River | 148-95-27A-34-1H | 3.6 |
| 147-095-12CAD | T. Sandvick | 1969 | 12 | 147N/95W | Stock | 1,410 | Fox Hills | 148-95-27A-34-1H | 3.9 |
| 147-095-14 AAA | NDSWC | 1968 | 14 | 147N/95W | Municipal | 1,430 | Fox Hills | 148-95-27A-34-1H | 4.1 |
| 147-095-14 CAC | M. Guimont | 1958 | 14 | 147N/95W | Domestic/Stock | 10 | Sentinel Butte | 148-95-27A-34-1H | 4.6 |
| 147-095-14 CBB1 | G. Kleeman | 1933 | 14 | 147N/95W | Unknown | 52 | Sentinal Butte Tongue River | 148-95-27A-34-1H | 4.4 |
| 147-095-14 CBB2 | G. Kleeman | 1963 | 14 | 147N/95W | Domestic | 120 | Sentinel Butte | 148-95-27A-34-1H | 4.4 |
| 147-095-14 CBB3 | G. Kleeman | 1933 | 14 | 147N/95W | Stock | 26 | Sentinel Butte | 148-95-27A-34-1H | 4.4 |
| 147-095-15 BB | Thomas Sandvick | 1976 | 15 | 147N/95W | Stock | 70 | Unknown | 148-95-27A-34-1H | 4.6 |
| 147-095-17 ACA | G. Tabor | 1968 | 17 | 147N/95W | Stock | 1,570 | Fox Hills | 148-95-27A-34-1H | 4.7 |
| 148-094-05BCB | USGS | 1994 | 5 | 148N/94W | Monitoring | 104 | Unknown | 148-95-22D-15-1H | 5.0 |

| Well Number | Owner | Date Drilled | Section | Township/ Range | Type/Use | Depth (feet) | Aquifer | Nearest Well | Miles to Proposed Well |
|---|---|---|---|---|---|---|---|---|---|
| 148-094-06CBB | Gabe Fettig | 2002 | 6 | 148N/94W | Stock | 1,848 | Unknown | 148-95-22D-15-1H | 4.2 |
| 148-094-06DBD | Tribal | Unknown | 6 | 148N/94W | Stock | Unknown | Sentinal Butte Tongue River | 148-95-22D-15-1H | 4.5 |
| 148-094-17DCD2 | USGS | 1994 | 17 | 148N/94W | Monitoring | 70 | Unknown | 148-95-27A-34-1H | 4.1 |
| 148-094-20DDD | Tribal | Unknown | 20 | 148N/94W | Unused | 135 | Till | 148-95-27A-34-1H | 4.2 |
| 148-094-28 | Matt Young Bird | 1982 | 28 | 148N/94W | Domestic | 225 | Unknown | 148-95-27A-34-1H | 4.7 |
| 148-095-01DBB | Tribal | Unknown | 1 | 148N/95W | Unknown | 240 | Sentinel Butte | 148-95-22D-15-1H | 3.9 |
| 148-095-03 | Daryl Young Bird | 1985 | 3 | 148N/95W | Domestic | 247 | Unknown | 148-95-22D-15-1H | 3.5 |
| 148-095-12DCC2 | | 1992 | 12 | 148N/95W | Monitoring | 52 | Sentinal Butte Tongue River | 148-95-22D-15-1H | 2.8 |
| 148-095-12DB | Joe Woundedface | 1993 | 12 | 148N/95W | Domestic | 58 | Unknown | 148-95-22D-15-1H | 3.1 |
| 148-095-12DB | Joe Woundedface | 1993 | 12 | 148N/95W | Domestic | 15 | Unknown | 148-95-22D-15-1H | 3.1 |
| 148-095-13ADC | Tribal | 1950 | 13 | 148N/95W | Unknown | 400 | Unknown | 148-95-27A-34-1H | 2.6 |
| 148-095-20 | Jim Mittlestadt | 1975 | 20 | 148N/95W | Domestic | 75 | Unknown | 148-95-22D-15-1H | 2.3 |
| 148-095-22CCA | NDSWC | Unknown | 22 | 148N/95W | Monitoring | 1,455 | Fox Hills | 148-95-22D-15-1H | 0.6 |
| 148-095-29CBC | D. Meyer | 1937 | 29 | 148N/95W | Stock | 760 | Cannonball/Ludlow | 148-95-22D-15-1H | 2.4 |
| 148-095-31CCA | G. Tabor | 1971 | 31 | 148N/95W | Stock | 1,350 | Fox Hills | 148-95-27A-34-1H | 3.9 |
| 148-095-31BAC | D. Meyer | Unknown | 31 | 148N/95W | Stock | 700 | Cannonball/Ludlow | 148-95-27A-34-1H | 3.6 |
| 148-095-32DBD | G. Tabor | 1971 | 32 | 148N/95W | Stock | 1,365 | Fox Hills | 148-95-27A-34-1H | 2.6 |
| 148-095-33BDB | D. Meyer | 1931 | 33 | 148N/95W | Stock | 436 | Tongue River | 148-95-27A-34-1H | 1.9 |

| Well Number | Owner | Date Drilled | Section | Township/ Range | Type/Use | Depth (feet) | Aquifer | Nearest Well | Miles to Proposed Well |
|---|---|---|---|---|---|---|---|---|---|
| 148-095-35BDD | T. Fettig | Unknown | 35 | 148N/95W | Unused | 400 | Tongue River | 148-95-27A-34-1H | 1.5 |

Source: North Dakota State Water Commission (2009)

## 3.3 WETLANDS, HABITAT, AND WILDLIFE

### 3.3.1 Wetlands

National Wetland Inventory (NWI) maps maintained by the U.S. Fish and Wildlife Service (USFWS) do not identify any jurisdictional wetlands in the area of the proposed well pad or access road (USFWS 2009). No wetlands were observed within the project area during the field survey conducted in October 2009. No riparian or wetland habitats are anticipated to be directly or indirectly impacted by the construction of the proposed access road or wells.

According to the NWI database, several palustrine emergent (PEM) wetlands exist within a 2-mile radius of the project area. NWI data indicate that PEM wetlands exist approximately 1.81 miles from the project area at an approximate bearing of 218.2°. Additionally, the riparian/floodplain of the Little Missouri River is likely to support at least temporary PEM wetlands. The closest estimated boundary of these potential PEM wetlands is approximately 1.24 miles from the project area at an approximate bearing of 186.8°.°

### 3.3.2 Wildlife

Several wildlife species that may exist in Dunn County are listed as threatened or endangered under the Endangered Species Act (ESA). Listed species in Dunn County include the black-footed ferret, gray wolf, interior least tern, pallid sturgeon, piping plover, and whooping crane (USFWS 2008). Although delisted in 2007, the bald eagle remains a species of special concern to the BIA and the Department of the Interior, and is effectively treated the same as a listed species. Tribes and states may recognize additional species of concern; however, such lists are taken under advisement by federal agencies but are not legally binding in the manner of the ESA. Listed species are described below.

**Bald Eagle (*Haliaeetus leucocephalus*)**
**Status:** Delisted in 2007
**Likelihood of impact:** May affect, but is not likely to adversely affect

The proposed project area is approximately 15 miles from Lake Sakakawea and does not contain suitable nesting/perching habitat, concentrated feeding areas, or other necessary habitat. Though delisted, the bald eagle is afforded some protection under the Migratory Bird Treaty Act (916 USC 703-711) and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c). No impacts are anticipated.

**Black-footed Ferret (*Mustela nigripes*)**
**Status:** Endangered
**Likelihood of impact:** No effect

Several isolated populations are known to exist in the United States. However, this species is presumed extirpated from North Dakota because it has not been observed in the wild for more than 20 years. No impacts are anticipated.

**Dakota Skipper (*Hesperia dacotae*)**
**Status:** Candidate
**Likelihood of impact:** May affect, but is not likely to adversely affect

The proposed project area is maintained as pasture land. Therefore, undisturbed native prairie areas with a high diversity of wildflowers and grasses were not observed in the proposed project area. The absence of suitable habitat makes the presence of Dakota skippers unlikely. No impacts are anticipated.

**Golden Eagle (*Aquila chrysaetos*)**
**Status:** Not listed; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act
**Likelihood of impact:** May affect, but is not likely to adversely affect

The golden eagle prefers habitat characterized by open prairie, plains, and forested areas. Usually, golden eagles can be found in proximity to badland cliffs that provide nesting habitat. The project area is surrounded by badland cliffs, therefore suitable golden eagle nesting habitat may be present around the project area. However, through the use of BMPs including techniques which will deter wildlife from entering into the project area, no adverse impact is anticipated.

**Gray Wolf (*Canis lupus*)**
**Status:** Endangered
**Likelihood of impact:** No effect

The gray wolf is thought to be regionally extirpated though the potential for transient individuals is still present. Additionally, the project area encompasses a negligible area relative to the approximate 50 to 5,019 square miles gray wolf packs (i.e., 2 to 30 individuals) protect as their territory. Construction activities are not likely to cause any adverse affect when gray wolves enter into their nomadic phase in the fall and winter, should transient wolves be present.

**Interior Least Tern (*Sterna antillarum*)**
**Status:** Endangered
**Likelihood of impact:** May affect, but is not likely to adversely affect

Interior least tern individuals are primarily piscivorous and frequent sparsely vegetated sand bars, gravel pits, and lake and reservoir shoreline. Therefore, due to the distance between the project area and suitable foraging and nesting habitat, the construction activities associated with this project are unlikely to affect any interior least tern individuals.

**Pallid Sturgeon (*Scaphirhynchus albus*)**
**Status:** Threatened
**Likelihood of impact:** May affect, but is not likely to adversely affect

The pallid sturgeon is a benthic dwelling fish that is most often found in highly turbid water of large rivers. They are most often found in sand and gravel substrates at variable depths and water velocity. If contaminants were released, they may eventually reach the Little Missouri River and Lake Sakakawea. To combat this risk, stringent BMPs will be coupled with active site monitoring by the BIA to reduce the chance of an adverse affect on the pallid sturgeon. Therefore, no adverse affect is anticipated.

**Piping Plover (*Charadrius melodus*)**
**Status:** Threatened
**Likelihood of impact:** May affect, but is not likely to adversely affect

The entire shoreline of Lake Sakakawea has been designated critical habitat for piping plover. These birds nest on sparsely vegetated shoreline beaches, peninsulas, and islands composed of sand, gravel, or shale. The nearest critical habitat would be approximately 15 miles from the proposed project area. Individual piping plovers may transition across or forage at the proposed project area during construction, drilling, production, or reclamation activities. However, no impact is anticipated, though minor impacts could occur as a result of the aforementioned activities.

**Whooping Crane (*Grus americana*)**
**Status:** Endangered
**Likelihood of impact:** May affect, but is not likely to adversely affect

No viable habitat, including PEM wetlands, is located within the proposed project area. The lack of suitable foraging and nesting habitat makes the proposed project area unsuitable for whooping cranes. No impact is anticipated.

The wildlife species listed in Table 5 were observed during field visits to the proposed project area. All wildlife species listed in Table 5 were noted using the observation of secondary indicators (i.e., scat, tracks, or both).

The primary impacts to wildlife species will come as a result of the construction of the dual well pad area including the construction of the new access road, increased vehicular traffic density, drilling activities, and potential commercial production. No impacts to listed species are anticipated because of the low likelihood of their occurrence in the proposed project area, confirmed by on-site assessments conducted by SWCA Environmental Consultants (SWCA) ecologists. Ground clearing might impact habitat for unlisted species, including small birds, small mammals, and other wildlife species. Proposed projects may affect raptor and migratory bird species through direct mortality, habitat degradation, and/or displacement of individual birds. These impacts are regulated in part through the Migratory Bird Treaty Act of 1918 (916 USC 703-711). Fragmentation of native prairie habitat can detrimentally affect grouse species; however, due to the ratio of each project area to the total landscape area, the overall disturbance would be negligible.

**Table 5. Wildlife Observed during Field Surveys at the Proposed Project Areas.**

| Well Pad | Common Name | Scientific Name | Observation Type | Habitat |
|---|---|---|---|---|
| Fort Berthold #148-95-22D-15-1H | Cottontail Rabbit | *Sylvilagus* sp. | Secondary | Mixed grass prairie with high sagebrush density. |
| Fort Berthold #148-95-27A-34-1H | Mule Deer | *Odocoileus hemionus* | Secondary | Mixed grass prairie with high sagebrush density. |

Precautions that may limit or reduce the possible impact to all wildlife species include:

- locating the well pad over areas with existing disturbances;
- netting the reserve pit between drilling and reclamation;
- removing any oil found in pits and ponds;
- installing covers under drip buckets and spigots; and
- conducting interim reclamation of at least half the disturbed area.

Reclamation would begin without delay if a well is determined to be unproductive, or upon completion of commercial production. Any wildlife species inhabiting the project area are likely to adapt to changing conditions, and continue to persist without long-term adverse impact.

## 3.4 SOILS

The proposed project area is located toward the center of the Williston Basin. The Greenhorn Formation, which consists of thin limestone and dark gray to black organic-rich shale, is found from the surface to a depth of approximately 4,000 feet. The Greenhorn is subdivided into lower and upper intervals of limestone and calcareous shale with a middle interval of shale. Near-surface sediment is of Recent, Pleistocene, or Tertiary age, and includes Sauk, Tippecanoe, Kaskaskia, Absaroka, Zuni, and Tejas sequences.

### 3.4.1 Natural Resources Conservation Service Soil Data

The Natural Resources Conservation Service (NRCS 2009) soil series present on the well pad and access road area, and the respective acreages, are summarized in Table 6. The acreage shown in Table 6 is based on the spatial extent of soil series combinations derived from NRCS data (Figure 15), therefore the acreage is approximate and used as a best estimate of soil series distribution within the proposed project area.

The following soil series descriptions represent individual soil series reported to exist within the proposed project area (NRCS 2009). Each individual soil series does not exist individually in the project area but rather in combination with other soil types (Table 6).

**Cabba:** The Cabba series consists of shallow, well drained, moderately permeable soils found on hills, escarpments, and sedimentary plains. The soil slopes broadly range between 2 and 70 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is approximately 43°F. The most common vegetation species found on this soil type are little bluestem (*Schizachyrium scoparium*), green needlegrass (*Nasella viridula*), and other various herbs, forbs, and shrub species (NRCS 2009).

**Cherry:** The Cherry series consists of very deep, well drained, moderately slowly or slowly permeable soils that formed in alluvium on fans, foot slopes, dissected uplands, and terraces. Slopes range from 0 to 25 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 14 inches. Soils are cropped to small grains, hay, and pasture and are used for grazing. Native vegetation is western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), green needlegrass, needleandthread (*Hesperostipa comata*), and a variety of forbs and shrubs (NRCS 2009).

**Table 6. Percentage of the Project Area Composed of Specific Soil Types.**

| Feature | Soil Series | Percentage of Location | Acres |
|---|---|---|---|
| **Fort Berthold #148-95-22D-15-1H and Fort Berthold #148-95-27A-34-1H** | | | |
| Access Road | Cherry-Cabba complex, 9 to 25 percent slopes | 6.3% | 0.27 |
| Dual Well Pad | Cherry-Cabba complex, 9 to 25 percent slopes | 93.7% | 4.01 |

### 3.4.2 Field-derived Soil Data

Soil data derived from an excavated soil pit during the field survey, including the matrix value, hue, chroma, and color name, are summarized in Table 7. Additionally, redoximorphic features (i.e., reduced/oxidized iron or manganese) deposits and soil texture were looked for at each location and noted if present. A Munsell soil color chart was used to determine the color of moist soil samples.

Soil erodibility (or K Factor) indicates the vulnerability of material less than 2 millimeters in size to sheet and rill erosion by water. Values can range from 0.02 (i.e., lowest erosion potential) to 0.69 (i.e., greatest erosion potential).

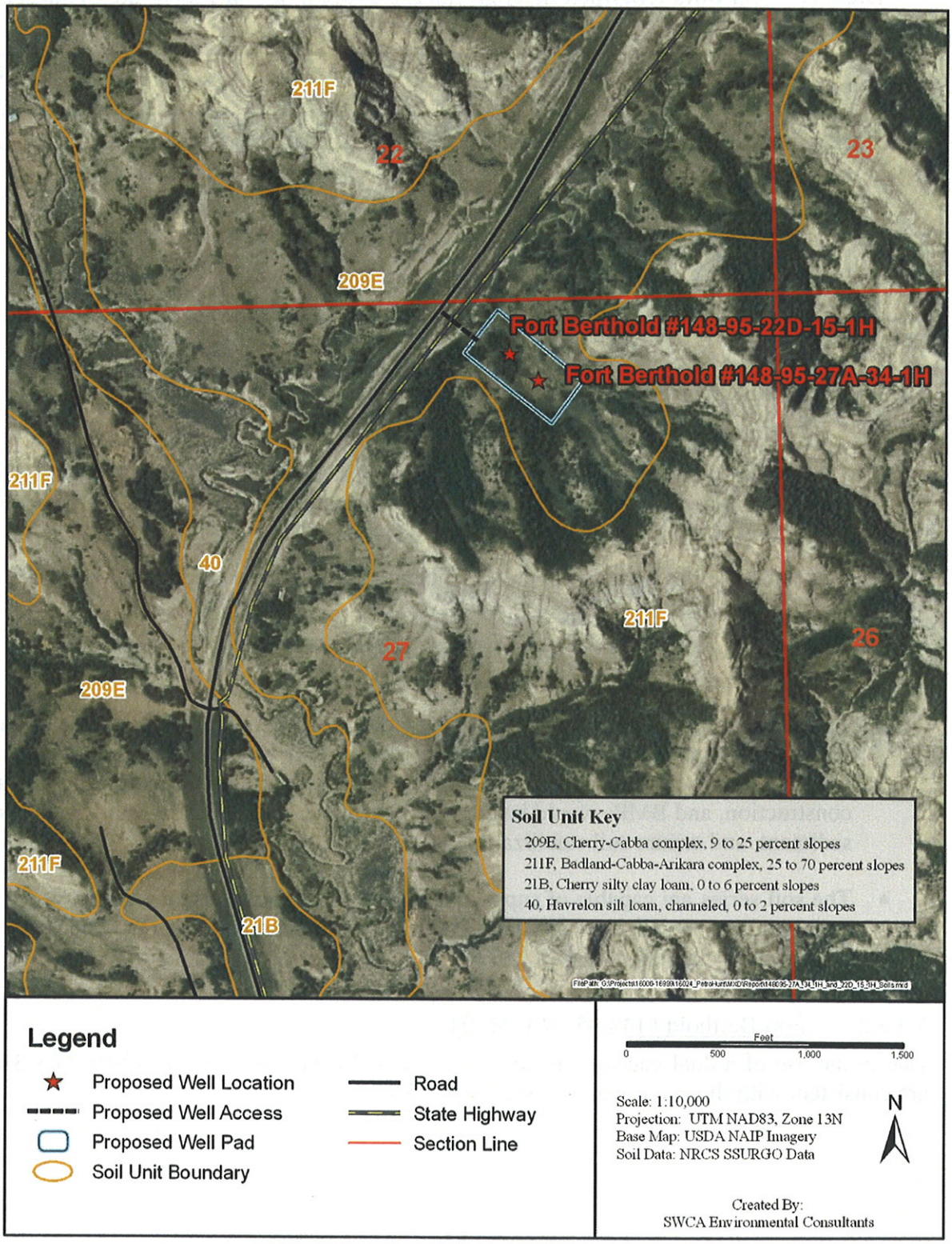



**Figure 15. Approximate spatial extent of soil types in and around Fort Berthold #148-95-22D-15-1H and Fort Berthold #148-95-27A-34-1H wells.**

**Table 7. Soil Data Obtained through the Excavation of Soil Pits in the Proposed Project Area.**

| Feature | Pit Depth (inches) | Soil Matrix Color (color name) | Redoximorphic Feature Color | Texture | Slope (%) | K Factor |
|---|---|---|---|---|---|---|
| **Fort Berthold #148-95-22D-15-1H and Fort Berthold #148-95-27A-34-1H** | | | | | | |
| Dual Well Pad | 0–10 | 10YR 3/2 (very dark grayish-brown) | 7.5YR 5/8 (strong brown) | Silty Clay | 5 | 0.32 |
| Access Road | 0–10 | 10YR 3/2 (very dark grayish-brown) | None Observed | Clay Loam | 5 | 0.32 |

### 3.4.3 Conclusions Regarding Soil Erosion Potential

3.4.3.1 Fort Berthold #148-95-22D-15-1H

- The Fort Berthold #148-95-22D-15-1H and Fort Berthold #148-95-27A-34-1H well pad and proposed new access road are both dominated (93.7% and 6.3%, respectively) by a Cherry-Cabba complex, 9 to 25 percent slopes (Table 6).
- This soil type has a moderate erosion potential, with slopes ranging between 9% and 25% (NRCS 2009).
- Reclamation of vegetative communities should be easily obtainable due to the affinity of native grassland species to this soil type (NRCS 2009).
- This location has a K Factor of 0.32. Using the Revised Universal Soil Loss Equation (RUSLE), there could be 5.32 tons/acre/year of soil loss from the site if it is not properly managed to prevent such loss. The site would be monitored during and after construction, and BMPs would be used to prevent erosion, minimize runoff and loss of sediment, and ensure soil stabilization.
- The soil series are capable of supporting native short and mid grass prairie vegetative communities, which may substantially increase the probability for successful and permanent reclamation (NRCS 2009).

3.4.3.2 Fort Berthold #148-95-27A-34-1H

Due to the use of a dual pad format, soil conclusions for Fort Berthold #148-95-27A-34-1H are consistent with those presented in Section 3.4.3.1.

#### 3.4.3.3 General

The soil types are not expected to create unmanageable erosion issues or interfere with reclamation of the area. Proven BMPs are known to significantly reduce erosion of various types of soil, including those in the project area (BLM Instruction Memorandum 2004-124, www. blm.gov/bmp; BLM and USFS 2007; Grah 1997). Topsoil stripped from areas of new construction would be retained for use during reclamation. Any areas stripped of vegetation during construction would be reseeded once construction activities have ceased. The implementation of BMPs by the operator is projected to reduce and maintain negligible levels of erosion.

## 3.5 VEGETATION AND INVASIVE SPECIES

The proposed project area occurs in the Little Missouri Badlands level 4 ecoregion which contains a short-grass prairie ecosystem with forested areas found within draws on the north slopes of hills (Bryce et al. 1998). Native grasses include western wheatgrass, blue grama, little bluestem, and prairie sandreed (*Calamovilfa longifolia*). Common wetland vegetation includes various sedge species (*Carex* spp.), bulrush (*Scirpus* spp.), and cattails (*Typha* spp.). Common shrub, sapling, and tree species found in draws and on north slopes include green ash (*Fraxinus pennsylvanica*) and mountain juniper (*Juniperus scopulorum*). Green ash may also be found in riparian zones with eastern cottonwood trees (*Populus deltoides*).

### 3.5.1 Fort Berthold #148-95-22D-15-1H

Vegetation noted within the Fort Berthold #148-95-22D-15-1H project area includes silver sagebrush (*Artemisia cana*), fringed sage (*Artemisia frigida*), smooth brome (*Bromus inermis*), American elm (*Ulmus americana*), green needlegrass, golden currant (*Ribes aureum*), Rocky Mountain juniper (*Juniperus scopulorum*), sideoats gramma (*Bouteloua curtipendula*), and crested wheatgrass (*Agropyron cristatum*).

### 3.5.2 Fort Berthold #148-95-27A-34-1H

Due to the proximity of the wells to one another, the plant species observed at Fort Berthold #148-95-27A-34-1H are conducive with those noted at Fort Berthold #148-95-22D-15-1H.

Noxious weeds have the potential to detrimentally affect public health, ecological stability, and agricultural practices. The North Dakota Century Code (Chapter 63-01.1) recognizes 12 species as noxious; six of these recognized species are known to exist in Dunn County. Table 8 indicates the total acreage occupied by each noxious species known to exist in Dunn County. Additional information is available from the NRCS Plants Database for North Dakota at http://www.plants.usda.gov.

**Table 8. Occupied Area for Recognized Noxious Weeds in Dunn County, North Dakota.**

| Common Name | Scientific Name | Dunn County (acres) |
|---|---|---|
| absinth wormwood | *Artemisia absinthium* | 38,600 |
| Canada thistle | *Cirsium arvense* | 32,800 |
| Dalmatian toadflax | *Linaria dalmatica* | 1 |
| diffuse knapweed | *Centaurea diffusa* | -- |
| field bindweed | *Convolvulus arvensis* | 33,000 |
| leafy spurge | *Euphorbia esula* | 10,500 |
| musk thistle | *Carduus nutans* | 2 |
| purple loosestrife | *Lythrum salicaria* | -- |
| Russian knapweed | *Acroptilon repens* | -- |
| salt cedar | *Tamarix ramosissima* | -- |
| spotted knapweed | *Centaurea stoebe* | -- |
| yellow starthistle | *Centaurea solstitialis* | -- |

Source: North Dakota Department of Agriculture 2007

"Invasive" is a general term used to describe plant species that are not native to a given area, spread rapidly, and have adverse ecological and economic impacts. These species may exhibit high reproductive rates and are usually adapted to occupy a diverse range of habitats otherwise occupied by native species. These species may subsequently out-compete native plant species for resources, causing a reduction in native plant populations and an increase in noxious weed populations.

Evaluation of the existing vegetation during on-site assessments conducted in October 2009 indicated no invasive species were present within the project area. However, potential disturbance of approximately 6.95 acres and removal of existing vegetation may facilitate the spread of invasive species. The APD and this EA require the operator to control noxious weeds throughout the project area. Surface disturbance and vehicular traffic must not take place outside approved ROWs or the well pad. Areas that are stripped of topsoil must be re-seeded and reclaimed at the earliest opportunity. Additionally, certified weed-free straw and seed must be used for all construction, seeding, and reclamation efforts. Prompt and appropriate construction, operation, and reclamation are expected to maintain minimal levels of adverse impacts to vegetation and will reduce the potential establishment of invasive vegetation species.

## 3.6 CULTURAL RESOURCES

Historic properties, or cultural resources, on federal or tribal lands are protected by many laws, regulations and agreements. The *National Historic Preservation Act of 1966* (16 USC 470 *et seq.*) at Section 106 requires, for any federal, federally assisted or federally licensed undertaking, that the federal agency take into account the effect of that undertaking on any district, site, building, structure or object that is included in the National Register of Historic Places (National Register) before the expenditure of any federal funds or the issuance of any federal license. Cultural resources is a broad term encompassing sites, objects, or practices of archaeological, historical, cultural and religious significance. Eligibility criteria (36 CFR 60.6) include association with important events or people in our history, distinctive construction or artistic characteristics, and either a record of yielding or a potential to yield information important in prehistory or history. In practice, properties are generally not eligible for listing on the National Register if they lack diagnostic artifacts, subsurface remains or structural features, but those considered eligible are treated as though they were listed on the National Register, even when no formal nomination has been filed. This process of taking into account an undertaking's effect on historic properties is known as "Section 106 review," or more commonly as a cultural resource inventory.

The area of potential effect (APE) of any federal undertaking must also be evaluated for significance to Native Americans from a cultural and religious standpoint. Sites and practices may be eligible for protection under the *American Indian Religious Freedom Act of 1978* (42 USC 1996). Sacred sites may be identified by a tribe or an authoritative individual (Executive Order 13007). Special protections are afforded to human remains, funerary objects, and objects of cultural patrimony under the *Native American Graves Protection and Repatriation Act* (NAGPRA, 25 USC 3001 *et seq.*).

Whatever the nature of the cultural resource addressed by a particular statute or tradition, implementing procedures invariably include consultation requirements at various stages of a federal undertaking. The MHA Nation has designated a Tribal Historic Preservation Officer (THPO) by Tribal Council resolution, whose office and functions are certified by the National Park Service. The THPO operates with the same authority exercised in most of the rest of North Dakota by the State Historic Preservation Officer (SHPO). Thus, BIA consults and corresponds with the THPO regarding cultural resources on all projects proposed within the exterior boundaries of the Fort Berthold Reservation.

A cultural resource inventory of this dual well pad and access road was conducted by personnel of SWCA Environmental Consultants, using a pedestrian methodology. Approximately 13.82 acres were intensively inventoried on October 16, 2009 (Markman 2010). No historic properties were located that appear to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.6) for inclusion on the National Register. As the lead federal agency, and as provided for in 36 CFR 800.5, on the basis of the information provided, BIA reached a determination of **no historic properties affected** for this undertaking. This determination was communicated to the THPO on February 5, 2010 (see Part 4); however, no response was received from the THPO within the allotted 30-day comment period.

## 3.7 SOCIOECONOMICS

The scope of analysis for social and economic resources includes a discussion of current social and economic data relevant to the Analysis Area and surrounding communities of the Reservation and McKenzie, Dunn, McLean, and Mountrail counties, North Dakota. These counties were chosen for analysis because potential socioeconomic impacts would most likely be realized due to their proximity to the proposed well locations and overlap of the Reservation. These communities are collectively referred to as the Analysis Area.

This section discusses community characteristics such as population, housing, demographics, employment, and economic trends taking place in the Analysis Area. Also included are data relating to the State of North Dakota and the United States, which provide a comparative discussion when compared to the Analysis Area. Information in this section was obtained from various sources including, but not limited to, the U.S. Census Bureau, the U.S. Bureau of Economics, and the North Dakota State Government.

### 3.7.1 Employment

The economy in the state of North Dakota, including the Reservation and four counties in the Analysis Area, has historically depended on agricultural, including grazing and farming. However, energy development and extraction, power generation, and services relating to these activities have increased over the last several years. Consequently, service and trade sectors have also become increasingly important; many of the service sector jobs are directly and indirectly associated with oil and gas development. In 2007, total employment in the state of North Dakota was approximately 487,337 (U.S. Bureau of Economic Analysis 2009a). Of this, the largest employers include government and government enterprises employing 16.6% of the labor force (81,218 jobs); health care and social assistance at 11.7% of the labor force (56,990 jobs), and retail trade at 11.3% of the labor force (55,478 jobs) (U.S. Bureau of Economic Analysis 2009a). Table 10 provides total employment opportunities for the Analysis Area between 2001 and 2007.

**Table 9. Total Employment for the Analysis Area and State of North Dakota, 2001 and 2007.**

| Location | Total Employment (2001) | Total Employment (2007) | Percent Change (+) | Unemployment Rate (2007) |
|---|---|---|---|---|
| Dunn County | 1,941 | 1,961 | 1.0 | 3.8% |
| McKenzie County | 4,164 | 4,600 | 10.4 | 3.1% |
| McLean County | 5,173 | 5,448 | 5.3 | 4.6% |
| Mountrail County | 3,691 | 3,711 | 0.5 | 5.7% |
| On or Near Fort Berthold Reservation | 1,211 | 1,287* | 6.2 | 71% |
| North Dakota | 448,897 | 487,337 | 8.5 | 3.1% |

U.S. Bureau of Economic Analysis 2009a.
* Bureau of Indian Affairs 2005. Represents 2005 data.

Although detailed employment information for the Reservation is not provided by the U.S. Bureau of Economics or the State of North Dakota, residents of the Reservation are employed in similar ventures as those outside the Reservation. Typical employment includes ranching, farming, tribal government, tribal enterprises, schools, federal agencies, and recently, employment related to conventional energy development. The MHA Nation's Four Bears Casino and Lodge, located 4 miles west of New Town, employs approximately 320 people, of which 90% are tribal members (Fort Berthold Housing Authority 2008).

The Fort Berthold Community College, which is tribally chartered to meet the higher education needs of the people of the MHA Nation, had 11 full-time members and 25 adjunct members in academic year 2006–2007. Approximately 73% of the full-time faculty members are of American Indian/Alaska Native descent, approximately 88% of which are enrolled members of the MHA Nation. Additionally, 65% of the part-time faculty members are of American Indian/Alaska Native descent and all (100%) are tribal members.

The BIA publishes biannual reports documenting the Indian service and labor market for the nation. According to the 2005 American Indian Population and Labor Force Report, of the 8,773 tribal members that were eligible for BIA-funded services, 4,381 constituted the total available workforce. Approximately 29%, or 1,287 members, were employed in 2005, indicating a 71% unemployment rate (as a percent of the labor force) for members living on or near the Reservation; 55% of the employed members were living below poverty guidelines. Compared to the 2001 report, 2005 statistics reflect a 6.2% increase in the number of tribal members living on or near the Reservation, but unemployment (as a percent of the labor force) has stayed steady at 71% and the percentage of employed people living below the poverty guidelines has increased to 55% (BIA 2005).

### 3.7.2 Income

Per capita income is often used as a measure of economic performance, but it should be used with changes in earnings for a realistic picture of economic health. Since total personal income includes income from 401(k) plans as well as other non-labor income sources like transfer payments, dividends, and rent, it is possible for per capita income to rise even if the average wage per job declines over time.

The North American Industry Classification System (NAICS) is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. According to NAICS standards, per capita personal income for Dunn County was $20,634 in 2000 and $26,440 in 2007, an increase of approximately 28.1%; per capita personal income for McKenzie County was $21,637 in 2000 and $32,927 in 2007, an increase of approximately 52.1%; per capita personal income for McLean County was $23,001 in 2000 and $38,108 in 2007, an increase of approximately 65.6%; and per capita personal income for Mountrail County was $23,363 in 2000 and $32,324 in 2007, an increase of approximately 38.3%. These figures compare with a State of North Dakota per capital personal income of $25,105 in 2000 and $36,082 in 2007, an increase of approximately 43.7% from 2000 (U.S. Bureau of Economic Analysis 2009b).

According to a 2008 report published by the Fort Berthold Housing Authority, the average per capita income for the Reservation was $8,855 in 1999, compared to $17,769 for the state and the U.S. average of $21,587 at that time (Fort Berthold Housing Authority 2008).

With the exception of McLean County, counties that overlap the Reservation tend to have per capita incomes and median household incomes below North Dakota statewide averages (Table 11). Similarly, as presented in Table 11, unemployment rates in all counties, including the Reservation, were equal to or above the state average of 3.1%. Subsequently, Reservation residents and MHA Nation members tend to have per capita incomes and median household incomes below the averages of the encompassing counties, as well as statewide and higher unemployment. Per capita income for residents on or near the Reservation is approximately 28% lower than the statewide average. The median household income reported for the Reservation (i.e., $26,274) is approximately 40% lower than the state median of $43,936. According to the BIA, approximately 55% of tribal members living on or near the Reservation were employed, but living below federal poverty levels (BIA 2005).

**Table 10. Income and Unemployment 2007**

| Unit of Analysis | Per Capita Income[1] | Median Household Income | Percent of All People in Poverty[2] |
|---|---|---|---|
| Dunn County | 26,440 | $37,632 | 13.5% |
| McKenzie County | 32,927 | $41,333 | 13.8% |
| McLean County | 38,108 | $44,421 | 10.4% |
| Mountrail County | 32,324 | $35,981 | 15.9% |
| Fort Berthold Reservation[3] | 10,291 | $26,274 | N/A |
| North Dakota | 36,082 | $43,936 | 11.8% |

Source: [1] U.S. Bureau of Economic Analysis 2009b
[2] United Stated Department of Agriculture (USDA) 2009
[3] North Dakota State Data Center 2009.
N/A – Data not available.

### 3.7.3 Population

Historic and current population counts for the Analysis Area, compared to the state, are provided below in Table 12. The state population showed little change between the last two census counts (1990–2000), but there were notable changes at the local level. Populations in all four counties have steadily declined in the past. McLean and Dunn counties had a higher rate of population decline among the four counties at 10.5% and 7.8%, respectively. These declines can be attributed to more people moving to metropolitan areas, which are perceived as offering more opportunities for growth. However, population on or near the Reservation has increased approximately 13.3% since 2000. While Native Americans are the predominant group on the Reservation, they are considered the minority in all other areas of North Dakota.

As presented in Table 12, population growth on the Reservation (13.3%) exceeds the overall growth in the state of North Dakota (-0.1%) and four counties in the Analysis Area. This trend

in population growth for the Reservation is expected to continue in the next few years (Fort Berthold Housing Authority 2008).

**Table 11. Population and Demographics.**

| County or Reservation | Population in 2008 | % of State Population | % Change Between 1990–2000 | % Change between 2000–2008 | Predominant Group (%) | Predominant Minority (Percent of Total Minority Population) |
|---|---|---|---|---|---|---|
| Dunn | 3,318 | 0.5 | -10.1 | -7.8 | Caucasian (84.9%) | American Indian (15.1%) |
| McKenzie | 5,674 | 0.8 | -10.1 | -1.1 | Caucasian (76.3%) | American Indian (23.7%) |
| McLean | 8,337 | 1.3 | -11.0 | -10.5 | Caucasian (91.3%) | American Indian (8.7%) |
| Mountrail | 6,511 | 1.0 | -5.6 | -1.8 | Caucasian (62.8%) | American Indian (37.2%) |
| On or Near Fort Berthold Reservation[1] | 11,897 | 1.8 | 178.0[2] | 13.3[3] | American Indian | Caucasian (~27%) |
| Statewide | 641,481 | 100 | 0.005 | -0.1 | Caucasian | American Indian (8.6%) |

Source: U.S. Census Bureau 2009a.
[1] Bureau of Indian Affairs 2005. Population shown reflects the Total enrollment in the Tribe in 2005. 2008 data unavailable. All information related to the Fort Berthold Reservation reflects 2005 data, including state population. 11,897 reflects tribal enrollment on or near the Reservation. According to the BIA, near the Reservation includes those areas or communities adjacent or contiguous to the Reservation.
[2] Bureau of Indian Affairs 2001. Reflects percent change between 1991 and 2001.
[3] Reflects percent change between 2001 and 2005.

### 3.7.4 Housing

Workforce-related housing can be a key issue associated with development. Historical information on housing in the four counties in the Analysis Area was obtained from the U.S. Census Bureau, 2000 census. Because the status of the housing market and housing availability changes often, current housing situations can be difficult to characterize quantitatively. Therefore, this section discusses the historical housing market. Table 13 provides housing unit supply estimates in the Analysis Area, including the Reservation and four overlapping counties.

The Fort Berthold Housing Authority manages a majority of the housing units within the Reservation. Housing typically consists of mutual-help homes built through various government programs, low-rent housing units, and scattered-site homes. Housing for government employees is limited, with a few quarters in Mandaree and White Shield available to Indian Health Service employees in the Four Bears Community and to BIA employees. Private purchase and rental housing are available in New Town. New housing construction has recently increased within much of the Analysis Area, but availability remains low.

Availability and affordability of housing could impact oil and gas development and operations. The number of owner-occupied housing units (1,122) within the Reservation is approximately 58% lower than the average number of owner-occupied housing units found in the four overlapping counties (1,921).

**Table 12. Housing Development Data for the Reservation and Encompassing Counties.**

| Region | Total Housing Units | | | | | | |
|---|---|---|---|---|---|---|---|
| | Occupied | Owner Occupied | Renter Occupied | Vacant | Total | Total | % change 2000–2008 |
| | 2000 | 2000 | 2000 | 2000 | 2000 | 2008 | |
| Dunn | 1,378 | 1,102 | 276 | 587 | 1,965 | 1,968 | 0.1 |
| McKenzie | 2,151 | 1,589 | 562 | 568 | 2,719 | 2,781 | 2.2 |
| McLean | 3,815 | 3,135 | 680 | 1,449 | 5,264 | 5,420 | 2.9 |
| Mountrail | 2,560 | 1,859 | 701 | 878 | 3,438 | 3,528 | 2.6 |
| Reservation | 1,908 | 1,122 | 786 | 973 | 2,881 | N/A | N/A |
| North Dakota | 257,152 | 171,299 | 85,853 | 32,525 | 289,677 | 313,332 | 8.2 |

Source: U.S. Census Bureau n.d.
N/A = Data not available.

In addition to the relatively low percent change of the total housing units compared to the state average, these four counties are ranked extremely low for both the state and national housing starts and have minimal new housing building permits, as presented in Table 14.

**Table 13. Housing Development Data for the Encompassing Counties 2000–2008.**

| Housing Development | North Dakota County | | | |
|---|---|---|---|---|
| | Dunn | McKenzie | McLean | Mountrail |
| New Private Housing Building Permits 2003–2008 | 14 | 14 | 182 | 110 |
| Housing Starts-State Rank | 51 / 53 | 15 / 53 | 21 / 53 | 17 / 53 |
| Housing Starts-National Rank | 3,112 / 3,141 | 2,498 / 3,141 | 2,691 / 3,141 | 2,559 / 3,141 |

Source: U.S. Census Bureau 2009b, 2009c

Impacts to socioeconomic resources of the Analysis Area would be minimal and therefore would not adversely impact the local area. Short-term impacts to socioeconomic resources would generally occur during the construction/drilling and completion phases of the proposed wells. Long-term effects would occur during the production phase, should the wells prove successful. Impacts would be significant if the affected communities and local government experienced an inability to cope with changes including substantial housing shortages, fiscal problems, or breakdown in social structures and quality of life.

As presented in Table 15, implementation of the proposed wells is anticipated to require between 14 and 28 workers per well in the short-term. If the wells prove successful, Petro-Hunt would install production facilities and begin long-term production. To ensure successful operations, production activities require between one and four full-time employees to staff operations. It is anticipated that a mix of local and Petro-Hunt employees would work in the Analysis Areas. Therefore, any increase in workers would constitute a minor increase in population in the Analysis Area required for short-term operations and would not create a noticeable increase in demand for services or infrastructure on the Reservation or the communities near the Analysis Area, including McKenzie and Dunn counties. Because the communities likely impacted by the proposed project have experienced a recent decline in population between 2000 and 2008 (as shown in Table 12), with the exception of the Reservation itself, and the historic housing vacancy rate (Table 13) indicates housing availability despite the growth of the population on the Reservation, these communities are able to absorb the projected slight increase in population related to this proposed project. As such, the proposed project would not have measurable impacts on housing availability or community infrastructure in the area. The proposed project also would not result in any identifiable impacts to social conditions and structures within the communities in the Analysis Area.

**Table 14. Duration of Employment during Proposed Project Implementation.**

| Activity | Duration of Activity (average days per well) | Daily Personnel (average number per well) |
|---|---|---|
| Construction (access road and well pad) | 8–10 days | 3–5 |
| Drilling | 35–40 days | 8–15 |
| Completion/Installation of Facilities | Approx. 10 days | 3–8 |
| Production | Ongoing – life of well | 1–4 |

Implementation of the proposed project would likely result in direct and indirect economic benefits associated with industrial and commercial activities in the area, including the Reservation, State of North Dakota, and potentially local communities near the Reservation. Direct impacts would include increased spending by contractors and workers for materials, supplies, food, and lodging in McKenzie and Dunn counties and the surrounding areas, which would be subject to sales and lodging taxes. Other state, local, and Reservation tax payments and fees would be incurred as a result of the implementation of the proposed project, with a small percentage of these revenues distributed back to the local economies. Wages due to employment would also impact per capita income for those that were previously unemployed or underemployed. Indirect benefits would include increased spending from increased oil and gas production, as well as a slight increase in generated taxes from the short-term operations. Mineral severance and royalty taxes, as well as other relevant county and Reservation taxes on production would also grow directly and indirectly as a result of increased industrial activity in the oil and gas industry.

## 3.8 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, signed in 1994 by President Clinton, requires agencies advance environmental justice (EJ) by pursuing fair treatment and meaningful involvement of minority and low-income populations. Fair treatment means such groups should not bear a disproportionately high share of negative environmental consequences from federal programs, policies, decisions, or operations. Meaningful involvement means federal officials actively promote opportunities for public participation, and federal decisions can be materially affected by participating groups and individuals.

The EPA headed the interagency workgroup established by the 1994 Executive Order and is responsible for related legal action. Working criteria for designation of targeted populations are provided in *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (EPA 1998). This guidance uses a statistical approach to consider various geographic areas and scales of analysis to define a particular population's status under the Executive Order.

EJ is an evolving concept with potential for disagreement over the scope of analysis and the implications for federal responsiveness. Nevertheless, due to the population numbers, tribal members on the Great Plains qualify for EJ consideration as both a minority and low-income population. Table 16 summarizes relevant data regarding minority and low-income populations for the Analysis Area.

**Table 15. Population Breakdown by Region and Race, 2002–2008.**

| Race | Dunn | | McKenzie | | McLean | | Mountrail | | North Dakota | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2008 | 2002 | 2008 | 2002 | 2008 | 2002 | 2008 | 2002 | 2008 |
| Caucasian | 3,067 | 2,818 | 4,493 | 4,329 | 8,313 | 7,610 | 4,480 | 4,086 | 587,085 | 586,272 |
| African American | 1 | 2 | 4 | 30 | 1 | 9 | 8 | 27 | 4,931 | 6,956 |
| American Indians and Alaska Natives | 469 | 467 | 1,175 | 1,230 | 558 | 587 | 1,949 | 2,277 | 31,104 | 35,666 |
| Asian / Pacific Islanders | 4 | 3 | 4 | 10 | 17 | 19 | 17 | 20 | 4,679 | 5,095 |
| Two or More Races | 1 | 28 | 32 | 75 | 118 | 112 | 68 | 101 | 6,311 | 7,492 |
| All Minorities | 475 | 500 | 1,215 | 1,345 | 694 | 727 | 2,042 | 2,425 | 47,025 | 55,209 |

Source: Northwest Area Foundation 2009.

In 2008, North Dakota's total minority population comprised approximately 55,209, or 8.6% of the state's total population. This is an increase of approximately 17.4% over the 2002 minority population numbers, compared with the 1.2% overall increase for the state's total population during the same time. Although 91.3% of the population in North Dakota is classified as Caucasian, this is a decrease of 1.3% from 2002. Conversely, as presented in Table 16, the minority population of the state has increased steadily since 2002. For example, the American Indian and Alaska Native population increased 0.6%, from 4.9% of the 2002

state population to 5.5% of the 2008 state population. Approximately 70% of Reservation residents are tribal members and 14% of the Dunn County population and 21.6% of the McKenzie County population comprises American Indians and Alaska Natives.

Poverty rate data for the counties in the Analysis Area are summarized in Table 17. The data show that poverty rates for Dunn County, Mountrail County, and the State of North Dakota increased from 2000 to 2007. Poverty rates have decreased for McKenzie and McLean counties.

**Table 16. Poverty Rates for the Analysis Area.**

| Location | 2000 | 2007 |
|---|---|---|
| Dunn County | 13.3% | 13.5% |
| McKenzie County | 15.7% | 13.8% |
| McLean County | 12.3% | 10.4% |
| Mountrail County | 15.7% | 15.9% |
| Fort Berthold Reservation | N/A | N/A |
| North Dakota | 10.4% | 11.8% |

Source: U.S. Census Bureau 2009d.
N/A = Data not available.

Generally, existing oil and gas leasing has already benefited the MHA Nation government and infrastructure from tribal leasing, fees, and taxes. Current oil and gas leasing on the Reservation has also already generated revenue to MHA Nation members who hold surface and/or mineral interests. However, owners of allotted surface within the Analysis Area may not necessarily hold mineral rights. In such cases, surface owners do not receive oil and gas lease or royalty income, and their only related income would be compensation for productive acreage lost to road and well pad construction. Those with mineral interests also may benefit from royalties on commercial production if the wells prove successful. Profitable production rates at proposed locations might lead to exploration and development of additional tracts owned by currently non-benefitting allottees. In addition to increased revenue for land and mineral holders, exploration and development would increase employment on the Reservation with oversight from the Tribal Employment Rights Office, which would help alleviate some of the poverty prevalent on or near the Reservation. Tribal members without either surface or mineral rights would not receive any direct benefits, except through potential employment, should they be hired. Indirect benefits of employment and general tribal gains would be the only potential offsets to negative impacts.

Additional potential impacts to tribes and tribal members include disturbance of cultural resources. There is potential for disproportionate impacts, especially if the impacted tribes and members do not reside within the Reservation and therefore do not share in direct or indirect benefits. This potential is reduced following the surveys of proposed well locations and access road routes and determination by the BIA that there would be no effect to historic properties. Furthermore, no resource is known to be present that qualifies as a TCP or for protection under the American Indian Religious Freedom Act. Potential for disproportionate impacts is further reduced by requirements for immediate work stoppage following an unexpected

discovery of cultural resources of any type. Mandatory consultation would take place during any such work stoppage, affording an opportunity for all affected parties to assert their interests and contribute to an appropriate resolution, regardless of their home location or tribal affiliation.

The proposed project has not been found to pose a threat for significant impact to any other critical element, including air quality, public health and safety, water quality, wetlands, wildlife, soils, or vegetation within the human environment. Through the avoidance of such impacts, no disproportionate impact is expected to low-income or minority populations. The Proposed Action offers many positive consequences for tribal members, while recognizing EJ concerns. Procedures summarized in this document and in the APD are binding and sufficient. No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required.

## 3.9 MITIGATION AND MONITORING

Many protective measures and procedures are described in this document and in the APD. No laws, regulations, or requirements have been waived with the exception of the NDIC set back waiver previously referred to. No compensatory mitigation measures are required. Monitoring of cultural resource impacts by qualified personnel is recommended during all ground-disturbing activities. Each phase of construction and development through production will be monitored by the BLM, BIA, and representatives of the tribe to ensure the protection of cultural, archaeological, and natural resources. In conjunction with 43 CFR 46.30, 46.145, 46.310, and 46.415, a report will be developed by the BLM and BIA that documents the results of monitoring in order to adapt the projects to eliminate any adverse impact on the environment.

## 3.10 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Removal and consumption of oil and/or gas from the Bakken Formation would be an irreversible and irretrievable commitment of resources. Other potential resource commitments include land area devoted to the disposal of cutting, soil lost to erosion (i.e., wind and water), unintentionally destroyed or damage cultural resources, wildlife killed as a result of collision with vehicles (e.g., construction machinery and work trucks), and energy expended during construction and operation.

## 3.11 SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Short-term development activities would not detract significantly from long-term productivity and use of the project area. The construction of the access road and well pad area would eliminate any forage or habitat use by wildlife and/or livestock. Any allottees to which compensation for land disturbance is owed will be properly compensated for the loss of land use. The initial disturbance area would decrease considerably once the wells were drilled and non-necessary areas had been reclaimed. Rapid reclamation of the project area would facilitate revived wildlife and livestock usage, stabilize soil, and reduce the potential for erosion and sedimentation.

## 3.12 CUMULATIVE IMPACTS

Environmental impacts may accumulate either over time or in combination with similar events in the area. Unrelated and dissimilar activities may also have negative impacts on critical elements, thereby contributing to the cumulative degradation of the environment. Past and current disturbances near the project area include farming, grazing, roads, and other oil and gas wells. Reasonably foreseeable future impacts must also be considered. Should development of these wells prove productive, it is likely that Petro-Hunt and possibly other operators would pursue additional development in the area. Current farming and ranching activities are expected to continue with little change because virtually all available acreage is already organized into range units to use surface resources for economic benefit. Undivided interests in the land surface, range permits, and agricultural leases are often held by different tribal members than those holding mineral rights. Over the past several years, exploration has accelerated over the Bakken Formation. Most of this exploration has occurred outside the Reservation boundary on fee land, but for purposes of cumulative impact analyses, land ownership and the Reservation boundary are immaterial. Although it is currently the dominant activity in the area, oil and gas development is not expected to have more than a minor cumulative effect on land use patterns.

No active wells are within 1 mile of project location (Table 18). There are 8, 106, and 457 oil and gas wells (combined active, confidential, and permitted) within 5, 10, and 20 miles, respectively, of the proposed project area (Tables 19 through 21; Figure 16).

**Table 18. Confidential, Active, and Permitted Wells within a 1-mile Radius of the Project Area.**

| | **Fort Berthold #148-95-22D-15-1H** | | **Fort Berthold #148-95-27A-34-1H** | |
|---|---|---|---|---|
| Reservation (on/off) | on | off | on | off |
| Confidential Wells | 0 | 0 | 0 | 0 |
| Active Wells | 0 | 0 | 0 | 0 |
| Permitted Wells | 0 | 0 | 0 | 0 |

**Table 19. Confidential, Active, and Permitted Wells within a 5-mile Radius of the Project Area.**

| | Fort Berthold #148-95-22D-15-1H | | Fort Berthold #148-95-27A-34-1H | |
|---|---|---|---|---|
| Reservation (on/off) | on | off | on | off |
| Confidential Wells | 2 | 2 | 2 | 2 |
| Active Wells | 3 | 1 | 3 | 1 |
| Permitted Wells | 0 | 0 | 0 | 0 |

**Table 20. Confidential, Active, and Permitted wells within a 10-mile Radius of the Project Area.**

| | Fort Berthold #148-95-22D-15-1H | | Fort Berthold #148-95-27A-34-1H | |
|---|---|---|---|---|
| Reservation (on/off) | on | off | on | off |
| Confidential Wells | 20 | 18 | 20 | 18 |
| Active Wells | 7 | 60 | 7 | 59 |
| Permitted Wells | 1 | 0 | 1 | 0 |

**Table 21. Confidential, Active, and Permitted Wells within a 20-mile Radius of the Project Area.**

| | Fort Berthold #148-95-22D-15-1H | | Fort Berthold #148-95-27A-34-1H | |
|---|---|---|---|---|
| Reservation (on/off) | on | off | on | off |
| Confidential Wells | 49 | 93 | 49 | 93 |
| Active Wells | 26 | 288 | 26 | 288 |
| Permitted Wells | 1 | 0 | 1 | 0 |

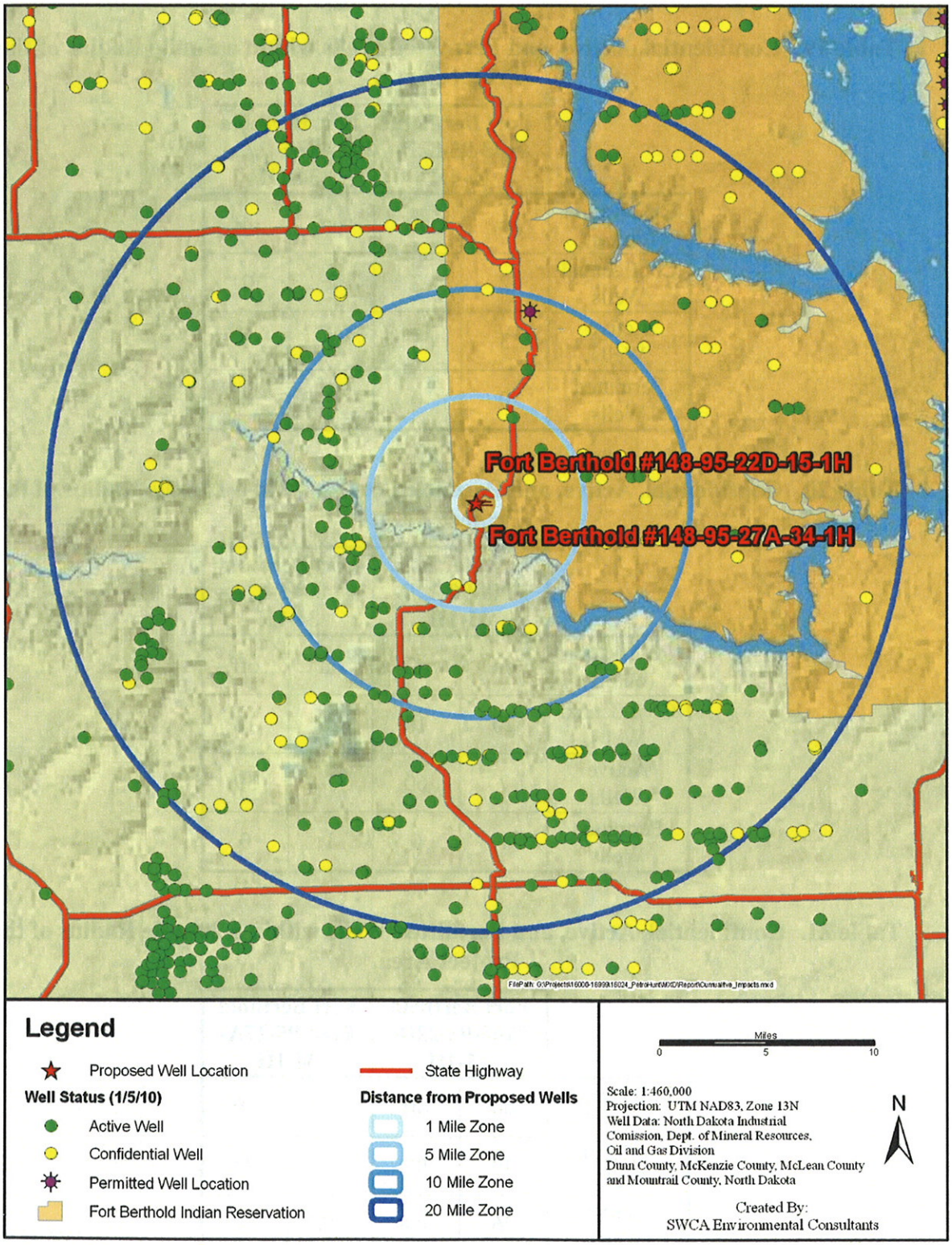



**Figure 16. Active, confidential, and permitted wells within a 1-, 5-, 10-, and 20-mile radius of the proposed project locations.**

Within the Reservation and near the proposed project area, development projects remain few and widely dispersed. If successful commercial production is achieved, new exploratory wells may be proposed, though such developments are merely speculation until APDs are submitted to the BLM and BIA for approval.

It is anticipated that the pace and level of natural gas development in this region of the state will continue at the current rate over the next few years and contribute to cumulative air quality impacts. The Proposed Action would incrementally contribute to emissions occurring in the region. In general, however, the increase in emissions associated with the Proposed Action—most of which would occur during well construction—would be localized, largely temporary, and limited in comparison with regional emissions.

No surface discharge of water would occur under the Proposed Action, nor would any surface water or groundwater be used during project development. The Proposed Action, when combined with other actions (cattle grazing, other oil and gas development, and agriculture) that are likely to occur in and near the project area in the future, would increase sedimentation and runoff rates. Sediment yield from active roadways could occur at higher rates than background rates and continue indefinitely. Thus, the Proposed Action could incrementally add to existing and future sources of water quality degradation in the Lower Missouri River, but increases in degradation would be reduced by Petro-Hunt's commitment to minimizing disturbance, using erosion control measures as necessary, and implementing BMPs designed to reduce impacts.

Unlike well pads, active roadways are not typically reclaimed, thus sediment yield from roads can continue indefinitely at rates two to three times the background rate. The Proposed Action would create additional lengths of unpaved roadway in the project area. Thus, the Proposed Action would incrementally add to existing and future impacts to soil resources in the general area. However, Petro-Hunt is committed to using BMPs to mitigate these effects. BMPs would include implementing erosion and sedimentation control measures such as installing culverts with energy-dissipating devices at culvert outlets to avoid sedimentation in ditches, constructing water bars alongside slopes, and planting cover crops to stabilize soil following construction and before permanent seeding takes place.

Vegetation resources across the project area could be affected by various activities, including additional energy development and surface disturbance of quality native prairie areas that have been largely undisturbed by development activities, grazing, and agriculture. Indirect impacts to native vegetation may be possible due to soil loss, compaction, and increased encroachment of unmanaged invasive weed species. Continued oil and gas development within the Reservation could result in the loss and further fragmentation of native mixed-grass prairie habitat. Past, present, and reasonably foreseeable future activities in the general area have reduced and would likely continue to reduce the amount of available habitat for listed species.

Significant archaeological resources are irreplaceable and often unique; any destruction or damage of such resources can be expected to diminish the archaeological record as a whole. However, no such damage or destruction of significant archaeological resources is anticipated as a result of the Proposed Action because these resources would be avoided, negating the cumulative impacts to the archaeological record.

The Proposed Action would incrementally add to existing and future socioeconomic impacts in the general area. The Proposed Action includes two wells, which would be an additional source of revenue for some residents of the Reservation. Increases in employment would be temporary during the construction, drilling, and completion phases of the proposed project. Therefore, little change in employment would be expected over the long term.

Current impacts from oil and gas-related activities are still fairly dispersed, and the required BMPs would limit potential impacts. No significant negative impacts are expected to affect any critical element of the human environment; impacts would generally be low and mostly temporary. Petro-Hunt has committed to implementing interim reclamation of the road and well pad immediately following construction and completion. Implementation of both interim and permanent reclamation measures would decrease the magnitude of cumulative impacts.

# 4.0 CONSULTATION AND COORDINATION

The BIA must continue to make efforts to solicit the opinions and concerns of all stakeholders (Table 22). For the purpose of this EA, a stakeholder is considered any agency, municipality, or individual person that the proposed action may affect either directly or indirectly in the form of public health, environmental, or socioeconomic issues. A scoping letter declaring the location of the proposed project area and explaining the actions proposed at each site was sent in advance of this EA to allow stakeholders ample time to submit comments or requests for additional information. Additionally, a copy of this EA should be submitted to all federal agencies with interests either in, near, or potentially affected by the proposed actions.

## Table 22. Scoping Comments

| Name | Organization | Comment | Response to Comment |
|---|---|---|---|
| Bagley, Lonny | BLM | No Comment | |
| Benson, Barry | MHA Nation | No Comment | |
| Bercier, Marilyn | BIA | No Comment | |
| Berg, George | NoDak Electric Cooperative, Inc. | No Comment | |
| Black, Mike | BIA | No Comment | |
| Boyd, Bill | Midcontinent Cable Company | No Comment | |
| Brady, Perry | THPO, Three Affiliated Tribes | No Comment | |
| Brien, David | Chairman, Turtle Mountain Band of Chippewa | No Comment | |
| Brugh, V. Judy | MHA Nation | No Comment | |
| Bryan, Kelly | Zenergy Operating Company, Inc. | No Comment | |
| Cayko, Richard | McKenzie County | No Comment | |
| Cimarosti, Dan | USACE | No Comment | |
| U.S. Army Corps of Engineers, Omaha District | Garrison Project Office | No Comment | |
| Danks, Marvin | Fort Berthold Rural Water Director | No Comment | |
| Dhieux, Joyce | EPA | No Comment | |
| Director, Insurance & Hazard | Federal Emergency Management Agency | No Comment | |
| Dixon, Doug | Montana Dakota Utilities | No Comment | |
| Erhardt, Toni | USACE- Bismarck | Must apply for a Section 10 Permit to tunnel under navigable waterway. | Application for Section 10 Permit was submitted 01/05/2010. |
| Erickson, Carroll | Ward County Board of Commissioners | No Comment | |
| Flores, J.R. | U.S. Department of Agriculture | No Comment | |
| Fox, Fred | MHA Nation | No Comment | |
| Glatt, David | NDDH | Environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. | BMPs will be employed to reduce the potential for adverse environmental impact. No adverse impact is anticipated from the scope of work contained with this Environmental Assessment. |
| Glover, John | Natural Resources Conservation Service | Farmland Protection Policy Act does not apply to this area and NRCS recommends wetlands are avoided. | No wetlands are located in the project area. |

| Name | Organization | Comment | Response to Comment |
|---|---|---|---|
| Gorton, Candace | USACE | No Comment | |
| Guzman, Frank | USFS | No Comment | |
| Hall, Todd | MHA Nation | No Comment | |
| Hanson, Jesse | North Dakota Parks and Recreation | A record of occurrence for *Macrhybopsis gelida* (sturgeon chub), a species of concern, exists for an area south of the project area in the Little Missouri River; Reclaim the area with native vegetation; Create the least amount of visual impact as possible near the Killdeer Mountain Four Bears Scenic Byway. | No impact is anticipated to the Little Missouri River system as a result of construction, operation, or reclamation activities. BMPs will be employed to ensure that the Little Missouri River is not impacted; the area will be reclaimed in accordance with guidelines set forth in the BLM Goldbook (2007); care will be taken to minimize the visual impacts of said activities. |
| Hauck, Reinhard | Dunn County | No Comment | |
| Hefferman, Dan | EPA | No Commnet | |
| His Horse Is Thunder, Ron | Chairman, Standing Rock Sioux Tribe | No Comment | |
| Hoffman, Warren | Killdeer, Weydahl Field | No Comment | |
| Hovda, Roger | Reservation Telephone Cooperative | No Comment | |
| Hudson-Schenfisch, Julie | McLean County Board of Commissioners | No Comment | |
| Hynek, David | Chair, Mountrail Board of County Commissioners | No Comment | |
| Johnson, Harley | New Town Municipal Airport | No Comment | |
| Kadrmas, Ray | Dunn County | No Comment | |
| Kuehn, John | Parshall-Hankins Field Airport | No Comment | |
| Kulas, Cheryl | Indian Affairs Commission | No Comment | |
| Kyner, Dave | FEMA | FEMA's major concern is whether the property is located within a mapped Special Flood Hazard Area. | Noted |
| Land Department | Northern Border Pipeline Company | No Comment | |
| Latimer, Tom | Red Willow Great Plains, LLC | No Comment | |
| Laux, Eric | USACE | | |
| Lindemann, Larry | Airport Manager, Barnes County Municipal Airport | No Comment | |
| Manager | Xcel Energy | No Comment | |

| Name | Organization | Comment | Response to Comment |
|---|---|---|---|
| Massad, Mary | Southwest Water Authority | No Comment | |
| McKenna, Michael | North Dakota Game and Fish Department | Recommend that construction be avoided to the extent possible within native prairie, wooded draws, riparian corridors, and wetland areas; suggest that vegetation surveys be conducted during the appropriate season and aerial raptor surveys be completed before construction begins. | No construction is proposed in wetland areas, undisturbed native prairie, or riparian corridors. A single wooded draw is anticipated to be cleared as a result of construction activities. The vegetative community present within the project area was satisfactorily inventoried during the field survey. No raptors are anticipated to be detrimentally affected by the proposed actions. |
| Mercer County | Mercer County Board of Commissioners | No Comment | |
| Missile Engineer, Chief | Minot Air Force Base | No Comment | |
| NAGPRA Office | MHA Nation | No Comment | |
| Nash, Mike | BLM | No Comment | |
| Natural Resources Department | MHA Nation | No Comment | |
| Nelson, Richard | U.S. Bureau of Reclamation | The proposed well pad is located in the vicinity of the rural water pipeline. Consult with Marvin Danks, Fort Berthold Rural Water Director. | Operator has been advised. |
| Nordquist, Don | Petro-Hunt, LLC | No Comment | |
| Obenauer, Steve | FAA | No Comment | |
| Olson, Frances | McKenzie County | No Comment | |
| Paaverud, Merl | State Historical Society | Send copy of reports and forms to keep archives current. Consider putting TCP-related info in separate reports not sent to SHPO. | Noted. |
| Packineau, Mervin | MHA Nation | No Comment | |
| Paulson, Gerald | Western Area Power Administration | No Comment | |
| Pearson, Myra | Spirit Lake Sioux Tribe | No Comment | |
| Peterson, Walter | North Dakota Department of Transportation | No Comment | |
| Poitra, Fred | MHA Nation | No Comment | |
| Prchal, Doug | North Dakota Parks and Recreation Department | No Comment | |

| Name | Organization | Comment | Response to Comment |
|---|---|---|---|
| Representative, Mandaree Segment | MHA Nation | No Comment | |
| Rudolph, Reginald | McLean Electric Cooperative, Inc. | No Comment | |
| Schelkoph, David | West Plains Electric Cooperative, Inc. | No Comment | |
| Selvage, Michael | Chairman, Sisseton-Wahpeton Sioux Tribe | No Comment | |
| Shortbull, Marietta | Fort Berthold Agency | No Comment | |
| Smith, Heather | EOG Resources, Inc. | No Comment | |
| Sorensen, Charles | USACE | Due to close proximity to the Little Missouri River, a closed loop system is recommended; living quarter's sewage systems have a closed system, Petro-Hunt, LLC obtains proper permits, and fill is certified as weed-free. | Operator has been advised. No closed loop system will be required. However, the BIA and BLM will aggressively monitor the site during all proposed activities to ensure BMPs are acting to reduce or eliminate the potential for adverse impact to the Lower Little Missouri Watershed. |
| Svoboda, Larry | EPA | No Comment | |
| Thompson, Brad | USACE | The project area is not located within Corps owned or operated lands. Consult with USFWS, EPA, and ND SHPO for input on project. | Noted; USFWS, EPA, and ND SHPO have been notified and comments solicited regarding the proposed action. |
| Thorson, Gary | McKenzie Electric Cooperative | No Comment | |
| Towner, Jeffrey | USFWS | A closed loop system is recommended. Proper precautions should be taken to avoid wildlife mortality as a result of construction or operations. Native prairie habitat should remain undisturbed. | Operator has been advised. |
| Chevance, Nick | National Park Service, Midwest Region | No Comment | |
| Wells, Marcus | Chairman, MHA Nation | No Comment | |
| Whitcalf, Frank | MHA Nation | No Comment | |
| Williams, Damon | MHA Nation | No Comment | |
| Wolf, Malcolm | MHA Nation | No Comment | |

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Great Plains Regional Office
115 Fourth Avenue S.E.
Aberdeen, South Dakota 57401

TAKE PRIDE IN AMERICA

IN REPLY REFER TO
DESCRM
MC-208

FEB 05 2010

Perry 'No Tears' Brady, THPO
Mandan, Hidatsa and Arikara Nation
404 Frontage Road
New Town, North Dakota 58763

Dear Mr. Brady:

We have considered the potential effects on cultural resources of a dual oil well pad and access road in Dunn County, North Dakota. Approximately 13.82 acres were intensively inventoried using a pedestrian methodology. Potential surface disturbances are not expected to exceed the area depicted in the enclosed report. No historic properties were located which appear to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.4) for inclusion on the National Register of Historic Places. No properties were located that appear to qualify for protection under the American Indian Religious Freedom Act (42 USC 1996).

As the surface management agency, and as provided for in 36 CFR 800.5, we have therefore reached a determination of **no historic properties affected** for this undertaking. Catalogued as **BIA Case Number AAO-1744/FB/10,** the proposed undertaking, location, and project dimensions are described in the following report:

Markman, Jon M.
(2010) A Class I and Class III Cultural Resource Inventory of the Fort Berthold 148-95-22D-15-1H and Fort Berthold 148-95-27A-34-1H Dual Well Pad and Access Road on the Fort Berthold Indian Reservation, Dunn County, North Dakota. SWCA Environmental Consultants for Petro-Hunt, LLC, Bismarck.

If your office concurs with this determination, consultation will be completed under the National Historic Preservation Act and its implementing regulations. The Standard Conditions of Compliance will be adhered to.

If you have any questions, please contact Dr. Carson N. Murdy, Regional Archaeologist, at (605) 226-7656.

Sincerely,

ACTING Regional Director

Enclosure

cc: Chairman, Three Affiliated Tribes
Superintendent, Fort Berthold Agency

## List of Preparers

An interdisciplinary team contributed to this document, following guidance in Part 1502.6 of CEQ regulations. This document was drafted by SWCA under the direction of the BIA. Information was compiled from various sources within SWCA.

### Petro-Hunt, LLC

- Jeff Hunt, Regional Land Manager
- Don Nordquist, Senior Landman

### SWCA Environmental Consultants

- Chris McLaughlin, Ecologist
  *Prepared the EA. Competed limited field survey.*
- Michael J. Cook, Ecologist/Project Manager
  *Conducted natural resource surveys for the well pad and the access road. Contributed to the preparation of the EA. Reviewed the EA.*
- Jon Markman, Archaeologist/Field Coordinator
  *Conducted cultural resource surveys for well pad and access road. Completed cultural resource section of the EA. Prepared the Negative Results Report.*
- Josh Ruffo, Wildlife Biologist/Project Manager
  *Participated in right-of-way onsite with BIA and BLM. Reviewed the EA.*
- Sarah Ruffo, Environmental Specialist
  *Prepared scoping letter and distributed scoping package.*
- Amarina Wuenschel, GIS Specialist
  *Created maps and provided spatially derived data calculations.*
- Brent Sobotka, Hydrologist/CPESC
  *Completed water resources and soil erosion sections.*
- Richard Wadleigh, NEPA Coordinator
  *Final Review of EA.*
- Scott Slessman, Archaeologist,
  *Cultural resources - Principal Investigator.*
- Matt Loscalzo, Natural Resource Planner,
  *Completed socioeconomic and environmental justice sections of EA.*

# 5.0 REFERENCES

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# 6.0 ACRONYMS

| | |
|---|---|
| **°F** | degrees Fahrenheit |
| **APD** | application for permit to drill |
| **APE** | area of potential effect |
| **BIA** | Bureau of Indian Affairs |
| **BLM** | Bureau of Land Management |
| **BMP** | best management practice |
| **CAA** | Clean Air Act |
| **CEQ** | Council on Environmental Quality |
| **CFR** | Code of Federal Regulations |
| **EA** | environmental assessment |
| **EIS** | environmental impact statement |
| **EJ** | environmental justice |
| **EPA** | Environmental Protection Agency |
| **ESA** | Endangered Species Act |
| **FONSI** | finding of no significant impact |
| **GHG** | greenhouse gas |
| **HAP** | hazardous air pollutant |
| **HUC** | hydrologic unit code |
| **MHA Nation** | Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara Nation |
| **NAGPRA** | Native American Graves Protection and Repatriation Act |
| **NDCC** | North Dakota Century Code |
| **NDDH** | North Dakota Department of Health |
| **NDIC** | North Dakota Industrial Commission |
| **NEPA** | National Environmental Policy Act |
| **NRCS** | Natural Resources Conservation Service |
| **NRHP** | National Register of Historic Places |
| **PEM** | palustrine emergent |
| **ROW** | right-of-way |
| **SHPO** | State Historic Preservation Officer |
| **TCP** | traditional cultural property |
| **THPO** | Tribal Historic Preservation Officer |
| **TMD** | total measured depth |
| **TVD** | total vertical depth |
| **USC** | United States Code |
| **USFS** | U.S. Forest Service |
| **USFWS** | U.S. Fish and Wildlife Service |
| **USGS** | U.S. Geological Survey |
| **VOC** | volatile organic compound |

# Notice of Availability and Appeal Rights

**PetroHunt: Fort Berthold #148-95-22D-15-1H**
**Fort Berthold #148-95-27A-34-1H**

THE BUREAU OF INDIAN AFFAIRS (BIA) IS PLANNING ON DRILLING TWO HORIZONTAL OIL/GAS WELLS ON *FORT BERTHOLD #148-95-22D-15-1H, AND FORT BERTHOLD #148-95-27A-34-1H BY PETRO-HUNT LLC* ON THE FORT BERTHOLD RESERVATION. CONSTRUCTION IS SCHEDULED TO BEGIN IN THE SPRING OF 2010.

AN ENVIRONMENTAL ASSESSMENT (EA) DETERMINED THAT PROPOSED ACTIVITIES WILL NOT CAUSE SIGNIFICANT IMPACTS TO THE HUMAN ENVIRONMENT. AN ENVIRONMENTAL IMPACT STATEMENT IS NOT REQUIRED. CONTACT HOWARD BEMER, SUPERINTENDENT AT 701-627-4707 FOR MORE INFORMATION AND/OR COPIES OF THE EA AND THE FINDING OF NO SIGNIFICANT IMPACT (FONSI).

THE FONSI IS ONLY A FINDING ON ENVIRONMENTAL IMPACTS – IT IS NOT A DECISION TO PROCEED WITH AN ACTION AND *CANNOT* BE APPEALED. BIA'S DECISION TO PROCEED WITH ADMINISTRATIVE ACTIONS *CAN* BE APPEALED UNTIL APRIL 15, 2010, BY CONTACTING:

UNITED STATES DEPARTMENT OF THE INTERIOR
OFFICE OF HEARINGS AND APPEALS
INTERIOR BOARD OF INDIAN APPEALS
801 N. QUINCY STREET, SUITE 300, ARLINGTON, VA 22203.

PROCEDURAL DETAILS ARE AVAILABLE FROM THE BIA FORT BERTHOLD AGENCY AT 701-627-4707.

**Project locations.**


***Figure 1, Project Overview Map***