

ENVIRONMENTAL ASSESSMENT

United States Bureau of Indian Affairs

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



Petro-Hunt LLC

Two Bakken Formation Exploratory Wells at One Location:

Fort Berthold 148-94-19B-18-1H

Fort Berthold Indian Reservation

September 2009

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September 2009.

Finding of No Significant Impact

Petro-Hunt LLC

Fort Berthold 148-94-19B-18-1H

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

The U.S. Bureau of Indian Affairs (BIA) has received a proposal for one oil/gas well, access road and related infrastructure on the Fort Berthold Indian Reservation to be located in Section 19 of Township 148 North—Range 94 West. Associated federal actions by BIA include determination 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 Application for Permit to Drill.

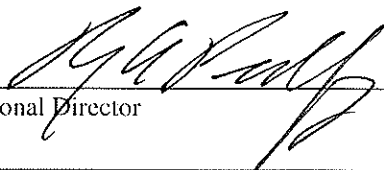
Potential of the proposed actions to impact the human environment is analyzed in the attached Environmental Assessment (EA), as required by the National Environmental Policy Act. Based on the recently completed EA, I have determined that the proposed project will not significantly affect the quality 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, archeological, 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.

ACTING

Regional Director



Date

9/21/09

TABLE OF CONTENTS

| | | |
|------|---|----|
| 1. | Purpose and Need for the Proposed Action | 3 |
| 2. | Proposed Action and Alternatives | 5 |
| 2.1 | Field Camps | 5 |
| 2.2 | Access Roads | 5 |
| 2.3 | Well Pads | 6 |
| 2.4 | Drilling | 6 |
| 2.5 | Casing and Cementing | 7 |
| 2.6 | Completion and Evaluation | 7 |
| 2.7 | Commercial Production | 7 |
| 2.8 | Reclamation | 8 |
| 2.9 | Construction Details at Individual Sites | 10 |
| 2.10 | Preferred Alternative | 11 |
| 3. | The Affected Environment and Potential Impacts | 12 |
| 3.1 | No Action Alternative | 12 |
| 3.2 | Air Quality | 13 |
| 3.3 | Public Health and Safety | 14 |
| 3.4 | Water Resources | 15 |
| 3.5 | Wetland/Riparian Habitat and Threatened or Endangered Species | 19 |
| 3.6 | Soils | 25 |
| 3.7 | Vegetation and Invasive Species | 27 |
| 3.8 | Cultural Resources | 30 |
| 3.9 | Socio-Economics | 31 |
| 3.10 | Environmental Justice | 32 |
| 3.11 | Mitigation and Monitoring | 33 |
| 3.12 | Irreversible and Irrecoverable Commitment of Resources | 34 |
| 3.13 | Short-Term Use Versus Long-Term Productivity | 34 |
| 3.14 | Cumulative Impacts | 34 |
| 4.0 | Consultation and Coordination | 37 |
| 5.0 | List of Preparers | 39 |
| 6.0 | References | 40 |
| 7.0 | Abbreviations and Acronyms | 43 |
| | Appendix | 44 |

Tables

| | | |
|------|---|----|
| 3.2 | Federal Air Quality Standards | 13 |
| 3.4a | Characteristics of Dunn County Aquifers | 16 |
| 3.4b | Existing Water Permits in Dunn County, North Dakota | 16 |
| 3.5a | Resident Bird Species McKenzie and Dunn Counties | 23 |
| 3.5b | Mammal Species in McKenzie and Dunn Counties | 24 |
| 3.6c | Soil Mapping Units | 25 |
| 3.6b | Soil Attributes | 25 |
| 3.6c | Acres of Disturbance | 26 |
| 3.7a | Invasive Species | 27 |
| 3.7b | Plant Species | 28 |
| 3.9a | Population and Demographics | 31 |
| 3.9b | Income and Unemployment | 32 |
| 3.9c | Housing Units-2000 (U.S. Census Bureau 2007-2008) | 32 |

Figures

| | | |
|-------|---|----|
| 1 | Project location | 4 |
| 2.4 | Typical Drilling Rig | 7 |
| 2.7 | Typical Commercial Operation | 8 |
| 2.8 | Example of reclamation from the Gold Book | 9 |
| 2.9a | Topo Map Showing Spacing Units | 10 |
| 2.9b | Access Road | 10 |
| 2.9c | Well Pad Location | 10 |
| 3.4a | Watershed Map | 15 |
| 3.4b | Water Resources | 18 |
| 3.5a | Topo Map of Site and Analysis Area | 19 |
| 3.5b | Aerial Photo of Site and Surrounding Area | 20 |
| 3.14a | Cumulative Impacts Analysis | 36 |

1. Purpose and Need for the Proposed Action

Petro Hunt LLC is proposing to drill two horizontal oil/gas wells from one location on the Fort Berthold Indian Reservation to evaluate and potentially develop the commercial potential of natural resources. Developments have been proposed on lands held in trust by the United States in Dunn County, North Dakota. The U.S. Bureau of Indian Affairs (BIA) is the surface management agency for potentially affected tribal lands and individual allotments. The BIA also holds title to the subsurface mineral rights. Two wells would be drilled from the surface location shown in Figure 1. Fort Berthold 148-94-19B-18-1H would be drilled from a single well pad in the NE¼NW¼ of Section 19, T148N-R94W.

The economic development of available resources and associated BIA actions are consistent with BIA's general mission. Leasing and development of mineral resources offers substantial economic benefits to both the Three Affiliated Tribes of the Mandan, Hidatsa and Arikara Nation and to individual tribal members. Oil and gas exploration and development activities are conducted under authority of the Indian Mineral Leasing Act of 1938 (25 USC 396a, *et seq.*), the Indian Mineral Development Act of 1982 (25 USC 2101, *et seq.*), the Federal Onshore Oil and Gas Royalty Management Act of 1982 (30 USC 1701, *et seq.*), and the Energy Policy Act of 2005 (42 USC 15801, *et seq.*). BIA actions in connection with the proposed project are largely administrative and include approval of leases, easements and rights-of-way, a determination regarding cultural resource effects and recommendations to the Bureau of Land Management (BLM) regarding approval of Applications for Permit to Drill (APDs).

These proposed federal actions require compliance with the *National Environmental Policy Act* of 1969 (NEPA) and regulations of the Council on Environmental Quality (CEQ, 40 CFR 1500-1508). Analysis of the proposed project's potential to impact the human environment will be documented and will guide federal decision making. An APD submitted by Petro Hunt LLC, describes developmental, operational and reclamation procedures and practices that contribute to the technical basis of this Environmental Assessment (EA). The procedures and practices described in the application are critical elements in both the project proposal and the BIA's decision regarding environmental impacts. This EA will result in either a Finding of No Significant Impact (FONSI) or a decision to prepare an Environmental Impact Statement (EIS).

There are several components to each proposed action. Both new and improved roads are needed to access the proposed well site. A well pad will be constructed to accommodate drilling operations. Pits for drilled cuttings will be constructed, used and reclaimed. Drilling could result in long-term commercial production at the site, in which case supporting facilities would be installed. The working portions of the well pad and the access road would remain in place during commercial production. All project components would eventually be abandoned and reclaimed, as specified in this document and the APD and according to any other federal conditions, unless formally transferred with federal approval to either the BIA or the landowner. The proposed wells are exploratory, in that results could also support developmental decisions on other leases in the surrounding area, but this EA addresses only the installation and possible long-term operation of these wells and directly associated infrastructure and facilities. Additional NEPA analysis, decisions and federal actions will be required prior to any other development.

Any authorized project will comply with all applicable federal, state and tribal laws, rules, policies, regulations and agreements. No construction, drilling or other ground-disturbing operations will begin until all necessary leases, easements, surveys, clearances, consultations, permissions, determinations and permits are in place.

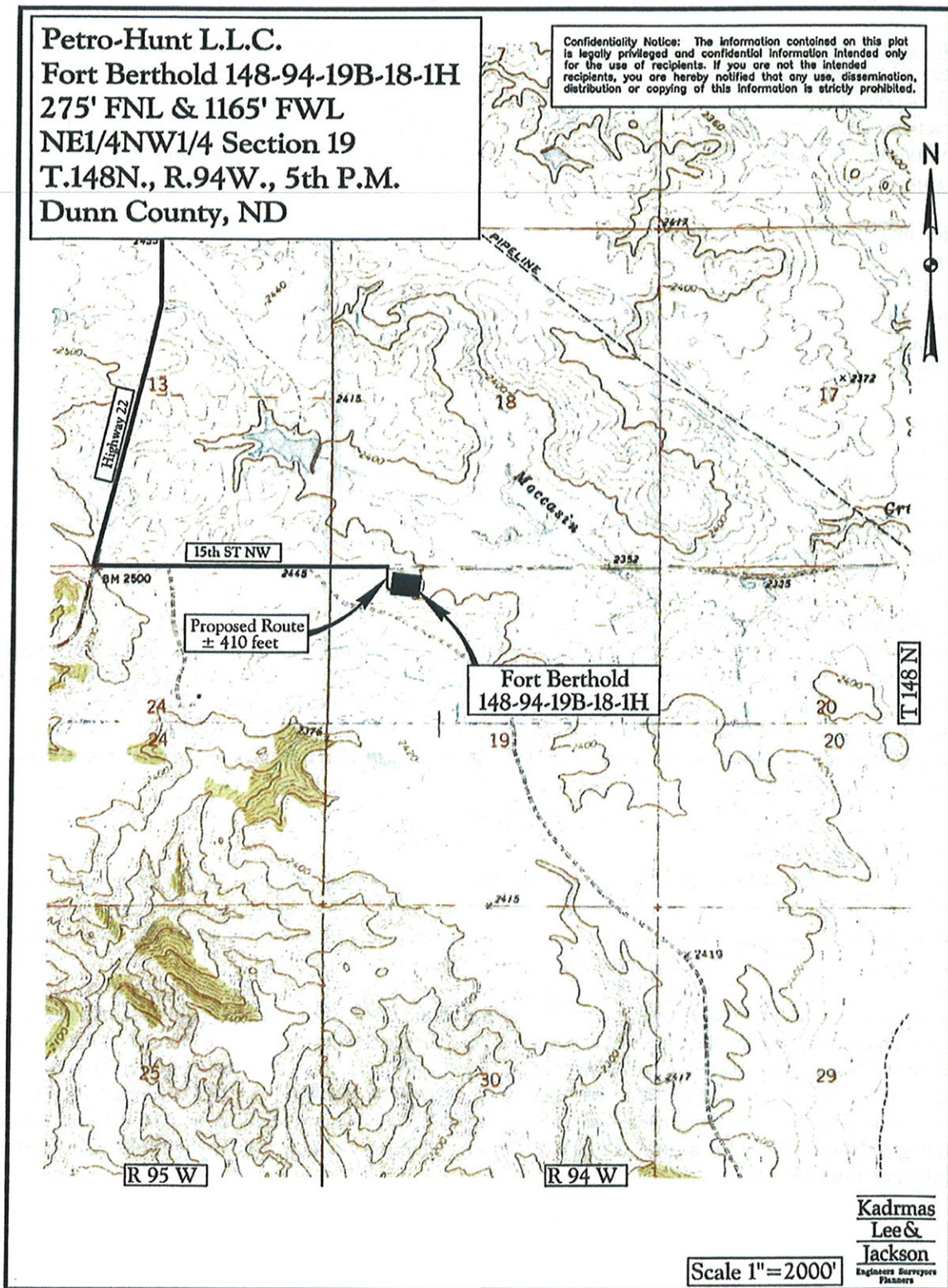


Figure 1: Project locations.

2. Proposed Action and Alternatives

The **No Action Alternative** must be considered within an Environmental Assessment. If this alternative is selected, BIA would not approve leases, rights-of-way or other administrative proposals for the proposed project. Applications for Permit to Drill (APD) for the well locations would not be approved. Current land use practices would continue at a No Action site. Development under other oil and gas leases would remain a possibility, but No Action is the only available or reasonable alternative to the specific proposals considered in this document.

This document analyzes the potential impacts of a specific proposed action - exploratory oil/gas wells on allotted surface and mineral estate within the boundaries of the Fort Berthold Indian Reservation in Dunn County, North Dakota. The proposed wells would test the commercial potential of the Middle Bakken Dolomite Member of the Bakken Formation. Site-specific actions would or might include several components, such as access roads, construction of a well pad, drilling operations, installation of production facilities, tanker traffic and reclamation.

All construction activities would follow lease stipulations, practices and procedures outlined in this document, the APD, guidelines and standards in *Surface Operating Standards for Oil and Gas Exploration and Development* (BLM/US Forest Service, Fourth Edition, also known as the Gold Book), and any conditions added by either BIA or BLM. All lease operations would be conducted in full compliance with applicable laws and regulations, including 43 CFR 3100, *Onshore Oil and Gas Orders 1, 2, 6 and 7*, approved plans of operations and any applicable Notices to Lessees.

2.1 Field Camps

Self-contained trailers may house a few key personnel during drilling operations, but any such arrangements would be very short-term. No long-term residential camps are proposed. Construction and drilling personnel would commute to the project site, most likely from within or around the Reservation. Human waste would be collected in standard portable chemical toilets or service trailers located on-site, then transported off-site to a state-approved wastewater treatment facility. Other solid waste would be collected in enclosed containers and disposed of at a state-approved facility.

2.2 Access Roads

A total of about 410 feet (0.08 miles) of new road would be constructed into the site. Signed agreements are in place allowing road construction across affected surface allotments. A maximum disturbed right-of-way (ROW) width of 40 feet would result in a total of 0.38 acres of surface disturbance, at the site. Two wells are planned for the surface location to minimize construction disturbance.

Construction would follow road design standards outlined in the Gold Book. A minimum of six (6) inches of topsoil would be stripped from the access road corridors, with the stockpiled topsoil redistributed on the outslope areas of the borrow ditches following road construction. These borrow ditch areas would be reseeded as soon as practical with a seed mixture determined by the BIA. If commercial production is established from a proposed location, the access road would be graveled with a minimum of four (4) inches of gravel and the roadway would remain in place for the life of the well(s). Details of road construction are addressed in the Multi-Point Surface Use and Operations Plan in the APD.

2.3 Well Pads

The proposed well pad would consist mainly of 1) an area leveled for the drilling rig and related equipment; and 2) a pit excavated for drilling fluids, drilled cuttings and fluids produced during drilling. The well pad area would be cleared of vegetation, stripped of topsoil and graded to the specifications in the approved APD. Topsoil would be stockpiled and stabilized until disturbed areas were reclaimed and re-vegetated. Excavated subsoil would be used in pad construction, with the finished well pad graded to ensure positive water drainage away from the drill site. Erosion control would be maintained through prompt re-vegetation and by constructing all necessary surface water drainage control, including berms, diversion ditches and waterbars.

The level area of the well pad (including a reserve pit for drilled cuttings) would be about 300' x 500' (3.44 acres) to accommodate two wells. Cut and fill on pad edges would result in a total disturbance of about 1 acre for the pad, in addition to the 0.38 acres for road construction. Details of pad construction and reclamation are described and diagrammed in the Surface Use Plan of each well's APD.

2.4 Drilling

After securing mineral leases, Petro Hunt LLC submitted APDs to the BLM on March 31, 2009, proposing to drill two wells at one location:

- Fort Berthold 148-94-19B-18-1H: NE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 19, T148N-R94W

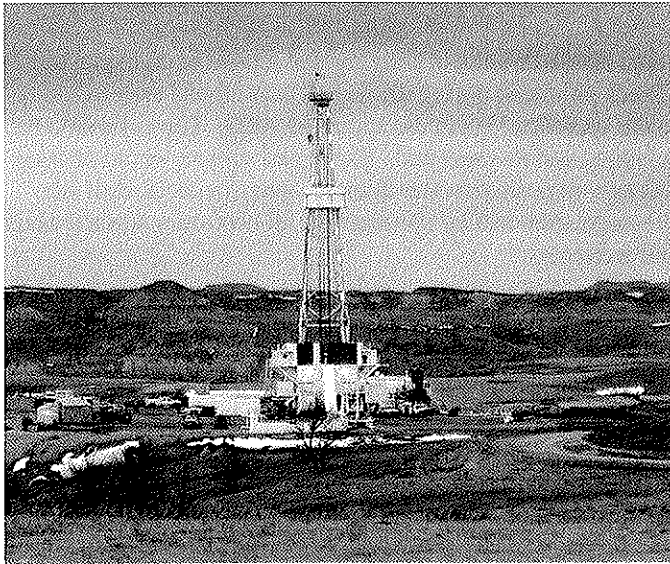
The BLM North Dakota Field Office forwarded copies of the APDs to BIA's Fort Berthold Agency in New Town, North Dakota, for review and concurrence. BLM will not approve an APD until BIA completes its NEPA process and recommends APD approval. No drilling will begin until an approved permit has been obtained from the BLM.

Initial drilling would be vertical to about 9,500 feet. The minimum setback of 500 feet (NDCC 43-02-03-18.2) from section lines would be maintained or achieved through directional drilling. Drilling would become roughly horizontal at a measured depth of about 11,000 feet, followed by the drilling of a lateral reach of about 4,700 feet in length at depths of about 11,000 feet within the Middle Bakken Dolomite Member.

Rig transport and on-site assembly would take about seven days. Drilling operations would require about 45 days to reach the target depth, using a rotary drilling rig rated for drilling to about 15,000 feet. A typical drilling rig is shown in Figure 2.4. For the first 2,500 feet of hole drilled, a fresh-water based mud system with non-hazardous additives such as bentonite would be used to minimize contaminant concerns. Water would be obtained from a commercial source for this drilling stage, using about 53 gallons of water per foot of hole drilled (a total of about 129,055 gallons) per well.

After setting and cementing the surface casing, an oil-based mud system (about 80% diesel fuel and 20% water) would be used to drill to the intermediate casing point. Oil-based drilling fluids can reduce the potential for hole sloughing while drilling through water-sensitive formations, such as shales. About 22,000 gallons of water and 110,000 gallons of diesel fuel would be used per well. Horizontal drilling would utilize saltwater-based mud drilling fluid. On the surface, toxic fluids would be contained in steel tanks placed on plastic/vinyl liners, then collected during drilling by centrifuging returns to separate the cuttings from fluids. Fluids would be recycled back into the steel tanks for re-use. Upon completion of drilling operations at each location, oil-based fluids would be collected to the extent possible and recycled for use elsewhere. Any free fluids remaining in the reserve pit would be removed and disposed of in accordance with North Dakota Industrial Commission (NDIC) rules and regulations.

September 2009.



Cuttings generated from drilling would be deposited in the reserve pit on the well pad. The reserve pits would be lined with an impervious (plastic/vinyl) liner to prevent drilling fluid seepage and contamination of the underlying soil. Liners would be installed over sufficient bedding (either straw or dirt) to cover any rocks, would overlap the pit walls, extend under the mud tanks, and would be covered with dirt and/or rocks to hold it in place. Prior to use, the entire location would be fenced completely with a cattle guard at the access road into location, in order to protect both wildlife and livestock. Fencing would be installed in accordance with Gold Book guidelines and maintained until the reserve pit is backfilled.

Figure 2.4: Typical drilling rig

2.5 Casing and Cementing

Surface casing would be set to about 2,500 feet and cemented back to the surface during drilling, isolating all near-surface freshwater aquifers in the project area. The Dakota Formation is a potential hydrocarbon zone expected to be encountered at a depth of about 5,000 feet, so production casing would be set and cemented to about 11,000 feet. Casing and cementing operations would be conducted in full compliance with *Onshore Oil and Gas Order 2*.

2.6 Completion and Evaluation

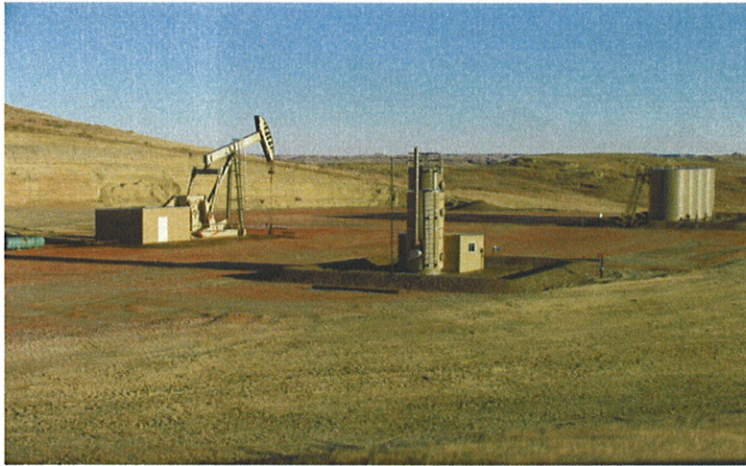
After a well has been drilled and cased, a completion (work-over) unit would be moved onto the site. For wells of the depth proposed, about thirty (30) days are usually needed to clean out the well bore, pressure test the casing, perforate and fracture the horizontal portion of the hole, and run production tubing for commercial production. If the target formation is to be fractured to stimulate production, the typical procedure is to pump a mixture of sand and a carrier (e.g., water and/or nitrogen) under extreme pressure downhole. The resulting fractures are propped open by the sand, increasing the capture zone of the well and maximizing efficient drainage of the field. After fracturing, the well is typically flowed back to the surface to recover fracture fluids and remove excess sand. Fluids utilized in the completion procedure would be captured either in the reserve pit or in tanks for disposal in strict accordance with NDIC rules and regulations.

2.7 Commercial Production

If drilling, testing and production support commercial production from the proposed location, additional equipment would be installed, including a pumping unit at the well head, a vertical heater/treater, tanks (usually four 400 barrel steel tanks), and a flare/production pit. An impervious dike sized to hold 100% of the capacity of the largest tank plus one full day's production would surround production tanks and the heater/treater. Load out lines would be located inside the diked area, with a heavy screen-covered drip barrel installed under the outlet. A metal access staircase would protect the dike and support flexible hoses used by tanker trucks. The BIA would choose an inconspicuous paint color for all permanent aboveground production facilities from colors recommended either by the BLM or the Rocky Mountain Five-State Interagency Committee. A typical producing rig is shown in Figure 2.7 and more detail is included in the APD.

Oil 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 product and 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 one hundred years.



Large volumes of gas are not expected from this location. Small volumes would be flared in accordance with Notice to Lessees (NTL) 4A and NDIC regulations, which prohibit unrestricted flaring for more than the initial year of operation (NDCC 38-08-06.4). Results could also encourage additional exploration on the Reservation. Should future oil/gas exploration activities be proposed by Petro Hunt LLC on the Fort Berthold reservation, those proposals and associated federal actions would require additional NEPA analysis and BIA consideration prior to implementation.

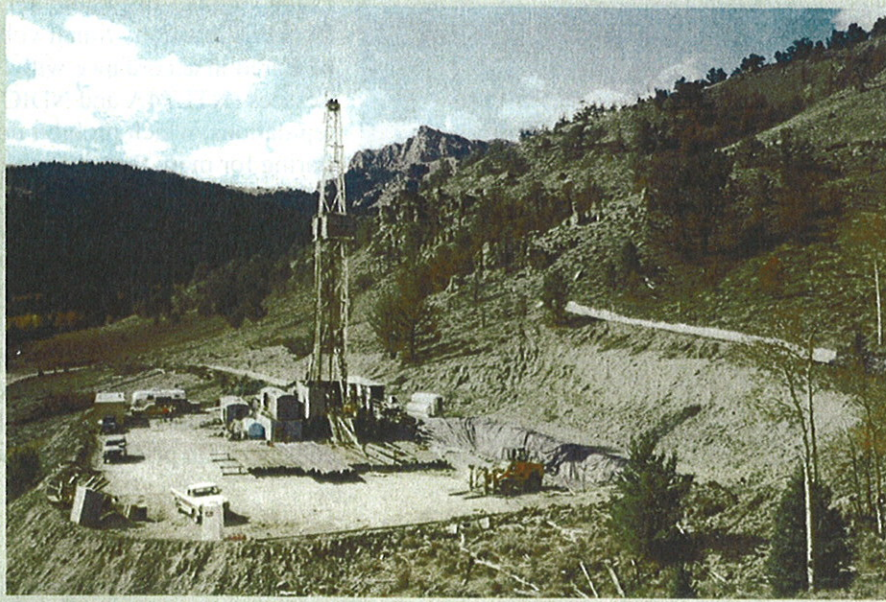
Figure 2.7: Typical commercial operation

2.8 Reclamation

The reserve pit and drilled cuttings would be treated, solidified, backfilled and buried as soon as possible after well completion. Any oily residue is dispersed and captured, preventing coalescence and release to the environment at significant rates in the future. Controlled mixing of cuttings with a non-toxic reagent causes an irreversible reaction that quickly results in an inert, solid material. The alkaline nature of the stabilized material also chemically stabilizes various metals that may be present, primarily by transforming them into less soluble compounds. Treated material would then be buried in the reserve pit, overlain by at least four feet of overburden as required by NDIC regulations.

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

Final reclamation would occur either in the very short term if the proposed well is 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. Access roads and work areas would be leveled or backfilled as necessary, scarified, re-contoured and re-seeded. 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. The Surface Use Plan within the APD contains additional details regarding both interim and final reclamation measures. Figure 2.8 shows an example of reclamation from the Gold Book.



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



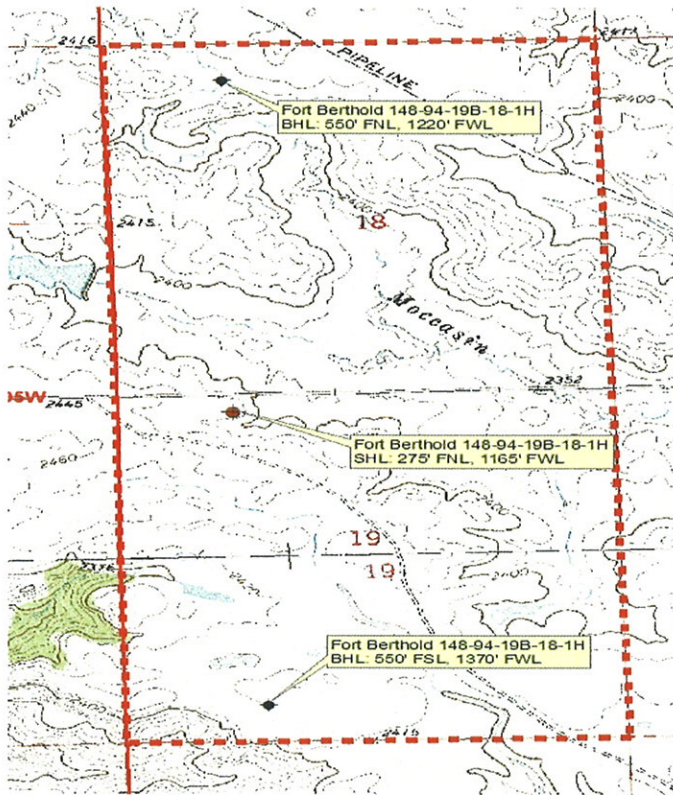
The well pad and access road have been recontoured back to the original contour, the topsoil respread, and the site revegetated.

Figure 2.8: Example of reclamation from the Gold Book

2.9 Construction Details at Individual Sites

Two lateral wellbores will be drilled from one surface location to minimize potential impacts.

Fort Berthold 148-94-19B-18-1H



As shown in Figure 2.9a the well pad would be in the NE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 19, T148N-R94W, to reach into Section 18 and the south half of Section 19. Access from Tribal Highway 14 would require 410 feet of new road which disturbance would be 0.40 acres. Photographs of the proposed well location and access road are shown in Figures 2.9b and 2.9c. Directional drilling would achieve and maintain the minimum 500' setback from the section boundaries of spacing units. Initial drilling will be vertical to about 9,600 feet in each wellbore. Directional drilling will result in a horizontal wellbore at a true vertical depth (TVD) of about 11,040 feet. Each well will total about 15,780 feet, including a lateral reach of about 4,740 feet in the Middle Bakken Member. The first lateral drilling target is about 554 feet FNL and 1,222 feet FWL, (NW $\frac{1}{4}$ NW $\frac{1}{4}$) of Section 18. A second lateral target is about 1,370 feet FSL and 551 feet FEL (SE $\frac{1}{4}$ SW $\frac{1}{4}$) of Section 19.

Figure 2.9a: Topo Map showing spacing units



Figure 2.9b: Access road



Figure 2.9c: Well pad location

2.10 Preferred Alternative

The preferred alternative is to complete all administrative actions and approvals necessary to authorize or facilitate oil and gas development at this proposed well pad location.

3. The Affected Environment and Potential Impacts

The Fort Berthold Indian Reservation is the home of the Three Affiliated Tribes 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, impounding the Missouri River upstream and inundating much of the Reservation. The remaining land on the Reservation was divided into three sections by Lake Sakakawea.

The proposed wells and access road are situated geologically within 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 within 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 northern Great Plains ecoregion, which consists of four physiographic units: 1) the Missouri Coteau Slope north of Lake Sakakawea; 2) the Missouri River trench (the part not flooded); 3) the Little Missouri River badlands; and 4) the Missouri Plateau south and west of Lake Sakakawea (Williams and Bluemle 1978). Much of the Reservation is on the Missouri Coteau Slope. Elevations of the glaciated, gently rolling landscape ranges from a normal pool elevation of 1,838 feet at Lake Sakakawea to over 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° F in January and between 55° 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 well pad site and spacing units are in a rural area consisting of grassland and shrubland that is currently either idle or used to graze livestock. The landscape has been previously disturbed by dirt trails and graveled and paved roadways. There are no residences within 3,000 feet of the proposed well pad. Existing conditions within the proposed drilling unit are described below. 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 and the Preferred Alternative. Impacts may be beneficial or detrimental, direct or indirect, and short-term or long-term. The 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 The No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed, drilled, installed, or operated. Existing conditions would not be impacted for 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, 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, trucking, and other traffic 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 resulting from the discovery of resources at these well locations.

3.2 Air Quality

The North Dakota Department of Health (NDDH) network of Ambient Air Quality Monitoring (AAQM) stations includes 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 pad. Critical pollutants tracked under National Ambient Air Quality Standards (NAAQS) of the Clean Air Act include sulfur dioxide (SO₂), particulate matter (PM₁₀), nitrogen dioxide (NO₂) and ozone (O₃). Two other critical pollutants – lead (Pb) and carbon monoxide (CO) – are not monitored by any of three stations. Table 3.2 summarizes federal air quality standards and available air quality data from the three-county study area.

Table 3.2: Air quality standards and data for Dunn, McKenzie, and Mercer Counties, North Dakota

| Pollutant | Averaging Period | NAAQS (µg/m ³) | NAAQS (ppm) | County | | |
|-------------------|----------------------|----------------------------|-------------|-------------------------|-------------------------|-------------------------|
| | | | | Dunn | McKenzie | Mercer |
| SO ₂ | 24-Hour | 365 | 0.14 | 0.004 ppm | 0.004 ppm | 0.011 ppm |
| | Annual Mean | 80 | 0.030 | 0.001 ppm | 0.001 ppm | 0.002 ppm |
| PM ₁₀ | 24-Hour | 150 | -- | 50 (µg/m ³) | 35 (µg/m ³) | 35 (µg/m ³) |
| | Annual Mean | 50 | -- | -- | -- | -- |
| PM _{2.5} | 24-Hour | 35 | -- | -- | -- | -- |
| | Weighted Annual Mean | 15 | -- | -- | -- | -- |
| NO ₂ | Annual Mean | 100 | 0.053 | 0.002 ppm | 0.001 ppm | 0.003 ppm |
| CO | 1-Hour | 40,000 | 35 | -- | -- | -- |
| | 8-Hour | 10,000 | 9 | -- | -- | -- |
| Pb | 3-Month | 1.5 | -- | -- | -- | -- |
| O ₃ | 1-Hour | 240 | 0.12 | 0.071 ppm | 0.072 ppm | 0.076 ppm |
| | 8-Hour | -- | 0.08 | 0.061 ppm | 0.066 ppm | 0.067 ppm |

Source: U.S. Environmental Protection Agency (EPA) 2006. µg/m³ = micrograms per cubic meter. ppm = parts per million.

North Dakota was one of only nine states in 2006 that met standards for all critical pollutants. The state also met standards for fine particulates and the eight-hour ozone standards established by the U.S. Environmental Protection Agency (EPA) (NDDH 2007). The three counties addressed in Table 3.2 are also in full attainment and usually far below established limits (American Lung Association 2006). The Clean Air Act mandates prevention of significant deterioration in designated attainment areas. Class I areas are of national significance and include national parks greater than 6,000 acres in size, national monuments, national seashores, and federal wilderness areas larger than 5,000 acres and designated prior to 1977. There is a Class I airshed at nearby Theodore Roosevelt National Park, which covers about 110 square miles in three units within the Little

Missouri National Grassland between Medora and Watford City, 30-40 miles west of the proposed well sites. The Reservation can be considered a Class II attainment airshed, which affords it a lower level of protection from significant deterioration.

The proposed project is similar to other projects installed nearby with the approval of state offices. Construction, drilling and tanker traffic would generate temporary, intermittent and nearly undetectable gaseous emissions of particulates, SO₂, NO₂, CO, and volatile organic compounds. Road dust would be controlled as necessary and other best management practices implemented as necessary to limit emissions to the immediate project areas (BLM 2005). No detectable or long-term impacts to air quality or visibility are expected within the airsheds of the Reservation, state, or Theodore Roosevelt National Park. No laws, regulations or other requirements have been waived; no monitoring or compensatory measures are required.

3.3 Public Health and Safety

Health and safety concerns include naturally-occurring toxic gases, hazardous materials used or generated during installation or production, and hazards posed by heavy truck traffic associated with drilling, completion and production activities. No residences were identified within 3,000 feet of the proposed site.

Hydrogen sulfide gas (H₂S) is extremely toxic in concentrations above 500 parts per million, but it has not been found in measurable quantities in the Bakken Formation. Before reaching the Bakken, however, drilling would penetrate the Mission Canyon Formation, which is known to contain varying concentrations of H₂S. Release of H₂S at dangerous concentrations is very unlikely. Contingency plans submitted to BLM comply fully with relevant portions of *Onshore Oil and Gas Order 6* to minimize the potential for gas leaks during drilling. Emergency response plans protect both the drilling crew and the general public within one mile of a well; precautions include automated sampling and alarm systems operating continuously at multiple locations on the well pad. No homes are within ½ mile of the proposed well pad and all are typically downwind from the pad, according to 2006 data from the AAQM site at the Dunn Center monitoring site (NDDH 2007). No direct impacts from H₂S are anticipated.

Negative impacts from construction *would be* largely temporary. Noise, fugitive dust, and traffic hazards would be present for about sixty days during construction, drilling and well completion, and would then diminish sharply during commercial operations. For each of the two proposed wells it is anticipated that about 50 trips, over the course of several days, would be required to transport the drilling rig and associated equipment to the site, with the same traffic later needed to remove the rig and other temporary facilities. Transport needs do not change significantly to drill a second well from the same pad.

If any well proves productive, one small truck would travel to the pad each day to check the pump. Gas would be flared initially, while oil and produced water would be hauled out by tankers, with tanker traffic depending directly on productivity. A successful Bakken well usually produces both oil and water at a high rate initially. In the vicinity of the proposed project, 500-1,000 barrels of oil per day might be expected at first, along with about 200 barrels of water. Over the next several months, daily production might drop to 200-400 barrels of oil and 30-70 barrels of water. An oil tanker can usually haul 140 barrels of oil per load, while water tanker usually hold 110 barrels. Production service might then start at 3-7 oil tankers and two water haulers in and out daily, before declining to 2-3 oil tankers and a single water load. Established load restrictions for state and BIA roadways would be followed and haul permits would be acquired as appropriate. All traffic must be confined to approved routes and conform to speed limits.

The U.S. EPA specifies chemical reporting requirements under Title III of the *Superfund Amendments and Reauthorization Act* (SARA) of 1986, as amended. No materials used or generated by this project for production, use, storage, transport, or disposal are on either the SARA list or on EPA's list of extremely hazardous substances in 40 CFR 355. Project design and operational precautions mitigate against impacts from toxic gases, hazardous materials or traffic. All operations, including flaring, would conform to instructions from BIA fire management staff. Impacts from the proposed projects are considered minimal, unlikely and insignificant. No laws, regulations or other requirements have been waived; no compensatory mitigation measures are required.

3.4 Water Resources

Surface Water

The project would be located within the Lake Sakakawea basin and Lower Little Missouri Sub-Region as seen in Figure 3.4a (NRCS 2008b). The *Site* would be in the Waterchief Bay watershed and the Upper Moccasin Creek sub-watershed (NDWC 2008a).

Runoff is generally sheet-flow until collected by ephemeral and perennial drainages leading to the Moccasin Creek and eventually the Missouri River (Lake Sakakawea). Surface runoff from around the *Site* would flow to the north to the Moccasin Creek and then to Missouri River (Lake Sakakawea) via Moccasin Creek Bay.

The proposed project has been sited to avoid direct impacts to surface water and minimize disruption of drainages. Roadway engineering and erosion control measures would mitigate the potential migration of sediments downhill or downstream. No measureable increase in runoff, or impacts to surface water are expected as a result of project approval.



Figure 3.4a Watershed Map

Groundwater

Aquifers in Dunn County, North Dakota, include (from deepest to shallowest) the Cretaceous Fox Hills and Hell Creek Formations, and the Tertiary Tongue River and Sentinel Butte Formations. See Table 3.4a. The shallow Sentinel Butte Formation crops out in Dunn County and is most commonly used for domestic supply in the area, meeting standards of the North Dakota Department of Health. Detailed analysis is available from the North Dakota Geological Survey, Bulletin 68, Part II, 1976.

Table 3.4a: Dunn County aquifers

| Formation Name | Depth Range (ft) | Thickness (ft) | Lithology |
|----------------|------------------|----------------|-------------------------|
| Sentinel Butte | 0 – 300 | Up to 500 | Siltstone and sandstone |
| Tongue River | 0 – 500 | Up to 500 | Siltstone and sandstone |
| Hell Creek | 900 – 1900 | 300 | Sandstone and shale |
| Fox Hills | 1200 – 2200 | 200 | Sandstone and shale |

The North Dakota State Water Commission has not issued permits for any water wells or surface water impoundments near the proposed project. The closest permit is 1.3 miles to the northwest in section 12 (Permit Number 148-095-12-DCC). Information on water permits in other sections of the township is summarized in Table 3.4b and 3.4c (NDWC 2008). Nonetheless, Petro-Hunt would protect the water quality of these aquifers by cementing casing across these zones to prevent contamination. The well bore will be drilled with fresh water to a point below the base of the Fox Hills Formation prior to setting casing to prevent contamination of the formation.

Table 3.4b: Existing Water Permits in T148-R94W, Dunn County, North Dakota

| Permit Number | Legal Location | | Permit Type | Permit Information | | |
|----------------|-----------------|---------|-------------------------------|-----------------------------|-------|------------|
| | Subdivision | Section | | Aquifer | Depth | Date |
| 148-094-06 DBD | NW1/4SE1/4SE1/4 | 6 | Unknown | Sentinel Butte-Tongue River | Unk | Unk |
| 148-094-13 BBD | SE1/4NW1/4NW1/4 | 13 | Unknown | Sentinel Butte-Tongue River | Unk | Unk |
| 148-094-15 CAD | SE1/4NE1/4SW1/4 | 15 | Surface Water Monitoring Site | Surface Water | 0 | Unk |
| 148-094-23 CBD | SE1/4NW1/4SW1/4 | 23 | Surface Water Monitoring Site | Surface Water | 0 | Unk |
| 148-094-14 AAB | NW1/4NE1/4NE1/4 | 14 | Observation Well | Tongue River | 315 | 6/23/1992 |
| 148-094-01 DDD | SE1/4SE1/4SE1/4 | 1 | Test Hole | No Obs Well Installed | 80 | 10/12/1971 |

Table 3.4b: Existing Water Permits in T148-R95W, Dunn County, North Dakota

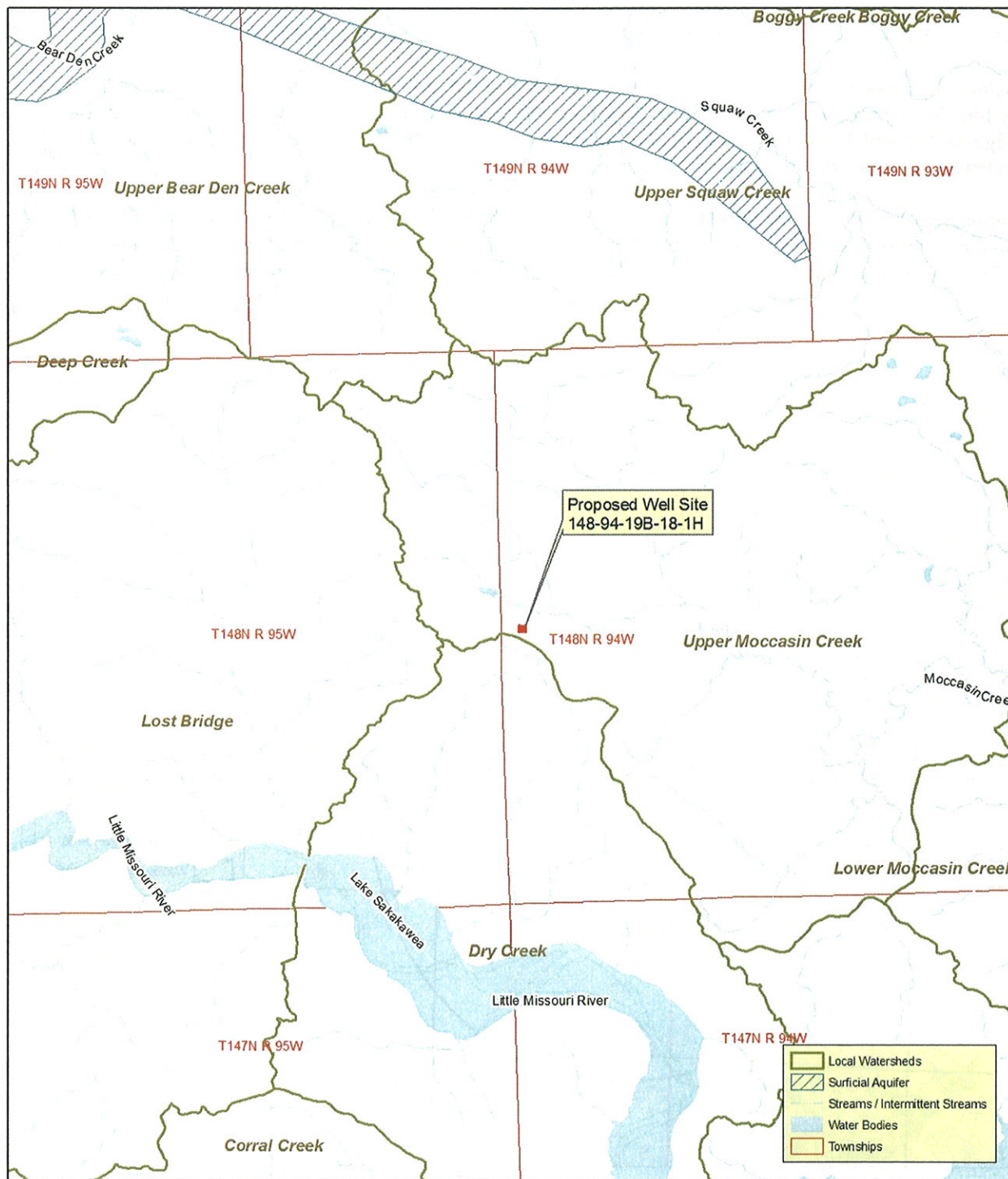
| Permit Number | Legal Location | | Permit Type | Permit Information | | |
|----------------|-----------------|---------|------------------|-----------------------------|-------|-----------|
| | Subdivision | Section | | Aquifer | Depth | Date |
| 148-095-22-CCA | NE1/4NE1/4SW1/4 | 22 | Unknown | Fox Hills | 1455 | Unk |
| 148-095-31-CCA | NE1/4NE1/4SW1/4 | 31 | Unknown | Fox Hills | Unk | Unk |
| 148-095-32-DBD | NW1/4SE1/4SE1/4 | 32 | Unknown | Fox Hills | Unk | Unk |
| 148-095-33-BDB | NW1/4SE1/4NW1/4 | 33 | Unknown | Tongue River | Unk | Unk |
| 148-095-35-BDD | SE1/4SE1/4NW1/4 | 35 | Unknown | Tongue River | Unk | Unk |
| 148-095-12-DCC | SW1/4SW1/4SE1/4 | 12 | Observation Well | Sentinel Butte-Tongue River | 52 | 6/23/1992 |

Source: North Dakota State Water Commission website: <http://www.swc.state.nd.us> (NDWC 2008)

September 2009.

Surface casing would be cemented in place to a depth of about 2,380 feet, isolating aquifers in the Fox Hills Formation and extending a minimum of fifty feet into the underlying Pierre shale. Intermediate casing would extend from the surface and be cemented between about 4,000 and 10,000 feet in depth to isolate potential productive water and hydrocarbon-bearing zones. Any produced water would be captured in tanks on site and periodically trucked to an approved disposal site. The frequency of trucking of either oil or water would depend on production rates. BIA and BLM would monitor all operations and record-keeping at their discretion. Evidence of ground water contamination related to the project would result in a stop work order until all appropriate measures were identified and implemented.

These and other construction and reclamation techniques included in the APD would minimize potential for impacts to both groundwater and surface water. No significant impacts to surface water or groundwater are expected as a result of the proposed action. No applicable laws or regulations would be waived; no compensatory mitigation measures are required to protect surface water or groundwater.



Local Watersheds and Aquifers

Petro-Hunt, L.L.C. - Fort Berthold 148-94-19B-18-1H
Section 19, T148N, R94W
Dunn County, ND

0 0.25 0.5 1 Miles

WPC Project 103-15-JS
Source: 2008 NDGIS HUB data

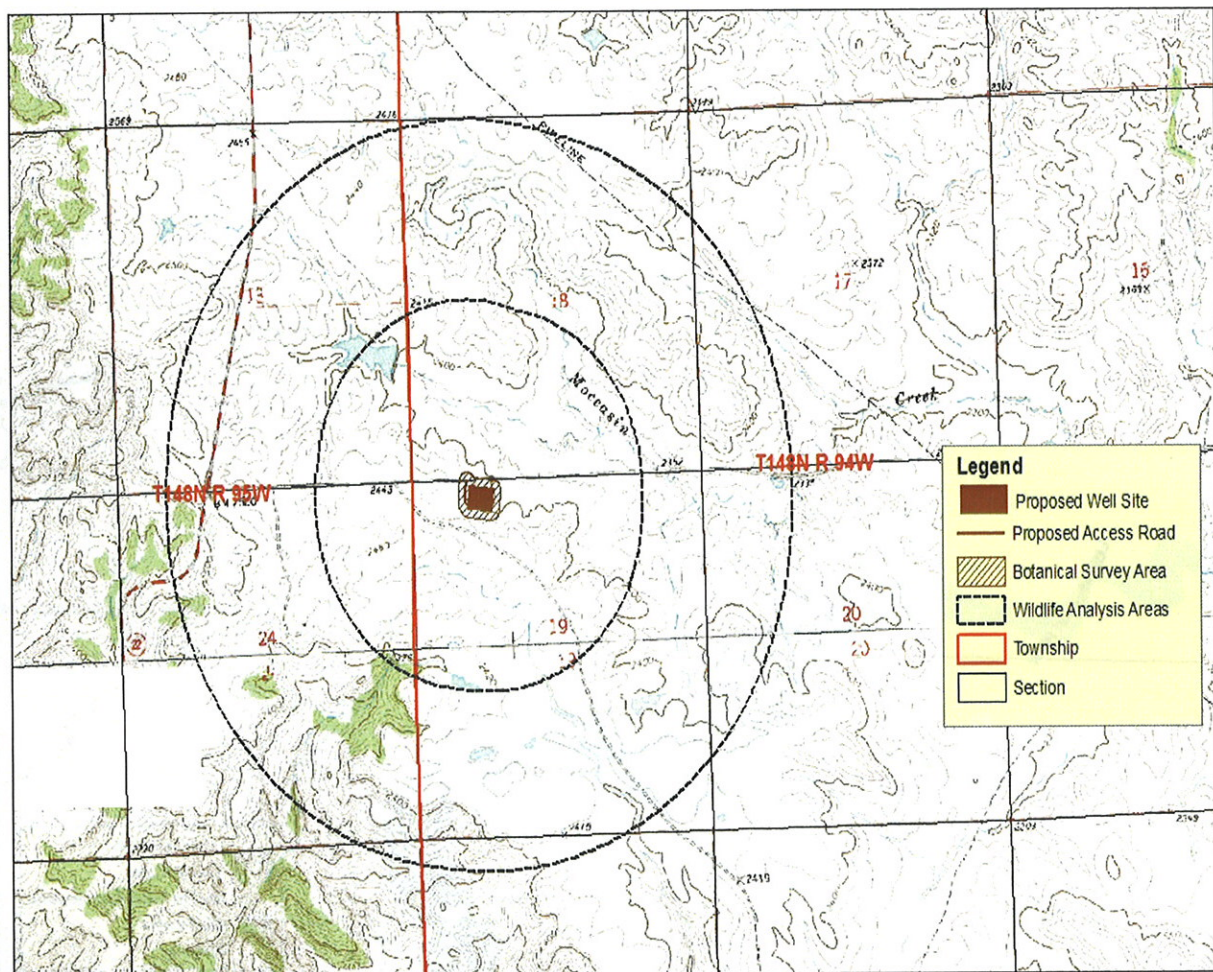


Figure 3.4b: Water resources

3.5 Wetland/Riparian Habitat and Threatened or Endangered Species

Wildlife occurrence and habitat within a one-mile radius of the *Site* were inventoried on November 17, 2008 by John W. Schulz, Senior Biologist, via a walking survey and visual inspection with the aid of binoculars (Figures 3.5a and 3.5b). Historical data for raptor species of concern in the area surrounding the *Site* was reviewed in conjunction with the on-*Site* survey (USFWS 2008).

National Wetland Inventory (NWI) maps maintained by the U.S. Fish and Wildlife Services (USFWS) do not directly identify any jurisdictional wetlands within the project area. Physical inventories on November 17, 2008, confirmed that no riparian or wetland habitats would be impacted by the proposed roads or wells.



I-B Topographic Map of Site and Analysis Area
 Petro-Hunt, L.L.C. - Fort Berthold 148-94-19B-18-1H
 Well Pad and Access Road
 NE1/4 NW1/4, Section 19, T148N, R94W
 Dunn County, ND

1:24,000

WPC Project 103-15-JS
 Source: USGS Topographic Map



Figure 3.5 a

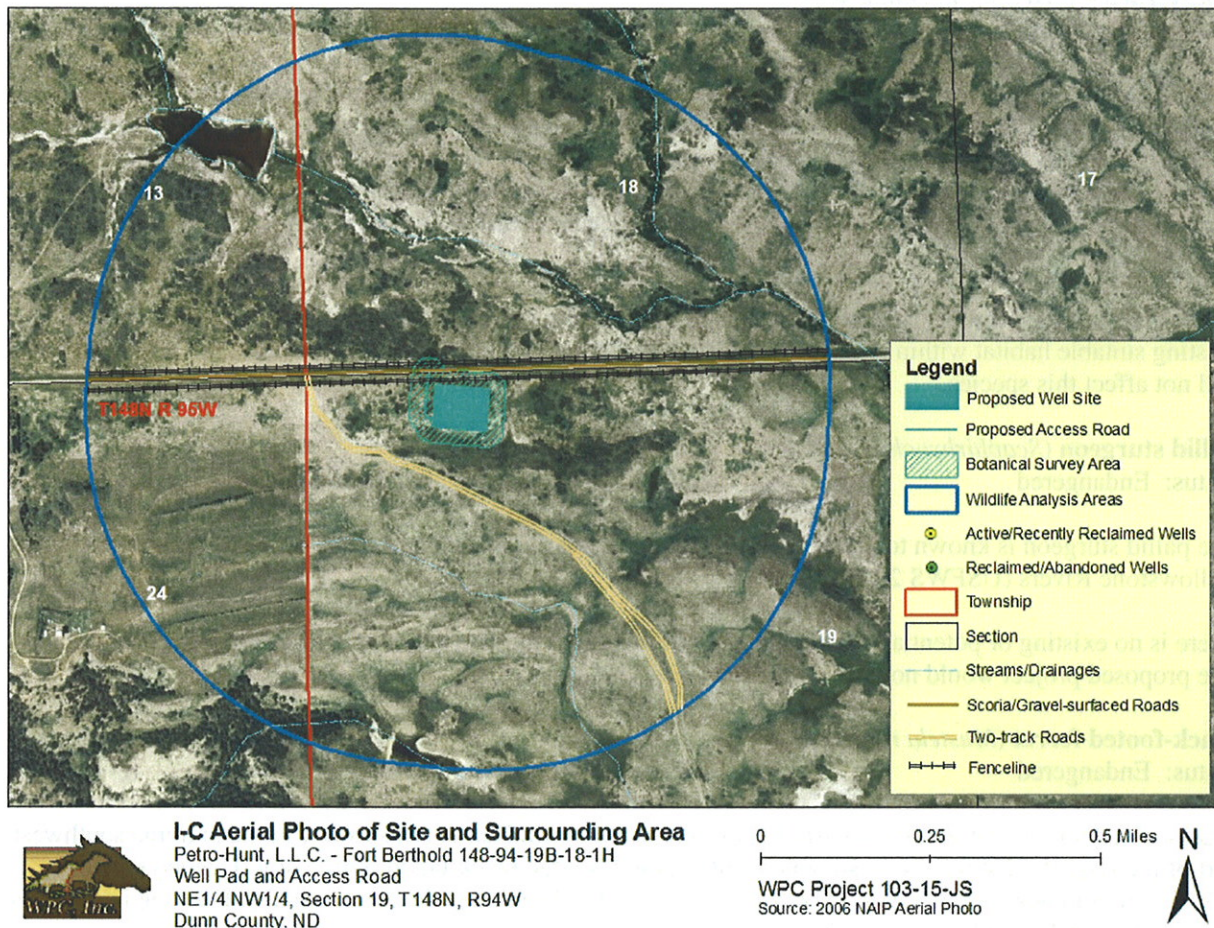


Figure 3.5 b

Threatened or Endangered Species

The U.S. Fish and Wildlife Service (USFWS) identifies seven federally listed species occurring in Dunn County, including one species that is a candidate for listing (USFWS 2008) as threatened or endangered under the *Endangered Species Act* (ESA). None of these species were observed during field reconnaissance of the proposed *Site*. The state of North Dakota, Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), and Fort Berthold Reservation do not have a list of threatened or endangered species different from the federal government. Tribes and states may recognize additional species of concern; such lists are taken under advisement by federal agencies, but are not legally binding in the manner of the ESA.

Whooping crane (*Grus Americana*).

Status: Endangered

Likelihood of occurrence: **unlikely**

Whooping cranes historically nested in North Dakota, but the whooping crane is currently only a migrant through North Dakota in the spring and fall. During spring and fall whooping crane migration, large shallow marshes with a minimal to nonexistent emergent zones are preferred for roost sites and upland cropland and pastures adjacent to and usually within one kilometer (0.62 mile) are used for foraging (Howe 1989).

Suitable habitat for whooping cranes is not present on-*Site*. The lack of a cropland/wetland matrix habitat makes migratory stopovers by whooping cranes unlikely. The proposed project will not affect this species.

Interior least tern (*Sterna antillarum*)

Status: Endangered

Likelihood of occurrence: **unlikely**

Natural habitat for interior least terns in North Dakota includes islands, beaches and sandbars of the Missouri and Yellowstone Rivers and along the shorelines of Lakes Sakakawea and Oahe (USFWS 2006). Interior least terns are generally restricted to larger meandering rivers with a broad floodplain, slow currents and greater sedimentation rates, which allow for the formation of suitable habitat. Interior least terns experience the greatest nesting success on sand or gravel bar islands because predation by terrestrial predators is reduced (USFWS 2006).

Interior least terns' seasonal habitat requisites are associated with rivers, streams and reservoirs. There is no existing suitable habitat within or near the *Site* that would be appropriate for this species. The proposed project will not affect this species.

Pallid sturgeon (*Scaphirhynchus albus*)

Status: Endangered

Likelihood of occurrence: **would not occur**

The pallid sturgeon is known to occur in North Dakota primarily at the confluence of the Missouri and Yellowstone Rivers (USFWS 2006).

There is no existing or potential aquatic habitat within or near the *Site* that would be suitable for this species. The proposed project would not affect this species.

Black-footed ferret (*Mustela nigripes*)

Status: Endangered

Likelihood of occurrence: **would not occur**

Black-footed ferrets historically occurred in this region of North Dakota, but mostly in the extreme southwest part of the state (USFWS 2006). Suitable habitat includes large black-tailed prairie dog (*Cynomys ssp.*) colonies or complexes of colonies. The ferret's primary food source is the black-tailed prairie dog and ferrets also inhabit black-tailed prairie dog burrows.

The proposed *Site* does not contain active black-tailed prairie dog colonies. The black-footed ferret is not expected to be present given the paucity of food and habitat in the project area. The proposed project would not affect this species.

Gray wolf (*Canis lupus*)

Status: Endangered

Likelihood of occurrence: **would not occur**

The most suitable habitat for the gray wolf in North Dakota is in the dense and contiguous forested areas in the north central and northeast parts of the state. There have been documented occurrences of gray wolves in south-central North Dakota (1985, 1990, and 1991) and confirmed reports of gray wolves in the Turtle Mountains of North Dakota (Grondahl, NDGFD, personal communication, 2006).

The *Site* does not contain dense, contiguous forested areas required by the gray wolf and there have been no historical wolf sightings within or near the project area (USFWS 2006). The proposed project would not affect this species.

Piping plover (*Charadrius melodus*)

Status: Threatened

Likelihood of occurrence: **unlikely**

The *Site* is, at the east end, four miles south of Lake Sakakawea which is designated critical habitat for piping plover (USFWS 2008). Critical habitat for the piping plover includes sparsely vegetated shoreline beaches,

peninsulas, islands composed of sand, gravel, or shale, and their interface with the water bodies (USFWS 2006).

Suitable habitat for piping plovers is not present within the *Site*. There are no suitable nesting/foraging habitats located as the *Site* and surrounding area are primarily grassland habitats. Birds occasionally may fly through the *Site* when migrating or moving between nesting and foraging areas. The proposed project would not affect this species.

Dakota skipper (*Hesperia dacotae*)

Status: Candidate

Likelihood of occurrence: **may occur**

North Dakota has a large and stable population of Dakota skippers. In the western part of the state, its habitat includes ungrazed native prairie with little bluestem (*Schizachyrium scoparium*), needle and thread (*Stipa viridula*), purple coneflower (*Echinacea spp.*) and a high forb and grass diversity (USFWS 2006). The Dakota skipper has been documented within both McKenzie and Dunn Counties (USFWS 2008). Confirmed observations were located at three sites approximately six miles north of the *Site* in the NE $\frac{1}{4}$ SW $\frac{1}{4}$ and NW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 28, T149N, R94W and the NE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 33, T149N, R94W (USFWS 2008), McKenzie County.

The *Site* does not contain suitable habitat for the Dakota skipper. No individuals were observed during the survey. The proposed project will not affect this species.

Other Wildlife Species

Numerous resident and migratory birds, mammals, amphibians and insects occupy the *Site* both continually and intermittently throughout the year. Due to the migratory and transient behavior of wildlife species, the information presented includes a discussion of wildlife resources known within the *Site* and at a regional level, obtained from queries of state and federal natural resource related databases, and interviews with state (Kreft, B., NDGFD, 2008) and federal management personnel (Ellsworth, T., USFWS, 2008). Focus was also given to land cover and potential habitat availability of the *Site* based on the field reconnaissance, which includes mixed grass prairie and shrub cover.

Eighteen resident birds are known from McKenzie and Dunn Counties (Table 3.5a). At least seventy-one migratory birds could potentially occur in the vicinity of the *Site*. These lists should not be considered comprehensive, but rather representative of the majority of species regularly present in the vicinity of the project area. Based on a lack of suitable waterfowl nesting habitat present within the region of the *Site* relative to eastern portions of the state, only limited use of the area (except staging on Lake Sakakawea, 10 miles from the project area) by migrating waterfowl species would be expected.

September 2009.

Table 3-5a. Resident Bird species in McKenzie and Dunn Counties.

| Common Name | Scientific Name |
|---|---------------------------------|
| American Crow | <i>Corvus brachyrhynchos</i> |
| Black-billed Magpie | <i>Pica hudsonia</i> |
| Black-capped Chickadee | <i>Poecile atricapilla</i> |
| Blue Jay | <i>Cyanocitta cristata</i> |
| Short-eared Owl | <i>Asio flammeus</i> |
| Downy Woodpecker | <i>Picoides pubescens</i> |
| Eastern Screech Owl | <i>Atus asio</i> |
| European Starling | <i>Sturnus vulgaris</i> |
| Gray Partridge | <i>Perdix perdix</i> |
| Great Horned Owl | <i>Bubo virginianus</i> |
| Hairy Woodpecker | <i>Picoides villosus</i> |
| House Finch | <i>Carpodacus mexicanus</i> |
| House Sparrow | <i>Passer domesticus</i> |
| Ring-necked Pheasant | <i>Phasianus colchicus</i> |
| Sharp-tailed Grouse | <i>Tympanuchus phasianellus</i> |
| White-breasted Nuthatch | <i>Sitta carolinensis</i> |
| Wild Turkey | <i>Meleagris gallinopus</i> |
| Horned Lark | <i>Eremophila alpestris</i> |
| Sources: Sibley, D. A. 2006. The Sibley Field Guide to Birds of Eastern North America North Dakota Game and Fish Department. | |

During the field survey, 11 resident and migratory bird species were observed. These were American crow (*Corvus brachyrhynchos*), black-capped chickadee (*Poecile atricapilla*), blue jay (*Cyanocitta cristata*), gray partridge (*Perdix perdix*), house sparrow (*Passer domesticus*), ring-necked pheasant (*Phasianus colchicus*), sharp-tailed grouse (*Tympanuchus phasianellus*), wild turkey (*Meleagris gallinopus*), prairie horned lark (*Eremophila alpestris*), red-tailed hawk (*Buteo jamaicensis*), and snow bunting (*Plectrophenax nivalis*). The majority of available trend information on birds focuses on game species. A review of the ND Game and Fish Department annual game bird reports for central and western North Dakota indicates that populations are healthy and stable-to-increasing in this region.

At least twenty-one large and small mammals are present within McKenzie and Dunn Counties throughout the year (Table 3.5b). The rolling mixed grass prairie, cropland and intermittent woody cover of the Site and vicinity likely provide food sources for many of these species. White-tailed deer (*Odocoileus virginianus*) were observed during the field survey. A review of ND Game and Fish Department winter aerial survey data indicates that white-tailed deer density within McKenzie and Dunn Counties is excellent and suggests a healthy and stable-to increasing deer population. Several other big game and furbearer species potentially inhabit the vicinity of the Site.

Table 3.5b: Mammal Species in McKenzie and Dunn Counties.

| Common Name | Scientific Name |
|--|--------------------------------------|
| Pronghorn Antelope | <i>Antilocapra americana</i> |
| Badger | <i>Taxidea Taxus</i> |
| Beaver | <i>Castor Canadensis</i> |
| Big Brown Bat | <i>Eptesicus fuscus</i> |
| Coyote | <i>Canis latrans</i> |
| Eastern Chipmunk | <i>Tamias striatus</i> |
| Fox Squirrel | <i>Sciurus niger</i> |
| Franklin's Ground Squirrel | <i>Spermophilus franklinii</i> |
| Little Brown Bat | <i>Myotis Lucifugus</i> |
| Long-tailed Weasel | <i>Mustela frenata</i> |
| Meadow Vole | <i>Microtus pennsylvanicus</i> |
| Mink | <i>Mustela vison</i> |
| Muskrat | <i>Ondatra zibethicus</i> |
| Raccoon | <i>Procyon lotor</i> |
| Red Fox | <i>Vulpes vulpes</i> |
| Red Squirrel | <i>Tamiasciurus hudsonicus</i> |
| Silver-haired Bat | <i>Lasionycteris noctivagans</i> |
| Thirteen-lined Ground Squirrel | <i>Spermophilus tridecemlineatus</i> |
| White-tailed Deer | <i>Odocoileus virginianus</i> |
| Mule Deer | <i>Odocoileus hemionus</i> |
| White-tailed Jackrabbit | <i>Lepus townsendii</i> |
| Sources: Knue, J. 1991. Big Game in North Dakota; A Short History North Dakota Game and Fish Department | |

Potential Impacts to Wildlife

Construction and operation of the *Site* is not likely to affect the six federally listed threatened or endangered species that have ranges that include the project area. No effects are expected for the pallid sturgeon, black-footed ferret, gray wolf and whooping crane because these species do not occupy the *Site* vicinity, other than occasional transients. Potential habitat of the Interior least tern and piping plover is not within the *Site*, but is in the vicinity. Habitat for the candidate species Dakota skipper is found in the *Site* vicinity but there is not adequate habitat on-*Site* for this species. Only indirect effects would be likely, such as temporary

displacement caused by noise or presence of humans. These potential effects are not likely to affect these species or habitat.

Regarding other wildlife species within the *Site*, construction activities that remove vegetation and disturb soil may cause direct mortality, displacement, or increased exposure to predators for of less mobile species (i.e. small mammals, amphibians, reptiles, ground-nesting birds). More mobile species (i.e. medium to large mammals and birds) would be expected to disperse from the *Site* during construction and re-enter the area following completion of construction activities. Long-term habitat loss would be minimal and restricted to the localized area of permanently altered vegetation. Disturbance to wildlife due to noise, increased traffic, and human presence may temporarily displace individuals during the construction period. However, these effects are not likely to cause long term declines in populations.

3.6 Soils

A published soil survey for Dunn County dates from 1982, with updated information available online from the Natural Resources Conservation Service (NRCS 2008). Soils in the project area are identified in Table 3.6a, followed by a brief description of the soil map units, a summary of attributes in Table 3.6b, and estimates of acres disturbed in Table 3.6c.

Table 3.6a: Soil Mapping Units

| Mapping Unit Name | Map Unit Symbol | Project Occurrence | |
|--|-----------------|--------------------|----------|
| | | Access Road | Well Pad |
| Cabba loam (15-45 percent slopes) | 9E | No | Yes |
| Rhoades silt loam (0-6 percent slopes) | 62B | Yes | Yes |

Source: NRCS Web Soil Survey website: <http://websoilsurvey.nrcs.usda.gov> (NRCS 2008a)

Map Unit 9E: Cabba loam, 15 to 45 percent slopes, is a shallow soil that is moderately steep to very steep. Cabba loam is primarily found on uplands. Permeability is moderate, surface runoff is very rapid, well drained, and available water capacity is very low. A restrictive layer is found at a depth of about 18 inches.

Map Unit 62B: Rhoades silt loam, 0 to 6 percent slopes, is a deep, nearly level and gently sloping soil that is moderately well drained. Surface runoff is slow, available water capacity is moderate, and permeability is very slow. A restrictive layer is found at a depth of about 3 inches.

Table 3.6b: Soil Attributes

| Mapping Unit Name | Map Unit Symbol | Project Occurrence | | Erosion Factor | | Hydrologic Soil Group | Composition | | |
|--|-----------------|--------------------|----------|----------------|---|-----------------------|-------------|--------|--------|
| | | Access Road | Well Pad | Kf | T | | % Silt | % Clay | % Sand |
| Cabba loam (15-45 percent slopes) | 9E | No | Yes | 0.32 | 2 | D | 39.5 | 20.0 | 40.5 |
| Rhoades silt loam (0-6 percent slopes) | 62B | Yes | Yes | 0.32 | 2 | D | 50.8 | 38.2 | 11.0 |

Source: NRCS website <http://soildatamart.nrcs.usda> (NRCS 2008a)

Erosion Factors indicate susceptibility of a soil to sheet and rill erosion by water. Kf indicates the erodability of material less than two millimeters in size. Values of K range from 0.02 to 0.69. Higher values indicate greater susceptibility.

T Factors estimate maximum average annual rates of erosion by wind and water that will not affect crop productivity. Tons/acre/year range from 1 for shallow soils to 5 for very deep soils. Higher T soils can tolerate higher rates of erosion without loss of productivity.

Hydrologic Soil Groups are based on estimates of runoff potential, based on infiltration rates during for thoroughly wetted soils unprotected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. The rate of infiltration decreases from Group A (high infiltration, low runoff) to D (low infiltration, high runoff).

Soil erosion rates have been extensively studied. Erosion potential would increase in the interval between construction and reclamation, as stabilizing vegetation is removed and topsoil stripped, with vulnerability increasing with slope. Various practices have been shown, however, to feasibly and significantly reduce erosion of a wide variety of soils, including those within the project area. Table 5.3 provides an estimate of the surface disturbance associated with road and well pad construction for all affected soil units. Implementation of proven management practices for stabilization and reclamation is expected to reduce erosion to negligible levels.

About 63 percent of the on-Site construction would occur in soil mapping unit 62B (Rhoades silt loam 0-6 percent slopes). This soil has low runoff potential, and moderate hazard of sheet and rill erosion by water, and low hazard of wind erosion. The remaining area consists of a soil that is very high in water erosion potential and a slightly higher hazard of wind erosion. Erosion potential would increase in the interval between construction and reclamation. Stabilizing vegetation would be removed and topsoil stripped during construction. Implementation of proven BMPs for stabilization and reclamation would be expected to reduce erosion to negligible levels.

Table 3.6c: Acres of Disturbance

| Mapping Unit Name | Map Unit Symbol | Access Road | | Well Pad | Total Acres | Percent of Total |
|--|-----------------|-------------|-------------|-------------|-------------|------------------|
| | | Length | Acres | | | |
| Cabba loam (15-45 percent slopes) | 9E | 36' | 0.08 | 1.44 | 1.52 | 37.2% |
| Rhoades silt loam (0-6 percent slopes) | 62B | 374' | 0.82 | 1.75 | 2.57 | 62.8% |
| | Totals | 410' | 0.90 | 3.19 | 4.09 | 100% |

September 2009.

3.7 Vegetation and Invasive Species

The Missouri Plateau Ecoregion (Missouri Slope) is a western mixed-grass and short-grass prairie (Bryce et al. 1998). The U.S. Department of Agriculture soil surveys for Dunn County describe vegetation within the proposed project area as mostly native grasses. Native grasses include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), blue grama (*Bouteloua gracilis*), side-oats grama (*Bouteloua curtipendula*), green needlegrass (*Nassella viridula*), and western wheatgrass (*Pascopyrum smithii*). Woody draws, coulees, and drainages may host communities of chokecherry (*Prunus virginiana*), buffaloberry (*Shepherdia argentea*), western snowberry (*Symphoricarpos occidentalis*), and gooseberry (*Ribes sp.*).

Invasive species is a general term referring to plants that are not native to an area, that spread aggressively, and have negative economic and environmental impacts. Otherwise known as noxious weeds, these species can spread easily to the detriment of public health, indigenous plant communities, crops, livestock, recreational areas, and the management of natural or agricultural systems. Of twelve species declared noxious under the North Dakota Century Code (Chapter 63-01.1), five are known to occur in Dunn County, including absinth wormwood, Canada thistle, dalmation toadflax, field bindweed, and leafy spurge (NDAA 2007). Table 3.7a shows Dunn County acreage for these species. No additional species have been designated by the county within its jurisdiction. Additional information is available from the NRCS Plants Database for North Dakota at <http://plants.usda.gov>.

Table 3.7a: Invasive species

| Common Name | Scientific Name | Dunn County Acres |
|----------------------|---|-------------------|
| Absinth wormwood | <i>Artemisia abinthium</i> L. | 24.500 |
| Canada thistle | <i>Cirsium arvense</i> (L.) Scop | 22.705 |
| Dalmation toadflax | <i>Linaria genistifolia</i> ssp. <i>dalmatica</i> | 2 |
| Diffuse knapweed | <i>Centaurea diffusa</i> Lam | -- |
| Field bindweed | <i>Convolvulus arvensis</i> L. | 19.800 |
| Leafy spurge | <i>Euphorbia esula</i> L. | 8.302 |
| Musk thistle | <i>Carduus nutans</i> L. | -- |
| Purple loosestrife | <i>Lythrum salicaria</i> | -- |
| Russian knapweed | <i>Acroptilon repens</i> (L.) DC. | -- |
| Saltcedar (tamarisk) | <i>Tamarix ramosissima</i> | 0 |
| Spotted knapweed | <i>Centaurea maculosa</i> Lam. | -- |
| Yellow starthistle | <i>Centaurea solstitialis</i> L. | -- |

Source: NRCS Plants Database for North Dakota at <http://plants.usda.gov>.

The *Site* was visually inspected on November 17, 2008 by Carolyn Godfread, Ph.D., Senior Botanist, for sensitive plants and their potential habitat via a general walking survey within a minimum 10-acre radius around the proposed well location and a minimum of 125 feet on either side of the proposed access route. All observed plants were recorded (Table 3.7b). Nomenclature follows McGregor et al. (1986).

Table: 3.7b: Plant Species

| List of Plants Species Observed on November 17, 2008 | |
|---|------------------------|
| <i>Achillea millefolium</i> L. | yarrow |
| <i>Agropyron smithii</i> Rydb. | western wheatgrass |
| <i>Andropogon gerardii</i> Vitman. | big bluestem |
| <i>Andropogon scoparius</i> Michx. | little bluestem |
| <i>Artemisia dracunculus</i> L. | silky wormwood |
| <i>Artemisia frigida</i> Willd. | fringed sage |
| <i>Artemisia ludoviciana</i> Nutt. | white sage |
| <i>Aster ericoides</i> L. | white aster |
| <i>Aster laevis</i> L. | smooth blue aster |
| <i>Aster oblongifolius</i> Nutt. | aromatic aster |
| <i>Atriplex nuttallii</i> S.Wats. | moundscale |
| <i>Bouteloua gracilis</i> (H.B.K.) Lag. ex. Griffiths | blue grama |
| <i>Bromus inermis</i> Leyss. Subsp. inermis | smooth brome |
| <i>Calamovilfa longifolia</i> (Hook.) Scribn. | prairie sandreed |
| <i>Cerastium arvense</i> L. | prairie chickweed |
| <i>Cirsium undulatum</i> (Nutt.) Spreng. | wavy-leaf thistle |
| <i>Dalea purpurea</i> Vent. | purple prairie clover |
| <i>Distichlis spicata</i> (L.) Greene var. <i>stricta</i> (Torr.) | inland saltgrass |
| <i>Echinacea angustifolia</i> DC. | purple coneflower |
| <i>Elymus canadensis</i> L. | Canada wild rye |
| <i>Glycyrrhiza lepidota</i> Pursh | wild licorice |
| <i>Grindelia squarrosa</i> (Pursh) | Curly-top gumweed |
| <i>Juniperus scopulorum</i> Sarg. | Rocky Mountain juniper |
| <i>Kochia scoparia</i> (L.) Schrad. | kochia |
| <i>Koeleria pyramidata</i> (Lam.) Beauv. | Junegrass |
| <i>Linum perenne</i> L. var. <i>lewesii</i> (Pursh) Eat. & Wright | blue flax |
| <i>Melilotus officinalis</i> (L.) Pall. | yellow sweet clover |
| <i>Monarda fistulosa</i> L. | wild bergamot |
| <i>Muhlenbergia cuspidata</i> (Torr.) Rydb. | plains muhly |
| <i>Poa pratensis</i> L. | Kentucky bluegrass |
| <i>Poa sandbergii</i> Vasey | Sandberg's bluestem |
| <i>Puccinellia nuttalliana</i> (Schult.) A. Hitchc. | alkali grass |
| <i>Rosa arkansana</i> Porter | prairie wildrose |
| <i>Rosa woodsii</i> Lindl. | western wildrose |
| <i>Selaginella densa</i> Rydb. | spikemoss |
| <i>Shepherdia argentea</i> (Pursh) Nutt. | buffaloberry |
| <i>Solidago missouriensis</i> Nutt. | prairie goldenrod |
| <i>Solidago rigida</i> L. | rigid goldenrod |
| <i>Stipa comata</i> Trin. & Rydb. | needle-and-thread |
| <i>Stipa viridula</i> Trin. | green needlegrass |
| <i>Symphoricarpos occidentalis</i> Hook. | western snowberry |

A short access road (410 ft) connects the proposed well site to Tribal Highway 14 that runs west to east along the section line just north of the *Site*. The route of the proposed road extends from the southwest corner of the *Site*, across a band of buffaloberry (*Shepherdia argentea*) and western snowberry (*Symphoricarpos occidentalis*). The most abundant grass species under and around the shrubs was Kentucky bluegrass (*Poa pratensis*). Around the shrubs where the bluegrass was not as dense there were areas with blue grama (*Bouteloua gracilis*), plains muhly (*Muhlenbergia cuspidata*) and green needlegrass (*Stipa viridula*). The most noticeable forbs were white sage (*Artemisia ludoviciana*), fringed sage (*Artemisia frigida*), white aster (*Aster ericoides*), blue flax (*Linum perenne*) and smooth blue (*Aster laevis*). The road ditch was vegetated primarily with smooth brome (*Bromus inermis*) but there was a small amount of big bluestem (*Andropogon scoparius*). Rigid goldenrod (*Solidago rigida*) and silky wormwood (*Artemisia dracuncululus*) were the most noticeable forbs. The soils along the access road were a grayish brown silty clay loam. In a few areas near the road the surface of the soil was primarily bare eroded clay with shale chips. The predominant species on these locations were inland saltgrass (*Distichlis spicata*) and alkali grass (*Puccinellia nuttalliana*).

The proposed well pad is located on a gentle east facing slope approximately 200 feet south of Tribal Highway 14, approximately one mile east of North Dakota Highway 22. The soils near the center of the *Site* were a grayish brown loam. Grasses were the dominant species near the center. The predominant species were western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), plains muhly (*Muhlenbergia 29uspidate*) and green needlegrass (*Stipa comata*). In several places there were large patches of Kentucky bluegrass (*Poa pratensis*). In addition, small amounts of needle-and-thread (*Stipa comata*) and prairie Junegrass (*Koeleria pyramidata*) were observed as well as small clumps of prairie sandreed (*Calamovilfa longifolia*). On a drier rise toward the west side blue grama (*Bouteloua gracilis*) was the predominant grass species growing within patches of spikemoss (*Selaginella densa*).

White sage (*Artemisia ludoviciana*) and fringed sage (*Artemisia frigida*) were the most conspicuous forbs. Other forbs observed were: yarrow (*Achillea millefolium*), silky wormwood (*Artemisia dracuncululus*), white aster (*Aster ericoides*), prairie wildrose (*Rosa arkansana*), aromatic aster (*Aster oblongifolia*), Missouri goldenrod (*Solidago missouriensis*), rigid goldenrod (*Solidago rigida*), wavy-leaf thistle (*Cirsium undulatum*), purple prairie clover (*Dalea purpurea*), curly-cup gumweed (*Grindelia squarrosa*), moundscale (*Atriplex nuttallii*) and prairie chickweed (*Cerastium arvense*). There was also a small amount of yellow sweet clover (*Melilotus officinalis*).

Thickets of shrubs were present around the *Site*. Buffaloberry (*Shepherdia argentea*) with an understory of western snowberry (*Symphoricarpos occidentalis*) were the predominant species. In a few places there were small Rocky Mountain junipers (*Juniperus scopulorum*) within the thicket as well as some western wood's rose (*Rosa woodsii*). Bergamot (*Monarda fistulosa*) was fairly abundant in and around the thickets and there were a few plants of wild licorice (*Glycyrrhiza lepidota*). The understory grass species seemed to be predominantly Kentucky bluegrass (*Poa pratensis*). Little bluestem (*Andropogon scoparius*) was noticeable in a few places around the edges of the thickets.

There were no rare species or species of concern observed on either the proposed well pad site or the proposed access road. Furthermore, the habitats present were unlikely to provide conditions appropriate for the growth of any such species. There should be no adverse impact on any rare or sensitive species.

Invasive Species

Grass species encountered during the field survey considered invasive were smooth brome (*Bromus inermis*), yellow sweet clover (*Melilotus officinalis*) and Kentucky bluegrass (*Poa pratensis*). Kentucky bluegrass was common both under the shrubs and in patches in the grassy area of the proposed well site. A small amount of yellow sweet clover was present near the proposed well pad. Smooth brome was present in the road ditch (Tribal Highway 14). Smooth brome and Kentucky bluegrass begin growth earlier than most native species and are consequently highly competitive. Controlling and minimizing the spread of these species during and following *Site* construction and operation will be part of the reclamation and monitoring plan.

The APD and this EA require the operator to control noxious weeds throughout the project area. Vehicles that have been driven in areas with invasive species must be cleaned with high-pressure sprayers before entering the project area. **Surface disturbance and vehicular traffic must not take place outside approved rights-of-way or the well pad.** Areas stripped of topsoil must be re-seeded and reclaimed at the earliest opportunity. 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 reduce vegetative impacts to minimal levels, effectively negating potential to establish or spread invasive species.

3.8 Cultural Resources

Cultural resources is a broad term encompassing sites, objects, or practices of archaeological, historical, cultural and religious significance. 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. 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). As a result, BIA consults and corresponds with the THPO on all projects proposed within the exterior boundaries of the Fort Berthold Reservation. The SHPO may have useful information, but has no official role regarding proposed federal actions on trust land. The MHA Nation has also designated responsible parties for consultations and actions under NAGPRA and cultural resources generally.

A cultural resource inventory of this well pad and access road project area was conducted on November 19, 2008 by personnel of Beaver Creek Archaeology, Inc. (Burns 2008). Approximately 10 acres were intensively inventoried using a pedestrian methodology. 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. One Traditional Cultural Property (TCP) was located that may qualify for protection under the *American Indian Religious Freedom Act of 1978* (42 USC 1996). 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, as the TCP will be avoided. This determination was communicated to the THPO on December 12, 2008 (see Part 4). No response was received from the THPO within the allotted 30-day comment period.

3.9 Socioeconomics

Socioeconomic conditions include population, demographics, income, employment, and housing. These conditions can be analyzed and compared at various scales. This analysis focuses on the reservation, the four counties that overlap most of the Reservation and the state of North Dakota. The state population showed little change between the last two censuses (1990–2000), but there were notable changes locally, as shown in Table 3.9a. Populations in Dunn, McKenzie, McLean, and Mountrail counties declined 5 to 11%, while population on the Fort Berthold Reservation increased by almost 10%. These trends are expected to continue (Rathge *et al.* 2002). While American Indians are the predominant group on the reservation, they are a minority everywhere else in the state. More than two-thirds (3,986) of the Reservation population are tribal members.

Table 3.9a: Population and Demographics

| County or Reservation | Population in 2000 | % of State Population | % Change 1990-2000 | Predominant Group | Predominant Minority |
|---------------------------|--------------------|-----------------------|--------------------|-------------------|-----------------------|
| Dunn County | 3,600 | 0.56% | - 10.1% | White | American Indian (12%) |
| McKenzie County | 5,737 | 0.89% | - 10.1% | White | American Indian (21%) |
| McLean County | 9,311 | 1.45% | - 11.0% | White | American Indian (6%) |
| Mountrail County | 6,631 | 1.03% | - 5.6% | White | American Indian (30%) |
| Fort Berthold Reservation | 5,915 | 0.92% | + 9.8% | American Indian | White (27%) |
| Statewide | 642,200 | 100% | + 0.005% | White | American Indian (5%) |

Source: U.S. Census Bureau 2007.

In addition to the ranching and farming that are employment mainstays in western North Dakota, employment on the reservation largely consists of ranching, farming, tribal government, tribal enterprises, schools, and federal agencies. The MHA Nation’s Four Bears Casino and Lodge, near New Town, employs over 320 people, 90% of whom are tribal members (Three Affiliated Tribes 2008).

As shown in Table 3.9b, counties overlapping the Reservation tend to have per capita incomes, median household incomes, and employment rates that are lower than North Dakota statewide averages. Reservation residents have lower average incomes and higher unemployment rates compared to the encompassing counties. MHA Nation members are in turn disadvantaged relative to overall Reservation incomes and unemployment rates that average in non-Indian data. The most recent census found that per capita income for residents of the Reservation is \$10,291 (less than 1/3 the state average). Overcrowded housing skews the median reservation household income upward to \$26,274 (about 1/3 the state average). A BIA report in 2003 found that 33% of employed MHA Nation members were living below federal poverty levels. The unemployment rate for tribal members is 22 %, compared to 11.1% for the reservation as a whole and 4.6% statewide.

Table 3.9b: Income and Unemployment

| Unit of Analysis | Per Capita Income | Median Household Income | Unemployment Rate (2007) | Employed but Below Poverty Level | Percent of All People in Poverty |
|---------------------------|-------------------|-------------------------|--------------------------|----------------------------------|----------------------------------|
| MHA Nation members | -- | -- | 22 % | 33 % | Unknown |
| Fort Berthold Reservation | \$ 10,291 | \$ 26,274 | 11.1 % | -- | Unknown |
| Mountrail County | \$ 29,071 | \$ 34,541 | 5.8 % | -- | 15.4% |
| Dunn County | \$ 27,528 | \$ 35,107 | 3.4 % | -- | 13% |
| McKenzie County | \$ 27,477 | \$ 35,348 | 3.1 % | -- | 15.8 % |
| McLean County | \$ 32,387 | \$ 37,652 | 4.7 % | -- | 12.8% |
| North Dakota | \$ 31,871 | \$ 40,818 | 3.2 % | -- | 11.2 % |

Source: U.S. Department of Agriculture Economic Research Data 2008 and BIA 2003.

Availability and affordability of housing could impact oil and gas development and operations. Housing information is summarized in Table 3.9c. The tribal 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. 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.

Table 3.9c: Housing Units – 2000 (U.S. Census Bureau 2007 and 2008).

| Housing Development | Fort Berthold Reservation | Dunn County | McKenzie County | McLean County | Mountrail County |
|--|---------------------------|-------------|-----------------|---------------|------------------|
| Existing Housing | | | | | |
| Owner-Occupied Units | 1,122 | 1,570 | 2,009 | 4,332 | 2,495 |
| Renter-Occupied Units | 786 | 395 | 710 | 932 | 941 |
| Total | 1,908 | 1,965 | 2,719 | 5,264 | 3,436 |
| New Private Housing Building Permits 2000-2005 | -- | 18 | 4 | 135 | 113 |
| Housing Development Statistics | | | | | |
| State rank in housing starts | -- | 51 of 53 | 15 of 53 | 21 of 53 | 17 of 53 |
| National rank in housing starts | -- | 3112 / 3141 | 2498 / 3141 | 2691 / 3141 | 2559 / 3141 |

The proposed project is not expected to have measurable impacts on population trends, local unemployment rates or housing starts. Relatively high-paying construction jobs would result from exploration and development of oil and gas reserves on the reservation, but most of these opportunities are expected to be short-term. The proposed action would require temporary employees during the well construction cycle and one to two full-time employees for the long-term production cycle. Short-term construction employment would provide some economic benefit. Long-term commercial operations would provide significant royalty income and indirect economic benefits.

3.10 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, was signed by President Clinton in 1994. The Order requires agencies to 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 U.S. Environmental Protection Agency (EPA) headed the interagency workgroup established by the 1994 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 Order.

Environmental Justice is an evolving concept with potential for disagreement over the scope of analysis and the implications for federal responsiveness. It is nevertheless clear that tribal members on the Great Plains qualify for EJ consideration as both a minority and low-income population. The population of the Dakotas is predominantly Caucasian. While some 70% of Reservation residents are tribal members, Indians comprise only 5% of North Dakota residents and 12% of the population of Dunn County. Even in a state with relatively low per capita and household income, Indian individuals and households are distinctly disadvantaged.

There are, however, some unusual EJ considerations when proposed federal actions are meant to benefit tribal members. Determination of fair treatment necessarily considers the distribution of both benefits and negative

impacts, due to variation in the interests of various tribal groups and individuals. There is also potential for major differences in impacts to resident tribal members and those enrolled or living elsewhere. A general benefit to MHA Nation government and infrastructure has already resulted from tribal leasing, fees and taxes. Oil and gas leasing has also already brought much-needed income to MHA Nation members who hold mineral interests, some of whom might eventually benefit further from royalties on commercial production. Profitable production rates at proposed locations might lead to exploration and development on additional tracts owned by currently non-benefitting allottees. The absence of lease and royalty income does not, moreover, preclude other benefits. Exploration and development would provide many relatively high-paying jobs, with oversight from the Tribal Employment Rights Office.

The owners of allotted surface within the project areas may not 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 compensatory for productive acreage lost to road and well pad construction. Tribal members without either surface or mineral rights would not receive any direct benefits whatsoever. Indirect benefits of employment and general tribal gains would be the only potential offsets to negative impacts.

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 significantly reduced following the survey of the proposed well location and access road route and the determination by the BIA that there will be no historic properties affected. Potential for disproportionate impacts is further mitigated by requirements for immediate work stoppage following an unexpected discovery of cultural resources of any type. Mandatory consultations will 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 significant impacts to any other critical element—air, public health and safety, water, wetlands, wildlife, soils or vegetation—within the human environment. Avoiding or minimizing such impacts also makes unlikely disproportionate impacts to low-income or minority populations. The proposed action offers many positive consequences for tribal members, while recognizing Environmental Justice 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.

3.11 Mitigation and Monitoring

Many protective measures and procedures are described in this document and in the APD. No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required. Monitoring of cultural resource impacts by qualified personnel is recommended during all ground-disturbing activities.

3.12 Irreversible and Irrecoverable 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 acreage devoted to disposal of drill cuttings, soil lost through wind and water erosion, cultural resources inadvertently destroyed, wildlife killed during earthmoving or in collisions with vehicles, and energy expended during construction and operation.

3.13 Short-Term Use Versus Long-Term Productivity

Short-term activities would not detract significantly from long-term productivity of the project area. The small areas dedicated to the access road and well pad would be unavailable for livestock grazing, wildlife habitat and other uses. Allottees with surface rights would be compensated for loss of productive acreage and project footprints would shrink considerably once wells were drilled and non-working areas were reclaimed and

reseeded. Successful and ongoing reclamation of the landscape would quickly support wildlife and livestock grazing, stabilize the soil, and reduce the potential for erosion and sedimentation. The major long-term resource loss corresponds with the project purpose: extraction of hydrocarbons from the Bakken Formation.

3.14 Cumulative Impacts

Environmental impacts may accumulate either over time or in combination with similar activities in the area. Unrelated activities may also have negative impacts on critical elements, thereby contributing to cumulative degradation of the environment. Past and current disturbances in the vicinity of the proposed project include farming, grazing, roads, and other oil/gas wells. Current land uses are expected to continue with little change, since undivided interests in the land surface are often held by different tribal members than those holding mineral rights. Virtually all available acreage is already organized into agricultural leases or range units to utilize surface resources for economic benefit; oil and gas development is not expected to have more than a minor effect on surface use patterns.

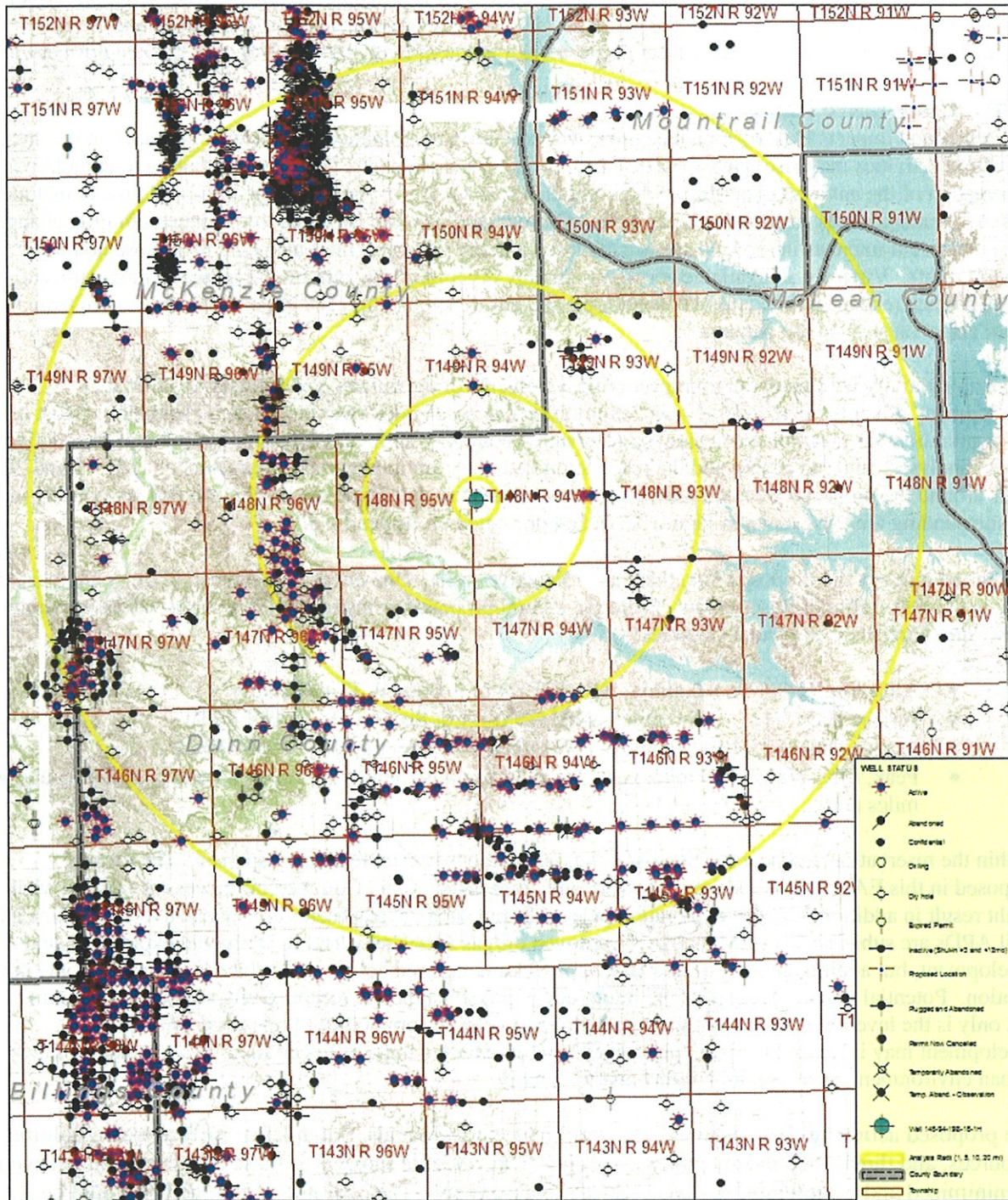
The major activity with potential to impact critical elements of the human environment is oil field development. Over the past several years, exploration has accelerated over the Bakken Formation. Most of this exploration has taken place outside the reservation boundary on fee land, but for purposes of cumulative impact analyses, land ownership and the reservation boundary are immaterial. Perimeters of 1, 5, 10, and 20 miles around the proposed well site were therefore evaluated to determine the level of oil and gas activity in the surrounding area, as shown in Figure 3.14a and presented on Appendix A.

Within ten miles of the proposed *Site*, there are 156 active wells. One hundred seventeen of these are located outside the Fort Berthold Reservation. There are several proposed or installed oil/gas wells within proximity of the *Site* (McKenzie and Dunn Counties):

- Alisa Fox 16-9H - 8.0 miles - SE1/4SE1/4 of Section 9, T149N R93W
- Nathan Hale 3-18 - 7.0 miles - NE1/4NW1/4 of Section 18, T149N R93W
- Nathan Hale 4-25H - 11.0 miles - NW1/4NW1/4 of Section 25, T150N R94W
- Peak, LLC Wells – 3.0 miles east, 3.0 miles north, 9.0 miles northeast, 8.0 miles southeast and 9.0 miles north.

Within the reservation and near the proposed site, installations remain few and dispersed. The project proposed in this EA would not share roads with any other installation. Commercial success at any new well might result in additional oil/gas exploration proposals, but such developments are speculative at this time and until APDs are submitted to BLM or BIA. Approved oil/gas leases may lead to additional exploration and development, but additional analysis and BIA approval are required before the surface is disturbed at any other location. Potential impacts from possible future development cannot be meaningfully analyzed at this time. Not only is the level of development highly sensitive to volatile commodities prices, but additional development may increase interest in pipelines, thereby *reducing* impacts to certain critical elements of the human environment, such as public safety and air quality.

The proposed action has been planned to avoid impacts to wetlands, floodplains, surface water, cultural resources, and threatened and endangered species. Unavoidable impacts to these or other resources would be minimized and/or mitigated as described in this document. The operator of any facility would be required to complete interim reclamation of the road and well pad immediately following construction and completion. Implementation of other precautionary and protective measures detailed in this EA, the APD, and applicable regulations are expected to minimize impacts to all critical elements of the human environment. Impacts from the proposed project are expected to generally be minor, temporary, manageable, and/or insignificant. No cumulative impacts are reasonably foreseen from existing and proposed activities, other than increasingly positive impacts to the reservation economy.



Cumulative Impacts Analysis
 Petro-Hunt, L.L.C. - Fort Berthold 148-94-19B-18-1H
 NE1/4 NW1/4, Section 19, T148N, R94W
 Dunn County, ND

0 2.5 5 Miles

WPC Project 103-15-JS
 Source: USGS Topo Map,
 NDOGC Data



Figure 3.14a:

4. Consultation and Coordination

The Bureau of Indian Affairs has completed many Environmental Assessments (EAs) for oil and gas projects at Fort Berthold since 2007. For the first 18 of these projects, prior notice was sent to about 60 tribes, government agencies, non-profit organizations and individuals. BIA consulted directly and repeatedly with the U.S. Fish and Wildlife Service to identify issues and incorporate best management practices for wildlife protection. BIA also routinely cooperated on every project with the Bureau of Land Management regarding operational standards and reclamation procedures.

Responses to previous notifications quickly became repetitious, usually consisting of form letters advising BIA that the respondent had no concerns or that the same general concerns applied to every project proposal. BIA has therefore discontinued mailing of individual notices for Fort Berthold oil and gas environmental review, except where proposals include unusual components not previously considered with other interested parties. There are no such components to the proposal analyzed in this EA. BIA is satisfied that the proper scope of analysis for such projects is known.

This justified simplification of NEPA procedures does not impact in any way BIA practices regarding cultural resource regulations and standard practices under the Natural Historic Preservation Act of 1966. Correspondence with the Tribal Historic Preservation Officer is reproduced below.

September 2009.



United States Department of the Interior

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



IN REPLY REFER TO:
DESCRM
MC-208

DEC 12 2008

Perry 'No Tears' Brady, THPO
Mandan, Hidatsa and Arikara Nation
PO Box 429
Parshall, North Dakota 58770

Dear Mr. Brady:

We have considered the potential effects on cultural resources of two oil well pads and access roads in McLean County, North Dakota. Approximately 27 acres were intensively inventoried using a pedestrian methodology. Potential surface disturbances are not expected to exceed the areas depicted in the enclosed reports. No historic properties were located that 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. Two Traditional Cultural Properties (TCPs) were located that may qualify for protection under the American Indian Religious Freedom Act (16 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 these undertakings, as the TCPs will be avoided. Catalogued as **BIA Case Number AAO-1598/FB/09**, the proposed undertakings, locations, and project dimensions are described in the following reports:

- Burns, Christina
- (2008) Berthold Location 1, 148.94.19 Well Pad: A Class III Cultural Resource Inventory, Dunn County, ND. Beaver Creek Archaeology, Inc. for Petro Hunt, LLC, Bismarck.
- (2008) Berthold Location 3, 148.94.17 Well Pad: A Class III Cultural Resource Inventory, Dunn County, ND. Beaver Creek Archaeology, Inc. 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, Archeologist, at (605) 226-7656.

Sincerely,

(sgd) Weldon Loudermilk

ACTING Regional Director

Enclosures

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

| | |
|------------------|----------|
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Acronyms

| | | | |
|-------------------|---|--------------|--------------------------------------|
| AAQM | Ambient Air Quality Monitoring (site) | TCP | Traditional Cultural Property |
| AIRFA Act | American Indian Religious Freedom Act | TERO | Tribal Employment Rights Office |
| APD | Application for Permit to Drill | THPO | Tribal Historic Preservation Officer |
| APE | Area of Potential Affect | TVD | Total Vertical Depth |
| BIA | Bureau of Indian Affairs | USC | United States Code |
| BLM | Bureau of Land Management | USFS | U.S. Forest Service |
| CFR | Code of Federal Regulations | USFWS | U.S. Fish and Wildlife Service |
| EA | Environmental Assessment | USGS | U.S. Geological Survey |
| EIS | Environmental Impact Statement | | |
| EPA | Environmental Protection Agency | | |
| FONSI | Finding of No Significant Impact | | |
| GPRO | Great Plains Regional Office | | |
| MHA Nation | Three Affiliated Tribes of the Mandan, Hidatsa and Arikira 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 | | |
| NDNH | North Dakota Natural Heritage | | |
| ND SWC | North Dakota State Water Commission | | |
| NEPA | National Environmental Policy Act | | |
| NHPA | National Historic Preservation Act | | |
| NPAL | Northern Plains Agroecosystems Laboratory | | |
| NRCS | Natural Resources Conservation Service | | |
| NRHP | National Register of Historic Places | | |
| NTL | Notice to Lessees | | |
| SHPO | State Historic Preservation Officer | | |

Appendix

Appendix A

Wells within 1, 5, 10, and 20 miles of Proposed Fort Berthold 148-94-19B-18-1H, Petro-Hunt L.L.C., Dunn County, ND

Source: ND Oil & Gas Industrial Commission, Data updated 06-01-2009

Wells within 1 mi radius (1)

Table with columns: FILE NO, API NO, OPERATOR, TD, SPUD DATE, FIELD NAME, QQ, SEC TWP, RNG, FEET, NS, FNSL, FEET, EW, FWL, LATITUDE, LONGITUDE, WELL TYPE, STATUS, SYMBOL. Contains 11 rows of well data.

Wells within 5 mi radius (9)

Table with columns: FILE NO, API NO, OPERATOR, TD, SPUD DATE, FIELD NAME, QQ, SEC TWP, RNG, FEET, NS, FNSL, FEET, EW, FWL, LATITUDE, LONGITUDE, WELL TYPE, STATUS, SYMBOL. Contains 11 rows of well data.

Wells within 10 mi radius (148)

Large table with columns: FILE NO, API NO, OPERATOR, TD, SPUD DATE, FIELD NAME, QQ, SEC TWP, RNG, FEET, NS, FNSL, FEET, EW, FWL, LATITUDE, LONGITUDE, WELL TYPE, STATUS, SYMBOL. Contains 148 rows of well data.

Table with 15 columns: FILE NO, API NO, OPERATOR, WELL NAME, TD, SPUD DATE, FIELD NAME, QO, SEC TWP, R3, R4, FEET, NS, FNSL, FEET, EW, FEWL, LATITUDE, LONGITUDE, WELL TYPE, STATUS, SYMBOL. The table contains a large volume of data rows for various well locations.

Table with columns: FILE NO, API NO, OPERATOR, WELL NAME, TD, SPD DATE, FIELD NAME, QO, SEC TWP, RNG, FEET NS, FNSL, FEET EW, FEWL, LATITUDE, LONGITUDE, WELL TYPE, STATUS, SYMBOL. The table contains a large volume of well data entries.

| FILE NO | API NO | OPERATOR | WELL NAME | TD | SPUD DATE | FIELD NAME | QQ | SEC TWP | RNG | FEET NS | FNSL | FEET EW | F2W | LATITUDE | LONGITUDE | WELL TYPE | STATUS | SYMBOL |
|---------|--------------------|---------------------------|---------------------------|-------|-----------|-------------------|------|---------|-----|---------|--------|---------|-----|-----------|-------------|--------------|--------|--------------|
| 18704 | 33-053-00915-00-00 | HESS CORPORATION | BE STATE A-151-45-16 94-1 | 0 | | BLUE BUTTES | SWNW | 16 | 151 | 98 | 1420 N | 536 W | | 47 501538 | -102.853533 | Confidential | DRY | Confidential |
| 3058 | 33-053-00911-00-00 | HUMBLE OIL & REFINING CO. | LEACH GOVERNMENT 1 | 975 | 1/19/1961 | 0.001 WILDCAT | NNNW | 13 | 151 | 98 | 916 N | 860 W | | 47 50423 | -102.852207 | OG | DRY | OG |
| 1558 | 33-053-00261-00-00 | HESS CORPORATION | BLUE BUTTES MADISON UNIT | 942 | 4/27/1958 | 0.001 BLUE BUTTES | NNNE | 16 | 151 | 98 | 860 N | 2005 E | | 47 503493 | -102.844593 | OG | DRY | OG |
| 3972 | 33-053-00261-00-00 | HESS CORPORATION | BLUE BUTTES MADISON UNIT | 547 | 1/17/1959 | 0.001 BLUE BUTTES | NNNE | 16 | 151 | 98 | 860 N | 2005 E | | 47 507701 | -102.834524 | OG | DRY | OG |
| 567 | 33-053-00941-00-00 | VALVERT & BRIGGS | BLUE BUTTES MADISON UNIT | 1140 | 9/29/1955 | 0.001 WILDCAT | SENE | 9 | 151 | 94 | 2101 N | 748 E | | 47 91412 | -102.689533 | OG | DRY | PNC |
| 567 | 33-053-00941-00-00 | VALVERT & BRIGGS | KENNETH DRAGS WOLF 1 | 1140 | 9/29/1955 | 0.001 WILDCAT | SENE | 10 | 151 | 94 | 2101 N | 748 E | | 47 91412 | -102.689533 | OG | DRY | PNC |
| 4694 | 33-053-00959-00-00 | GULLEND INC. | DRAGS WOLF 1 | 12209 | 12/6/1988 | 0.001 WILDCAT | NNNW | 10 | 151 | 94 | 500 N | 660 W | | 47 918509 | -102.709977 | OG | DRY | DRY |