



# United States Department of the Interior

BUREAU OF INDIAN AFFAIRS  
Great Plains Regional Office  
115 Fourth Avenue S.E., Suite 400  
Aberdeen, South Dakota 57401



IN REPLY REFER TO:  
DESCRM  
MC-208

APR 10 2012

## MEMORANDUM

TO: Superintendent, Fort Berthold Agency

FROM: <sup>Acting</sup> Regional Director, Great Plains Region

SUBJECT: Environmental Assessment and Finding of No Significant Impact

In compliance with the regulations of the National Environmental Policy Act (NEPA) of 1969, as amended, an Environmental Assessment (EA) has been completed and a Finding of No Significant Impact (FONSI) has been issued. The EA authorizes land use for seven wells on the Martin Fox #20-17H oil and gas well pad on the Fort Berthold Indian Reservation.

All the necessary requirements of the National Environmental Policy Act have been completed. Attached for your files is a copy of the EA, FONSI and Notice of Availability. The Council on Environmental Quality (CEQ) regulations require that there be a public notice of availability of the (40 C.F.R. Section 1506.6(b)). Please post the attached notice of availability at the Agency and Tribal buildings for 30 days.

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

### Attachment

cc: Tex Hall, Chairman, Three Affiliated Tribes (with attachment)  
Elgin Crows Breast, Tribal Historic Preservation Officer (with attachment)  
Derek Enderud, BLM, Bureau of Land Management (with attachment)  
Michael Madson, SWCA (with attachment)  
Eric Wortman, EPA, (with attachment)  
Jonathon Shelman, Corps of Engineers  
Jeff Hunt, Fort Berthold Agency



## Finding of No Significant Impact

### WPX Energy Williston, LLC

#### Seven Potential Wells on the Martin Fox #20-17H Bakken/Three Forks Developmental Oil and Gas Well Pad; HA, HB, HC, HD, HW, HX, HZ

Fort Berthold Indian Reservation  
Dunn County, North Dakota

The U.S. Bureau of Indian Affairs (BIA) has received a proposal to drill seven oil and gas wells located atop the Martin Fox #20-17H oil and gas well pad located in the S½S½ Section 20, T149N, R93W, Dunn County, North Dakota on the Fort Berthold Reservation. Associated federal actions by BIA include determinations of effect regarding environmental resources and positive recommendations to the Bureau of Land Management regarding the Applications for Permit to Drill.

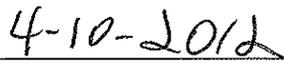
The potential of the proposed action to impact the human environment is analyzed in the following Environmental Assessment (EA), as required by the National Environmental Policy Act. Based on the EA, I have determined that the proposed project will not significantly affect the quality of the human or natural 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 solicited for the preceding NEPA document was sufficient to ascertain potential environmental concerns associated with the currently proposed project.
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 alternatives.
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. This guidance includes the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) (MBTA), the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.) (NEPA), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250) (BGEPA), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", and the Endangered Species Act (16 U.S.C. 1531 et seq.) (ESA).
4. The proposed action is designed to avoid adverse effects to historic, archaeological, cultural and traditional properties, sites and practices. Compliance with the procedures of the National Historic Preservation Act is complete.
5. Environmental justice was fully considered.
6. Cumulative effects to the environment are either mitigated or minimal.
7. No regulatory requirements have been waived or require compensatory mitigation measures.
8. The proposed project will improve the socio-economic condition of the affected Indian community.

Acting

  
Regional Director

  
Date

# **ENVIRONMENTAL ASSESSMENT**

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

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

**Cooperating Agency:**

**Bureau of Land Management**

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



**WPX Energy Williston, LLC**

**Seven Potential Wells on the Martin Fox #20-17H Bakken/Three Forks Developmental  
Oil and Gas Well Pad; HA, HB, HC, HD, HW, HX, HZ**

**Fort Berthold Indian Reservation**

**April 2012**

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

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- B Species Accounts and Affects Determinations
- C Consultation Reply from MHA THPO
- D U.S. Fish and Wildlife Service Informal Section 7 Consultation and Concurrence Letters
- E General Scoping Letter

## **1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION**

This environmental assessment (EA) addresses the potential impacts associated with the construction, and possible long term operation of, facilities and locations discussed in the Proposed Action by WPX Energy Williston, LLC (WPX); the drilling of seven oil and gas wells on one well pad and the installation of an access road and utility corridor consisting of oil, gas, and produced water gathering pipelines, electric and fiber optic lines, and temporary aboveground fresh water lines that will be used in the hydraulic fracturing process.

The BIA's general mission is to represent the interests, including the trust resources, of members of the Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara (MHA) Nation, as well as those of individual tribal members. All members of the MHA Nation, including individual allotment owners, could benefit substantially from the development of oil and gas exploration on the Reservation.

Developments have been proposed on lands held in trust by the United States on the Fort Berthold Indian Reservation (the Reservation) in Dunn County, North Dakota (ND), in locations that target specific areas in the Bakken/Three Forks Formation, a known oil reserve. The Bureau of Indian Affairs (BIA) is the surface management agency for potentially affected tribal lands and individual allotments, in addition to managing lands held in title by the tribe and tribal members with subsurface mineral rights. The following assessment is based on the need for analysis of any proposed endeavor under BIA jurisdiction.

WPX will comply with all applicable federal, state, and tribal laws, rules, policies, regulations, and agreements. WPX also agrees to follow all best management practices (BMPs) and monitoring mitigations listed in this document. No disturbance of any kind would begin until all required clearances, consultations, determinations, easements, leases, permits, and surveys are in place.

## **2.0 FEDERAL AND OTHER RELEVANT REGULATIONS AND AUTHORITIES**

Oil and gas exploration and subsequent development are under the authority of the Energy Policy Act of 2005 (42 United States Code [USC] 15801, et seq.), the Federal Onshore Oil and Gas Royalty Management Act of 1982 (30 USC 1701, et seq.), the Indian Mineral Development Act of 1982 (25 USC 2101, et seq.), and the Indian Mineral Leasing Act of 1938 (25 USC 396a, et seq.). The BIA's role in the Proposed Action includes approving easements, leases, and ROWs; determining effects on cultural resources; and making recommendations to the Bureau of Land Management (BLM).

Compliance with NEPA, the Council on Environmental Quality (CEQ) regulations (Title 40 Code of Federal Regulations [CFR] 1500–1508), 43 CFR 3100, and Onshore Oil and Gas Order Nos. 1, 2, 6, and 7 is required due to the project's location on federal lands. The BLM is responsible for the final approval of all APDs after receiving recommendations for approval from the BIA. The BLM is also tasked with on-site monitoring of construction and production activities as well as resolution of any dispute that may arise as a result of any of the aforementioned actions. Informal Section 7 consultation and compliance with Section 106 regulations are adhered to in addition to other regulatory agencies on an as needed basis.

The procedures and technical practices described in the EA describe potential impacts to the project area and analyze potential impacts to elements in the natural and human environment for both the No Action Alternative (described in Section 3.1) and the Proposed Action. Impacts may be beneficial or detrimental, direct or indirect, and short-term or long-term. This EA also analyzes the potential for cumulative impacts and ultimately makes a determination as to the significance of any impacts.

In the absence of significant negative consequences, this EA would result in a Finding of No Significant Impact. Should significant adverse impacts be identified as a result of the direct, indirect, or cumulative effects of the Proposed Action, then NEPA requires the preparation of an environmental impact statement. It should be noted that a significant benefit from the project does not necessarily require preparation of an environmental impact statement. Commercial viability of the proposed wells could result in additional exploration in the area, and any future oil/gas exploration activities and associated federal actions that are proposed wholly or partly on trust land would require additional NEPA analysis and BIA consideration prior to implementation and/or production activities.

### **3.0 PROPOSED ACTION AND THE NO ACTION ALTERNATIVE**

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

#### **3.1 THE NO ACTION ALTERNATIVE**

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

#### **3.2 THE PROPOSED ACTION**

In addition to the No Action Alternative, this document analyzes the potential impacts of one new developmental oil and gas well pad and the associated infrastructure, including a potential of seven wells, located in the west-central portion of the Reservation in Dunn County, North Dakota (Figure 3-1). The proposed wells would attempt to develop the commercial potential of the Bakken/Three Forks Formation in this vicinity. Well surface hole locations, shown in Figure 3-2, were chosen by WPX in consultation with tribal and BIA resource managers to provide development resources for the Bakken/Three Forks Formation. Bottom hole locations are under the jurisdiction of the NDIC and BLM.

WPX has acquired the leases and is proposing to drill a potential of seven oil wells on the proposed Martin Fox #20-17H well pad (well pad) within the boundary of the Fort Berthold Indian Reservation (the Reservation) to develop the commercial potential of natural resources. The proposed well pad described below, and illustrated in Figures 3-1 and 3-2, would be located within the Reservation.

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

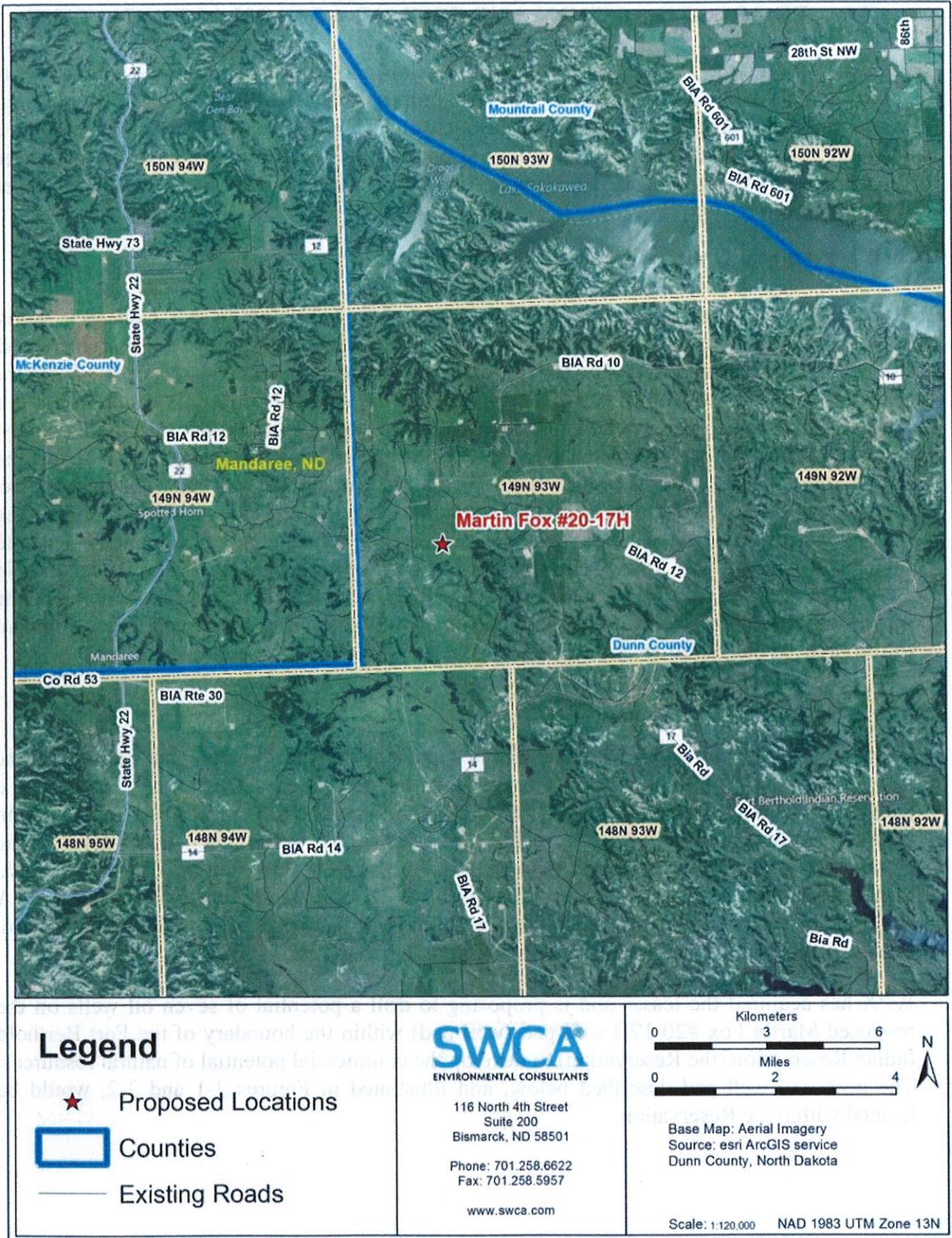


Figure 3-1. Proposed Action project area overview map.

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

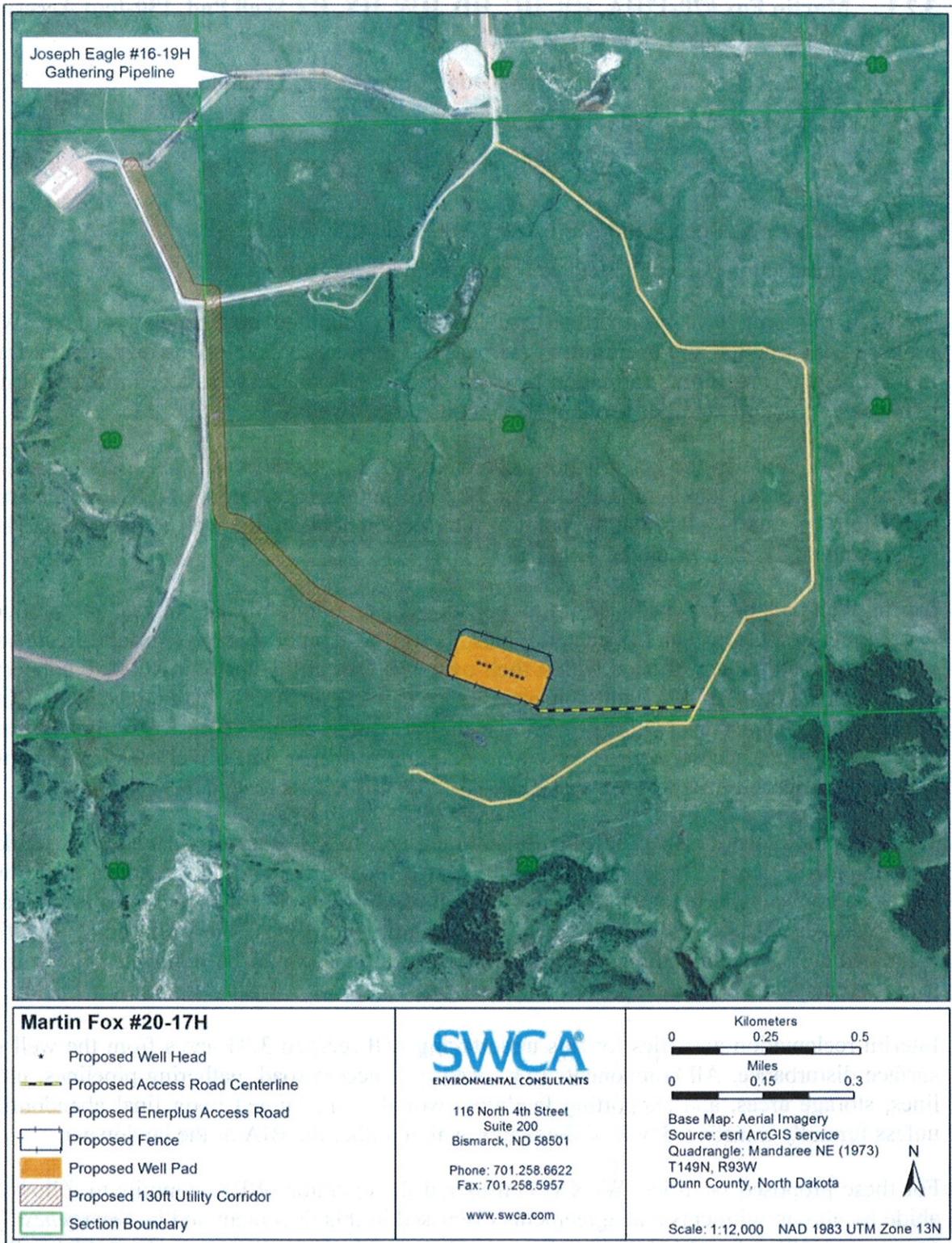


Figure 3-2. Proposed Martin Fox #20-17H well pad, access road, and utility corridor location.

### **3.2.1 Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Well Pad, 130-foot Access Road, and 130-foot Utility Corridor**

- S½ S½ Section 20, T149N, R93W, Dunn County, North Dakota
- Fenced Area: Well Pad (8.79 acres)
- Surface Disturbance: Well Pad (7.29 acres); Access Road (4.41 acres); Utility Corridor (17.25 acres)
- Post-Interim Reclamation Pad Area: Well Pad (4.24 acres)
- Construction Schematics (Plats) can be found in Appendix A

Wells in this unit have been drilled and have been found to be financially viable. WPX proposes construction and operation of the well pad in order to develop the oil potential found in the Bakken/Three Forks formation by exploration wells and serve as a centralized location to house production facilities servicing seven oil and gas wells.

Appendix A contains the construction schematics for the specific well pads. As shown, the fenced area would include topsoil piles, soil berms, pump jacks, tanks, and heater treaters. A cattle guard would be placed at the point of intersection between the well pad and access road and any needed CMPs would be installed.

During well pad, access road, and utility corridor construction, oil, natural gas, and produced water pipelines, electric and fiber optic lines, as well as temporary above ground fresh water pipelines, would be constructed within their own 130-foot utility corridor ROW to connect to the Joseph Eagle #16-19H gathering pipeline system via an Arrow maintained PGL ROW. Arrow would be responsible for providing a similar plan to address their ROW. In addition, a separate 130-foot access road ROW would be purchased that will travel east from the well pad to the proposed Enerplus Morgan #149-93-29B-32H access road.

WPX proposes location-specific containment measures to safeguard against a highly unlikely unanticipated release. These include installing two foot berms around the edges of the well pad, locating secondary containment in the form of topsoil and spoils stockpiles in drainages to prevent any offsite movement events, and rounding corners of the well pad. In addition, contained storm water, sediments and errant hydrocarbons would be removed via a vacuum truck and disposed of at an approved facility.

Interim reclamation activities for this undertaking will reclaim 3.94 acres from the well pad surface disturbance. All components (e.g., well pad, access road, gathering pipelines, utility lines, storage areas, and supporting facilities) would be reclaimed upon final abandonment unless formally transferred, with federal approval, to either the BIA or the landowner.

For these proposed facilities, WPX is considered the operator. WPX commits to follow and abide by all commitments and agreements discussed in this document and in *Emergency Spill Contingency Plan for Oil Gathering Systems Operated by WPX Energy in the Williston Basin of North Dakota* (WPX Energy Williston, LLC 2012).

### **3.2.2 Well Pad and Infrastructure Locations**

Well pad, access road, and utility corridor locations, shown in Figure 3-2, were developed in consultation with tribal and BIA resource managers during a pre-clearance process that included surveys for cultural, archaeological, and natural (i.e., biological and physical) resources.

Interdisciplinary on-site meetings were conducted on November 10, 2011, to review the proposed locations with regard to topography, potential drainage issues, and erosion control measures. Surveys were conducted by SWCA prior to that time to determine potential impacts to both natural and cultural resources. The on-site meetings were attended by the surveyors, SWCA natural and cultural resource specialists, WPX representatives, a BIA representative, and a Tribal Historic Preservation Office (THPO) monitor.

### **3.2.3 Well Pad**

The proposed well pad would include a leveled area (pad) that would be used for the drilling rig and equipment. The pad would be stripped of topsoil and vegetation and then graded. The topsoil would be stockpiled and stabilized with native grasses until it could be used to reclaim and revegetate the disturbed area. The sub-soils would be used in the construction of the pad and the finished pad would be graded to ensure that water drains away from the pad. WPX would surround the well pad with a containment berm designed to hold 110% of the largest tank plus one full day's daily production volume to prevent hazardous runoff or spills. Additional BMPs for erosion control would be implemented and could include surface drainage controls, soil surface protection methodologies, and sediment capture features (refer to Section 4.12). The well pad would be surrounded by a fence to keep livestock offsite as well as any unauthorized people from becoming injured by wandering onsite. At the point where the access road and fence meet, a cattle guard would be installed. The well pad would use a closed-loop system, in which cuttings and fluid would be hauled off site and disposed of at an approved facility. A cuttings pit would only be constructed in the event of an accident during drilling in which cleanup crews could not reach the location for an extended time. The pit would be used to hold the waste until cleanup could be completed so as not to impede drilling operations, and would then be reclaimed; any fluids and cuttings would be transported off-site to be disposed of at an approved facility.

### **3.2.4 Access Road and Utility Corridor**

Approximately 1,539.70 feet of new access road would be constructed using a purchased ROW width of 130 feet, to connect the proposed well pad to the proposed Enerplus Morgan 149-93-29B-32H access road. The utility corridor would be approximately 1.10 miles in length, consisting of gathering pipelines, temporary above ground freshwater pipelines, and electric and fiber optic lines, and would be constructed in their own separate 130-foot ROW to connect to the existing Joseph Eagle #16-19H gathering pipeline system. Signed agreements would be in place allowing road and utility construction across affected private and allotted land surfaces, and any applicable approach permits and/or easements would be obtained prior to any construction activity.

Access road construction would follow road design standards outlined in the BLM Gold Book (BLM and U.S. Forest Service [USFS] 2007). At a minimum, 8 inches of topsoil would be removed from the access road corridors. This stockpiled topsoil would then be placed on the outside slopes of the ditches following road construction. The ditches would be reseeded as quickly as possible using a seed mixture determined by the BIA. Care would be taken during road construction to avoid disturbing or disrupting any buried utilities that exist along existing major roads. The access roads would be surfaced with a minimum of 4 inches of aggregate if the site were to be established as a commercial production site. Also, the roadway would remain in use for the life of the wells. Details of road construction are addressed in the APD. A diagram of typical road cross sections is provided in Figure 3-3.

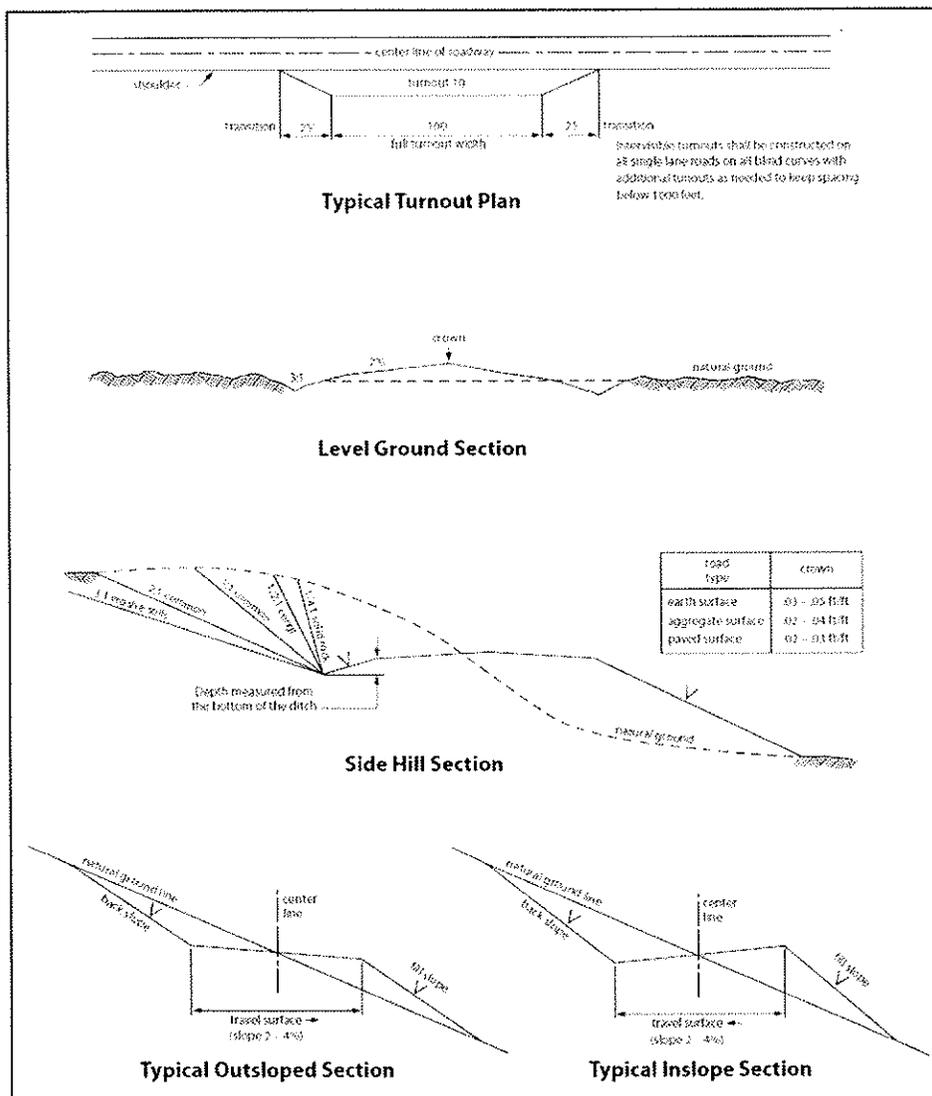


Figure 3-3. Typical road cross sections (BLM and USFS 2007).

### **3.2.5 Gathering Pipelines**

Oil, gas, and water pipelines would be buried in two 2.5-foot-wide trenches, spaced 5.0 feet apart, or one 5.0-foot-wide trench. Oil and gas pipelines would be no greater than 8 inches in diameter and constructed of steel. The water pipeline would also be no greater than 8 inches in diameter and constructed of Fiberspar<sup>®</sup> or similar material. Technical descriptions for the materials, corrosion rates, spill response plans, pipeline marking procedures, quality assurance/control, valve locations, boring locations, and reclamation plans are Arrows' specific procedures for pipeline construction.

The requirements of 49 CFR 192.707 would be adhered to with regard to the marking of buried pipelines. Specifically, pipeline markers would be placed within 1,000 feet of one another, at all public road crossings, railroad crossings, creek crossings, fence crossings, and at all points of major direction change.

Steel pipe would be purchased that is rated as American Petroleum Institute (API) 5L X52 and inspected all pipe while at the mill to ensure quality. An external epoxy coating would be applied to a minimum thickness of 14 millimeters. During construction, all welds are visually inspected for quality and completeness by qualified professionals. Once welds have passed visual inspection, they are subjected to 100 percent non-destructive testing. After passing these tests, the weld areas are covered for corrosion protection. After the weld areas have been covered, the external coating of the pipe is inspected using a jeep meter to detect holes and cracks. The pipe is lowered into the trench and buried. Prior to being put into service, the steel pipe is hydrotested to approximately 1.5 times the minimum design pressure of 1,180 pounds per square inch gauge (psig).

The produced water pipe is designed to sustain a minimum pressure of 750 psig and is hydrotested to approximately 900 psig prior to being approved for service. Two valves would be installed at each end of the proposed pipelines. One valve would be installed at the well location while the second valve would be installed at the proposed tie-in. The installation of two valves would allow the isolation of the proposed gathering pipelines, if required.

Arrow has developed a Spill Response Plan (Plan) (Middick 2011) for the Phase 3 southwest pipeline. The spill preventative measures and monitoring protocols, notification procedures, spill detection and on-scene spill mitigation procedures, response activities, contacts, training and drill procedures, and response plan review and update procedures, as referenced in the plan, apply to the proposed pipelines, so long as Arrow remains the operator. A copy of the plan has been filed with the BIA and Arrow has legally committed to adhering to the procedures and requirements as defined by federal law (Title 49 Code of Federal Regulations [CFR] 194). Arrow, on behalf of WPX, has committed to developing a project specific spill response plan that will be submitted to the BIA prior to the commencement of construction activities.

### **3.2.6 Well Drilling**

The proposed bottom hole targets and drilling paths are summarized below and illustrated in Figure 3-4.

#### **3.2.6.1 Martin Fox #20-17H**

The spacing unit consists of 1,280 acres (+/-) with the following bottom hole and drilling target locations.

- **#20-17HA:** Bottom hole located in the NW¼ NW¼ Section 17, T149N, R93W (Figure 3-4). The drilling target is located approximately 600 feet from the west line and 250 feet from the north line.
- **#20-17HB:** Bottom hole located in the SE¼ SW¼ Section 17, T149N, R93W (Figure 3-4). The drilling target is located approximately 1,900 feet from the west line and 250 feet from the south line.
- **#20-17HC:** Bottom hole located in the NW¼ NE¼ Section 17, T149N, R93W (Figure 3-4). The drilling target is located approximately 2,000 feet from the east line and 250 feet from the north line.
- **#20-17HD:** Bottom hole located in the NE¼ NE¼ Section 17, T149N, R93W (Figure 3-4). The drilling target is located approximately 600 feet from the east line and 250 feet from the north line.
- **#20-17HW:** Bottom hole located in the NW¼ NW¼ Section 17, T149N, R93W (Figure 3-4). The drilling target is located approximately 1,250 feet from the west line and 250 feet from the north line.
- **#20-17HX:** Bottom hole located in the NE¼ NW¼ Section 17, T149N, R93W (Figure 3-4). The drilling target is located approximately 2,550 feet from the west line and 250 feet from the north line.
- **#20-17HZ:** Bottom hole located in the NE¼ NE¼ Section 17, T149N, R93W (Figure 3-4). The drilling target is located approximately 1,250 feet from the east line and 250 feet from the north line.

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

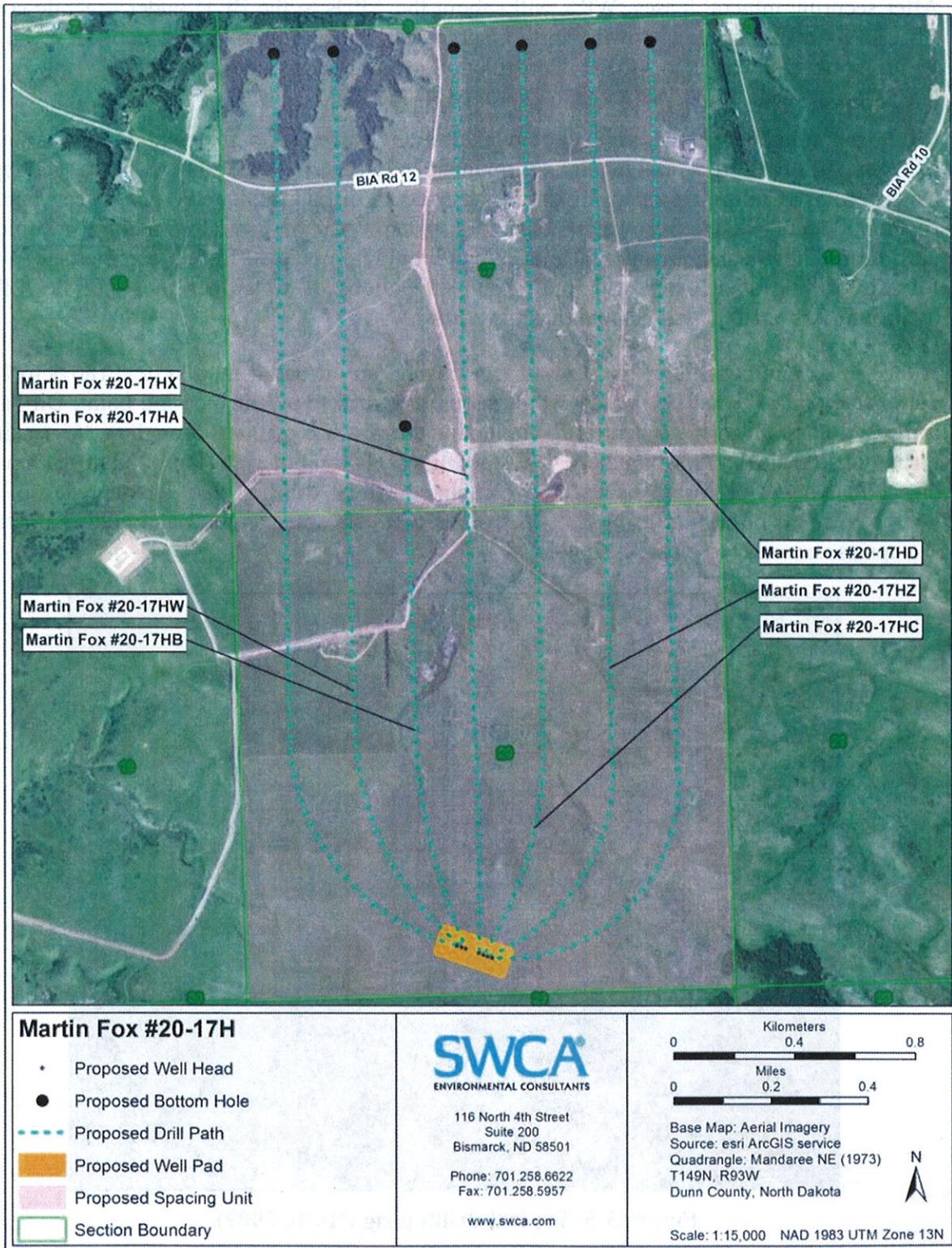
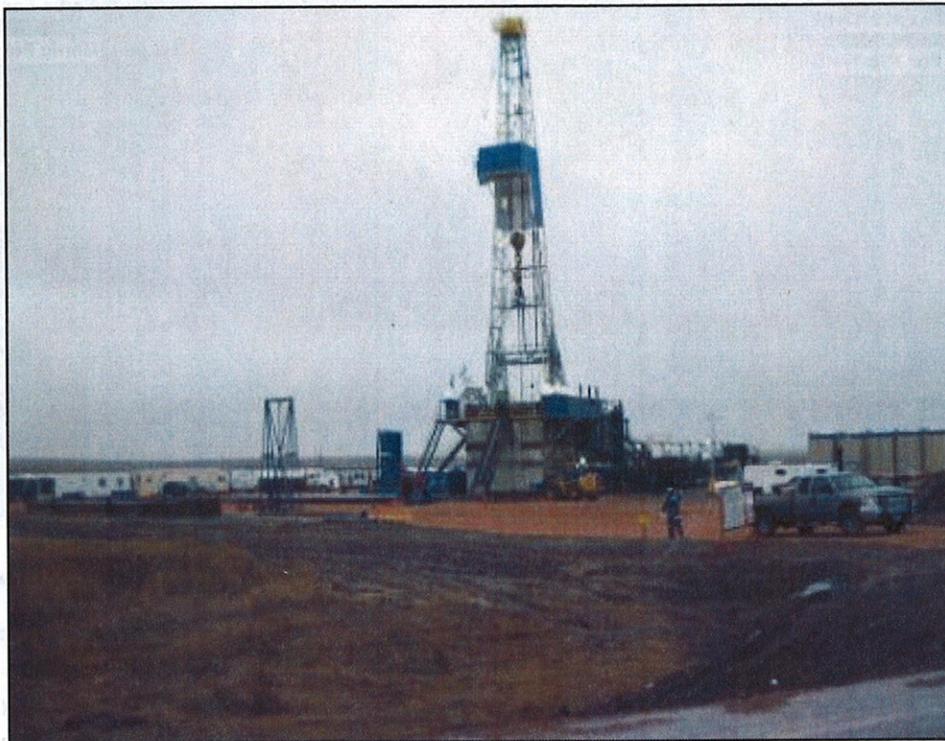


Figure 3-4. Proposed Martin Fox #20-17H infrastructure location and spacing unit boundary.

After securing mineral leases, WPX will submit the APDs to the BLM under separate cover. The BIA's office in New Town, North Dakota, will receive a copy of the APDs from the BLM North Dakota Field Office. Construction would begin when the BIA completes the NEPA process and the APDs are then approved by the BLM.

Rig transport and on-site assembly would take roughly seven days; a typical drill rig is shown in Figure 3-5. Drilling would require approximately 35 days per well to reach the target depth, using a rotary drilling rig rated for drilling to a depth of approximately 15,000 feet. For the first 2,500 feet drilled, a freshwater-based mud system with non-hazardous additives would be used to minimize contaminant concerns. Water would be obtained from a commercial source for this drilling stage, using approximately 8.4 gallons of water per foot of hole drilled (approximately 21,000 gallons total for this portion).

After setting and cementing the near-surface casing, an oil-based mud system (80% to 85% diesel fuel and 15% to 20% water) would be used to drill to a 7-inch casing point. Oil-based drilling fluids reduce the potential for hole sloughing while drilling through water-sensitive formations (shales). Approximately 4,720 additional gallons of water and 18,900 gallons of diesel fuel per well would be used to complete vertical drilling. The lateral reach of the borehole would be drilled using 33,600 gallons of fresh water as mud and adding polymer sweeps as necessary to clean the hole.



**Figure 3-5. Typical drilling rig (Ruffo 2009).**

### **3.2.7 Casing and Cementing**

Surface casing would be set at an approximate depth of 2,500 feet and cemented back to the surface during drilling, isolating all near-surface freshwater aquifers in the project area. The Fox Hills Formation and Pierre Formation would be encountered at depths of approximately 1,700 and 1,800 feet, respectively. Production casing would be cemented from a depth approximately 11,256 feet up to about 4,000 feet in order to isolate the hydrocarbon zone present in the Dakota Formation below a depth of 4,500 feet. Casing and cementing operations would be conducted in full compliance with Onshore Oil and Gas Order No. 2 (43 CFR 3160).

### **3.2.8 Completion and Evaluation**

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

### **3.2.9 Commercial Production**

If drilling, testing, and production support commercial production from the proposed well pad, additional equipment would be installed, including a pumping unit at the well head, a vertical heater/treater, storage tanks (usually 400-barrel steel tanks), and a flare pit (Figure 3-6). An impervious dike sized to hold 110% of the capacity of the largest tank plus one full day’s production would surround the tanks and the heater/treater. Load out lines would be located inside the diked area and a heavy screen-covered drip barrel would be installed under the outlet. A metal access staircase would protect the dike and support flexible hoses used by tanker trucks. For all above-ground facilities not subject to safety requirements, the BIA would choose a paint color, recommended by the BLM or the Rocky Mountain Five-State Interagency Committee, which would blend with the natural color of the landscape.

The duration of production operations cannot be reliably predicted, but some oil wells have been pumping for more than 100 years. The operator estimates that each of the wells would yield approximately 450 barrels of oil per day and 100 barrels per day of water during the first year of production. After the first year, the operator estimates production would decrease to approximately 250 barrels of oil per day and 50 barrels per day of water. Produced water is mostly recovered hydraulic fracturing fluids and is expected to become minimal after two years.



**Figure 3-6. Typical producing oil well pad.**

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

### **3.2.10 Field Camp**

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

### **3.2.11 Reclamation**

#### **3.2.11.1 Interim Reclamation**

Reclamation would continue over the life of the well pad and would include the return of topsoil, and contouring and seeding of native vegetation. Initial reclamation would be required six months after construction, if environmentally feasible, and then following any maintenance work or additions of infrastructure. Reclamation would be required before final abandonment of the decommissioned well pad. A successful reclamation would at all times be the responsibility of the operator.

The portions of the well pad, access road, and utility corridor not used for functionality would be back-filled, assuming frozen or saturated soils are not present. Topsoil piles would be

stored on site during construction. If construction is to occur during winter, WPX would partially use non-frozen back-fill soil to the extent possible and cover the entire ROW with straw. Topsoil would be distributed as soon as practicable after the soil has defrosted. Topsoil piles would be covered to eliminate the potential for rill erosion and subsequent loss of soil during spring snow melt and precipitation events.

Applicable short- and long-term BMPs would be used to minimize and control erosion in disturbed areas. To reduce compaction, the access road and utility corridor ROWs and well pad area would be plowed before the stockpiled topsoil is distributed.

The disturbed areas would be reclaimed and contoured as soon as possible after construction is complete (fall/spring). The access road ROW and disturbed area outside of the working well pad area would be covered with stockpiled topsoil and seeded with a seed mixture determined by the BIA.

A noxious weed survey would be conducted prior to construction covering the well pad and the access road and utility corridor ROW. WPX would control any noxious weeds within the ROW and other applicable facilities by approved chemical or mechanical methods, according to the weed management plan developed by the BIA to treat known or likely to occur noxious weed species. If seeding of the ROW does not occur due to growing season constraints, WPX will deploy approved weed-free hay across the entire ROW to reduce the potential for excessive erosion as a result of spring snow melt and precipitation.

The entire ROW would be monitored for erosion, subsidence, and noxious weeds. In areas where problems are found to occur, reclamation efforts would continue until the BIA feels the ROW is successfully reclaimed. Reclamation is considered successful when:

- seeded areas are established;
- adjacent vegetative communities spread back into the disturbed areas; and
- noxious weeds are under control.

If the new seeding is not successful after two growing seasons, the BIA may require additional efforts to establish vegetation.

### 3.2.11.2 Final Reclamation

Final reclamation would occur when the well pad is decommissioned. All disturbed areas would be reclaimed, reflecting the BIA's view of oil and gas exploration and production as temporary intrusions on the landscape. All facilities would be removed. Access roads and work areas would be leveled or backfilled as necessary, scarified, recontoured, and 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. Figure 3-7 provides an example of reclamation (BLM and USFS 2007).

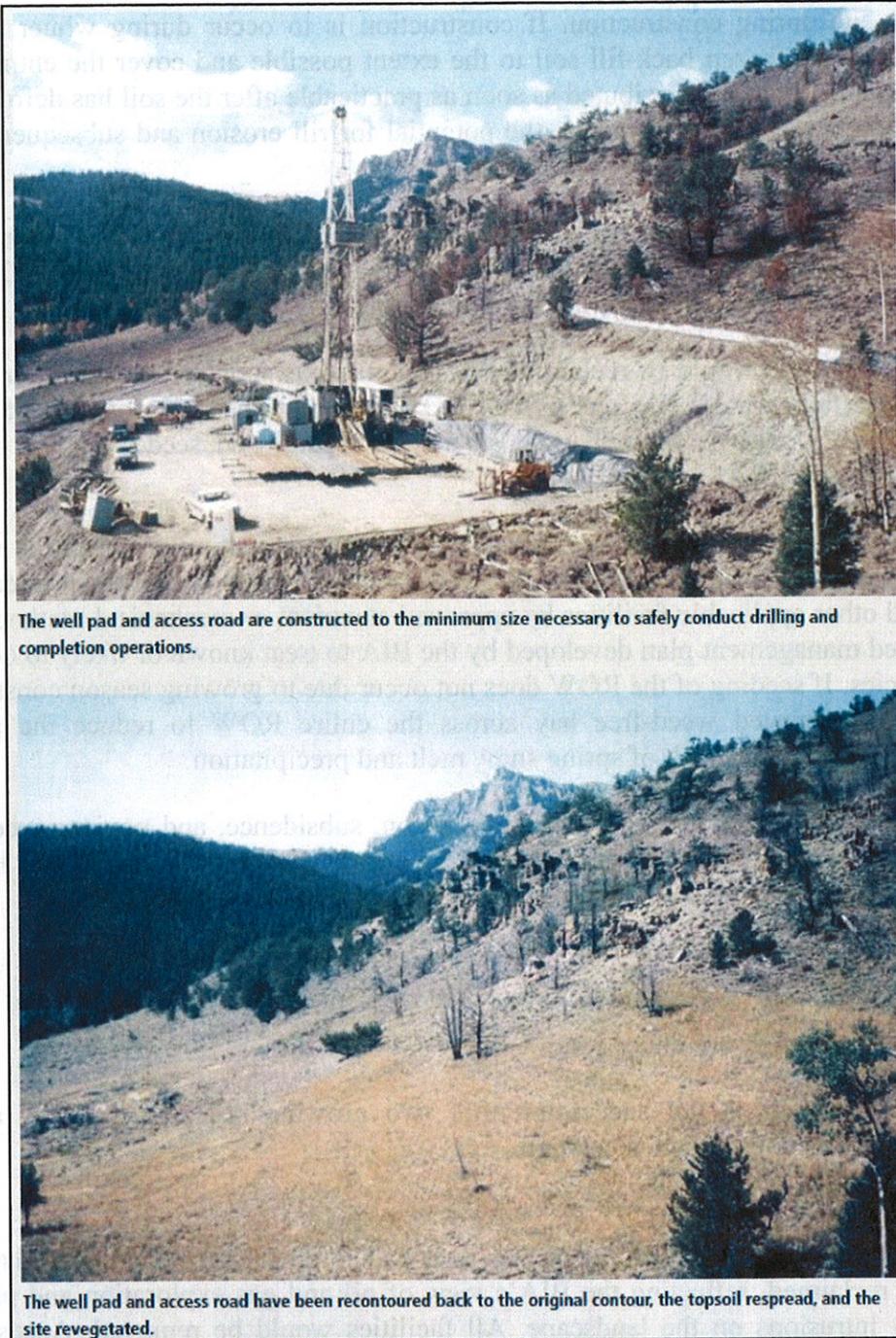


Figure 3-7. Example of reclamation from the BLM Gold Book (BLM and USFS 2007).

### 3.3 BIA-PREFERRED ALTERNATIVE

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

## **4.0 THE AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS**

The broad definition of NEPA leads to the consideration of the following elements of the human and natural environment: 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.

### **4.1 PHYSICAL SETTING**

The proposed well pad site and spacing unit would be in a rural area located on the Reservation in west-central North Dakota. The Reservation is the home of the MHA Nation and encompasses more than one million acres, of which almost half, including the project area, are held in trust by the United States for either the MHA Nation or individual allottees.

The proposed well pad, access road, and utility corridor would be 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/Three Forks Formation is a well-known source of hydrocarbons targeted by the Proposed Action. 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/Three Forks Formation feasible.

The Reservation is within the northern Great Plains ecological region, which consists of four physiographic units: 1) the Missouri Coteau Slope north of Lake Sakakawea; 2) the Missouri River trench (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 Plateau Slope. Elevations of the unglaciated, gently rolling landscape range from a normal pool elevation of 1,838 feet at Lake Sakakawea to approximately 3,300 feet in the Killdeer Mountains. Annual precipitation on the plateau averages between 15 and 17 inches. Mean temperatures fluctuate between -3 and 21 degrees Fahrenheit (°F) in January and between 55°F and 83°F in July, with 95 to 130 frost-free days each year (U.S. Geological Survey 2010).

### **4.2 AIR QUALITY**

#### **4.2.1 Air Quality Standards for Criteria Pollutants**

The federal Clean Air Act (CAA) (USC § 7401–7671, as amended in 1990) established national ambient air quality standards (NAAQS) for criteria pollutants to protect public health and welfare. It also set standards for other compounds that can cause cancer, regulated emissions that cause acid rain, and required federal permits for large sources. National ambient air quality standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead (EPA 2010a). The primary NAAQS have been set for pervasive compounds that are generally emitted by industry or motor vehicles. Standards for each pollutant meet specific public health and welfare criteria; thus, they are called the ‘criteria pollutants.’

The CAA mandates prevention of significant air quality deterioration in certain designated attainment areas and has designated more stringent air quality standards, known as Secondary Standards, for these areas. Class I attainment areas have national significance and include national parks greater than 6,000 acres, national monuments, national seashores, and federal wilderness areas larger than 5,000 acres that were designated prior to 1977 (Ross 1990). The Class I regulations (40 CFR 51.307) attempt to protect visibility through a review of major new and modified sources of pollutants, and requiring strict air quality emission standards if they will have an adverse impact on visibility within the Class I area (National Park Service 2010).

The nearest designated attainment area to the project area is the Theodore Roosevelt National Park (TRNP), a Class I area that covers about 110 square miles in three units within the Little Missouri National Grassland. The north unit of TRNP is approximately 16 miles south of Watford City, North Dakota, and approximately 40 miles west of the proposed well sites. Two air quality monitoring stations are located there, with the North Unit monitoring most criteria pollutants (National Park Service 2010; North Dakota Department of Health [NDDH] 2010). All other parts of the state, including the Reservation, are classified as Class II attainment areas, affording them protections through the Primary NAAQS (NDDH 2010).

Some states have adopted more stringent standards for criteria pollutants, or have chosen to adopt new standards for other pollutants. For instance, the NDDH has established a standard for hydrogen sulfide (H<sub>2</sub>S) (NDDH 2010).

Criteria pollutants and their health effects include the following.

- **Sulfur dioxide (SO<sub>2</sub>):** SO<sub>2</sub> is a colorless gas with a strong, suffocating odor. Sulfur dioxide is produced by burning coal, fuel oil, and diesel fuel, and can trigger constriction of the airways, causing particular difficulties for asthmatics. Long-term exposure is associated with increased risk of mortality from respiratory or cardiovascular disease. SO<sub>2</sub> emissions are also a primary cause of acid rain and damage to plant life (EPA 2010a).
- **Inhalable Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>):** PM<sub>10</sub> and PM<sub>2.5</sub> are classes of compounds that can lodge deep in the lungs, causing adverse health problems, depending on their size, concentration, and content. Based on extensive health studies, particulate matter is regulated under two classes: PM<sub>10</sub> is the fraction of total particulate matter 10 microns or smaller, and PM<sub>2.5</sub> is two and one-half microns or smaller. Inhalable particulate matter can range from inorganic wind-blown soil to organic and toxic compounds found in diesel exhaust. Toxic compounds such as benzene often find a route into the body via inhalation of fine particulate matter (EPA 2010a).
- **Nitrogen dioxide (NO<sub>2</sub>):** NO<sub>2</sub> is a reddish-brown gas with an irritating odor. Primary sources include motor vehicles, industrial facilities, and power plants. In the summer months, NO<sub>2</sub> is a major component of photochemical smog. NO<sub>2</sub> is an irritating gas that may constrict airways, especially of asthmatics, and increase the susceptibility to infection in the general population. NO<sub>2</sub> is also involved in ozone smog production (EPA 2010a).

- Ozone (O<sub>3</sub>):** O<sub>3</sub> is a colorless gas with a pungent, irritating odor and creates a widespread air quality problem in most of the world's industrialized areas. Ozone smog is not emitted directly into the atmosphere but is primarily formed through the reaction of hydrocarbons and nitrogen oxides (NO<sub>x</sub>) in the presence of sunlight. Health effects associated with O<sub>3</sub> can include reduced lung function, aggravated respiratory illness, and irritated eyes, nose, and throat. Chronic exposure can cause permanent damage to the alveoli of the lungs. O<sub>3</sub> can persist for many days after formation and travel several hundred miles (EPA 2010a).
- Carbon monoxide (CO):** CO is a colorless, odorless gas that is a byproduct of incomplete combustion. CO concentrations typically peak nearest a source, such as roadways or areas with high fireplace use, and decrease rapidly as distance from the source increases. Ambient levels are typically found during periods of stagnant weather, such as on still winter evenings with a strong temperature inversion. CO is readily absorbed into the body from the air. It decreases the capacity of the blood to transport oxygen, leading to health risks for unborn children and people suffering from heart and lung disease. The symptoms of excessive exposure are headaches, fatigue, slow reflexes, and dizziness (EPA 2010a).

The Primary and Secondary NAAQS for criteria pollutants are summarized in Table 4-1. NEPA assessments require analysis of both near-field and far-field as part of the cumulative effects of proposals on air quality. Therefore, the North Dakota Ambient Air Quality Standards (AAQS) are shown as well as federal standards.

**Table 4-1. NAAQS and Other Air Quality Standards.**

Pollutant	Averaging Period	Primary Standard (NAAQS)	Secondary Standard (National Parks)	North Dakota AAQS
SO <sub>2</sub> in parts per million of air (ppm)	3-hour	-	0.5	0.273 (1-hour)
	24-hour	0.14	-	0.099
	Annual Mean	0.03	-	0.023
PM <sub>10</sub> in micrograms per cubic meter of air (µg/m <sup>3</sup> )	24-hour	150	-	150
	Expected Annual Mean	50		50
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	24-hour	35	35	-
	Weighted Annual Mean	15	15	-
NO <sub>2</sub> (ppm)	Annual Mean	0.053	0.053	0.053
CO (ppm)	8-hour	9	-	9
	1-hour	35	-	35
O <sub>3</sub> (ppm)	8-hour	0.075	0.075	-
	1-hour	-	-	0.12
Lead (µg/m <sup>3</sup> )	Quarterly Mean	1.5	1.5	1.5

Pollutant	Averaging Period	Primary Standard (NAAQS)	Secondary Standard (National Parks)	North Dakota AAQS
Hydrogen Sulfide (H <sub>2</sub> S) (ppm)	Instantaneous	-	-	10
	1-hour	-	-	0.20
	24-hour	-	-	0.10
	3-month	-	-	0.02

Sources: EPA 2010a; NDDH 2010.

North Dakota has separate state standards for several pollutants that are different from the federal criteria standards. These are the standards for SO<sub>2</sub> and H<sub>2</sub>S. All other state criteria pollutant standards are the same as federal. North Dakota was one of 13 states that met standards for all federal criteria pollutants in 2008.

In addition, the EPA averages data from monitoring stations within each county to determine the Air Quality Index (AQI), a general measure of air quality for residents of the county. An AQI greater than 100 is indicative of unhealthy air quality conditions for the county residents, although residents may experience greater or lesser risks depending on their proximity to the sources of pollutants (EPA 2010b).

#### 4.2.2 Greenhouse Gas Emissions and Responses to the Threat of Climate Change

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs). Some GHGs such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. The EPA (2010c) identifies the principal GHGs that enter the atmosphere because of human activities as the following.

- **Carbon Dioxide (CO<sub>2</sub>):** CO<sub>2</sub> enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). CO<sub>2</sub> is also removed from the atmosphere (or “sequestered”) when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH<sub>4</sub>):** CH<sub>4</sub> is emitted during the production and transport of methane, coal, natural gas, and oil. CH<sub>4</sub> emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- **Nitrous Oxide (N<sub>2</sub>O):** N<sub>2</sub>O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- **Fluorinated Gases:** Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are typically emitted in small quantities, but are potent GHGs thought to contribute significantly to global warming processes (EPA 2010c).

CO<sub>2</sub> is the primary GHG, responsible for approximately 90 percent of radiative forcing, which is the rate of energy change as measured at the top of the atmosphere. Radiative forcing can be positive (warmer) or negative (cooler) (EPA 2010c). To simplify discussion of the various GHGs, the term 'Equivalent CO<sub>2</sub> or CO<sub>2</sub>e' has been developed.

Equivalent CO<sub>2</sub> or CO<sub>2</sub>e is the amount of CO<sub>2</sub> that would cause the same level of radiative forcing as a unit of one of the other GHGs. For example, one ton of CH<sub>4</sub> has a CO<sub>2</sub>e of 22 tons; therefore, 22 tons of CO<sub>2</sub> would cause the same level of radiative forcing as one ton of CH<sub>4</sub>. Nitrous oxide has a CO<sub>2</sub>e value of 310 (EPA 2010c). These GHGs are all positive radiative forcing GHGs. Thus, control strategies often focus on the gases with the highest positive CO<sub>2</sub>e values (EPA 2010c). This document incorporates by reference cited studies and reports from the Pew Center (2009) and the Intergovernmental Panel on Climate Change (2007) concerning GHGs and their impacts.

On May 13, 2010, EPA issued a final rule that establishes thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration and title V Operating Permit programs are required for new and existing industrial facilities (EPA 2010d). This final rule "tailors" the requirements of these CAA permitting programs to limit which facilities will be required to obtain New Source Review Prevention of Significant Deterioration and title V permits. Facilities responsible for nearly 70 percent of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities. Emissions from small farms, restaurants, and all but the very largest commercial facilities will not be covered by these programs at this time; however, the EPA recently initiated additional hearings to help determine the types of industries to be held to new standards under these federal permits (EPA 2010d).

Energy production and supply was estimated to emit up to 25.9% of GHGs world-wide in 2004 (Pew Center 2009). Methane gas (CH<sub>4</sub>), with a high radiative forcing CO<sub>2</sub>e ratio, is a common fugitive gas emission in oil and gas fields (EPA 2010d). Oil and gas production, however, is highly variable in potential GHG emissions. Oil and gas producers in the United States are not considered large GHG emitters by the EPA, and are not the subject of any current federal proposals that would regulate GHG emissions.

#### **4.2.3 Hazardous Air Pollutants**

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

2009). HAP emissions receive evaluation based on the degree of exposure that can cause risk of premature mortality, usually from cancer.

Risk assessments express premature mortality in terms of the number of deaths expected per one million persons. The NDDH typically reviews projects and either requires an applicant to prepare a risk assessment or assign the state engineers to do the work. For new sources emitting HAPs with known negative health effects, an applicant must demonstrate that the combined impact of new HAP emission does not result in a maximum individual cancer risk greater than one in one hundred thousand.

#### **4.2.4 Existing Air Quality in the Project Area**

Federal air quality standards apply in the project area, which is designated as a Class II attainment area. Although the State of North Dakota does not have jurisdiction over air quality matters on the Reservation and no air quality monitoring stations occur within the boundaries of the Reservation, monitoring efforts are being made by the state and industry in the area. The NDDH operates a network of monitoring stations around the state that continuously measure pollution levels. Industry also operates monitoring stations as required by the state. The data from all these stations are subject to quality assurance, and when approved, it is published on the World Wide Web and available from EPA and NDDH (NDDH 2010).

Monitoring stations providing complete data near the project area include Theodore Roosevelt National Park North Unit (TRNP-NU) (Air Quality Station #380530002) in McKenzie County, and Dunn Center (Air Quality Station #38025003) in Dunn County (NDDH 2010). These stations are located west and southeast of the proposed well sites, respectively. Bear Paw Energy and Amerada Hess operate site-specific monitoring stations in the region. However, these stations do not provide coverage that is applicable to this analysis (NDDH 2010).

Criteria pollutants measured at the two monitoring stations include SO<sub>2</sub>, PM<sub>10</sub>, NO<sub>2</sub>, and O<sub>3</sub>. Lead and CO are not monitored by either of the stations. Table 4-2 summarizes the NAAQS and the maximum levels of criteria pollutants. The highest value at either of the two monitoring locations is shown for each year from 2007 through 2009.

All monitored criteria pollutants are well below federal and state standards in the project area for all years in the study period from 2007 through 2009. In addition to the low levels of monitored criteria pollutants, the EPA reports that Dunn County has had zero days in which the AQI exceeded 100 in 2007 and 2008, indicating that general air quality does not pose an unhealthy condition for residents of these counties (EPA 2010b). The AQI was not available for 2009, but is also likely to be zero for these counties.

**Table 4-2. Maximum Levels of Monitored Pollutants, 2007–2009, as Measured at Dunn Center and Theodore Roosevelt National Park North Unit Monitoring Stations.**

Criteria Pollutant	Averaging Period	Primary Standard (NAAQS)	Maximum Reported Level from Dunn Center and TRNP-NU Monitoring Stations		
			2009	2008	2007
SO <sub>2</sub> (parts per million [ppm])	24-hour	0.14	0.006	0.004	0.004
	Annual Mean	0.03	0.0005	0.0004	0.0011
PM <sub>10</sub> (micrograms per cubic meter [µg/m <sup>3</sup> ])	24-hour	150	54	108	57.4
	Expected Annual Mean	50	11.3	14.2	13.2
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	24-hour	35	15	35.7	22.2
	Weighted Annual Mean	15	3.4	3.7	3.6
NO <sub>2</sub> (ppm)	Annual Mean	0.053	0.0015	0.0018	0.0015
O <sub>3</sub> (ppm)	8-hour	0.08	0.057	0.0063	0.0071

Source: NDDH 2010.

#### 4.2.5 Typical Air Emissions from Oil Field Development

According to EPA Emission Inventory Improvement documents (EPA 1999), oil field emissions encompass three primary areas: combustion, fugitive, and vented. Typical processes that occur during exploration and production include the following.

- Combustion emissions include SO<sub>2</sub>, ozone precursors called volatile organic compounds (VOCs), GHGs, and HAPs. Sources include engine exhaust, dehydrators, and flaring (EPA 1999).
- Fugitive emissions include criteria pollutants, H<sub>2</sub>S, VOCs, HAPs, and GHGs. Sources of fugitive emissions include mechanical leaks from well field equipment such as valves, flanges, and connectors that may occur in heater/treaters, separators, pipelines, wellheads, and pump stations. Pneumatic devices such as gas actuated pumps and pressure/level controllers also result in fugitive emissions. Other sources of fugitive emissions include evaporation ponds and pits, condensate tanks, storage tanks, and wind-blown dust (from truck and construction activity) (EPA 1999).
- Vented emissions include GHGs, VOCs, and HAPs. Primary sources are emergency pressure relief valves and dehydrator vents (EPA 1999).

Pad and road construction, drilling activities, and tanker traffic would generate emissions of criteria pollutants and HAPs. Primary emissions sources during drilling are diesel exhaust, wind-blown dust from disturbed areas and travel on dirt roads, evaporation from pits and sumps, and gas venting. Diesel emissions are being progressively controlled by the EPA in a nationwide program (EPA 2010d). This program takes a two-pronged approach. First, fuels are improving to the ultra-low sulfur standard, and secondly manufacturers must produce progressively lower engine emissions.

#### **4.2.6 Air Quality Best Management Practices**

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

- Transportation BMPs to reduce the amount of fugitive dust and vehicle emissions
  - Use directional drilling to drill multiple wells from a single well pad;
  - use centralized water storage and delivery, well fracturing, gathering systems;
  - use telemetry to remotely monitor and control production;
  - use water or dust suppressants to control fugitive dust on roads;
  - control road speeds; and
  - use van or carpooling.
- Drilling BMPs to reduce rig emissions
  - Use cleaner diesel (Tier 2, 3, and 4) engines;
  - use natural gas-powered engines; and
  - use “green” completions to recapture product that otherwise would have been vented or flared.
- Unplanned or emergency releases
  - Use high-temperature flaring if gas is not recoverable.
- Vapor recovery
  - Use enclosed tanks instead of open pits to reduce fugitive VOC emissions; and
  - use vapor recovery units on storage tanks.
- Inspection and maintenance
  - Use and maintain proper hatches, seals, and valves;
  - optimize glycol circulation and install a flash tank separator;
  - use selective catalytic reduction; and
  - replace high-bleed with low-bleed devices on pneumatic pumps.
- Monitoring and repair
  - Use directed inspection and maintenance methods to identify and cost-effectively fix fugitive gas leaks; and
  - install an air quality monitoring station.

#### **4.2.7 Potential Air Quality Impacts**

Based on the existing air quality of the region, typical air levels and types of emissions from similar oil field projects, and WPX's commitment to implementation of BMPs identified in Section 4.2.6, the Proposed Action would not produce significant increases in criteria pollutants, GHGs, or HAPs. The Proposed Action would incrementally contribute to emissions occurring within the region. In general, however, the increase in emissions associated with the Proposed Action would occur predominantly during construction and

drilling operations and therefore would be localized, largely temporary, and limited in comparison with regional emissions. Since the AQI is exceptionally low in the cumulative impact analysis area (CIAA) (see Section 4.2), and the expected future development would be widely dispersed in time and space, the Proposed Action is not expected to impact attainment status based on any of the Primary and Secondary NAAQS for criteria pollutants or other regulated air emissions. Contribution of the proposal to incremental increases of unregulated GHG emissions is expected to be minor.

### **4.3 WATER RESOURCES**

This section identifies the existing water resources within the project area and potential effects of the Proposed Action. Specific subjects discussed in this section include surface water and surface water quality, groundwater resources, and the potential short-term and long-term impacts of the Proposed Action on these water resources.

#### **4.3.1 Surface Water**

The surface water resources in the project area would be managed and protected according to existing federal laws and policies regarding the use, storage, and disposal of the resource during the construction and operation of the project. Surface water resource use and protection is administered under the following federal laws:

- Clean Water Act of 1972, as amended (33 USC 1251 et seq.)
- Federal Land Policy and Management Act of 1976 (43 USC 1711–1712)
- National Environmental Policy Act of 1972 (42 USC 4321)
- Safe Drinking Water Act of 1974, as amended (42 USC 300 et seq.)

Water quality is protected under the Federal Water Pollution Control Act (as amended), otherwise known as the Clean Water Act (CWA). The CWA has developed rules for regulating discharges of pollutants into waters of the U.S. and also regulates water quality standards for surface waters. The CWA has also made it unlawful to discharge any pollutant from a point source into any navigable waters of the U.S., unless a permit has been obtained from the National Pollution Discharge Elimination System (NPDES) program.

The Environmental Division of the MHA Nation has had an application pending with the EPA since 1996 for delegation of authority to set federally approved water quality standards on the Reservation. In the absence of tribal surface water quality authorities, enforcement of federal environmental laws regarding surface water on the Reservation is accomplished through permitting, inspection, and monitoring activities of the NPDES, as administered by the EPA.

The proposed WPX well pad, access road, and utility corridor would occur within the Upper Squaw Creek (HUC 101102050607) sub-watershed, the Waterchief Bay (HUC 1011020506) watershed, and the Lower Little Missouri River (HUC 10110205) drainage basin (Figure 4-1).

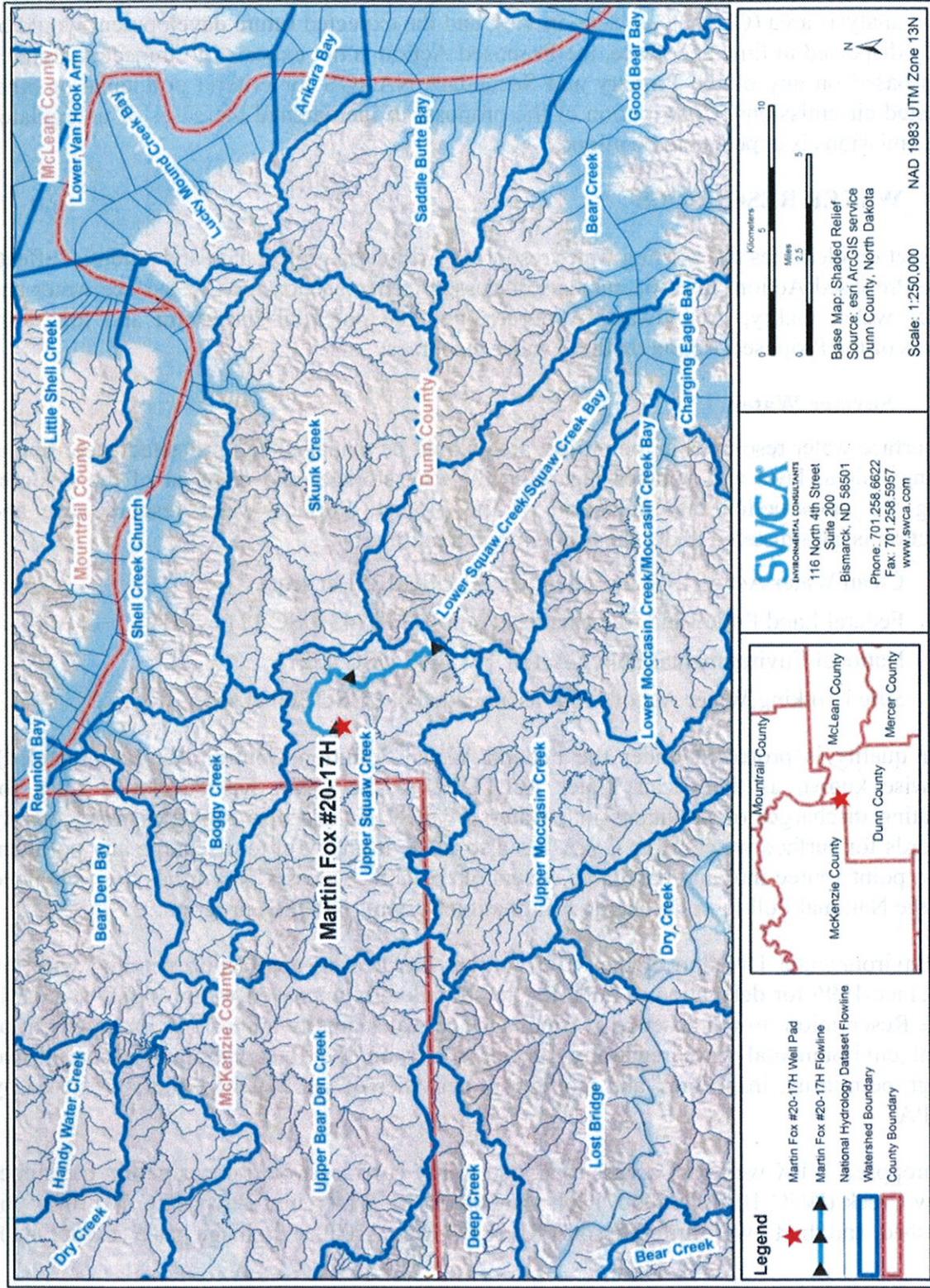


Figure 4-1. Watersheds and surface runoff directions near the proposed Martin Fox #20-17H well pad.

Runoff from the proposed well pad would flow, at its closest, from the proposed well pad, approximately 6.04 river miles, until reaching perennial waters in Squaw Creek. Lake Sakakawea is approximately an additional 14.66 river miles downstream. See Section 4.12, Mitigation and Monitoring, for further details.

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

### 4.3.2 Groundwater

Aquifers in the project area include, from deepest to shallowest, the Cretaceous Fox Hills and Hell Creek formations and the Tertiary Ludlow, Tongue River, and Sentinel Butte formations (Table 4-3). Several shallow aquifers related to post-glacial outwash composed of till, silt, sand, and gravel are located in Dunn County. However, none are within the proposed project areas.

The shallow Sentinel Butte Formation commonly used for domestic supply in the area, outcrops in Dunn County. This aquifer meets standards of the NDDH (Croft 1985). Detailed analyses are available from the North Dakota Geological Survey, Bulletin 68, Part III, 1976.

**Table 4-3. Common Aquifers in the Proposed Project Area and Surrounding Region.**

Period	Formation		Depth Range (feet)	Thickness (feet)	Lithology	Water-Yielding Characteristics
Quaternary	Alluvium		0-40	40	Silt, sand, and gravel	Maximum yield of 50 gal/min to individual wells from sand and gravel deposits.
Tertiary	Fort Union Group	Sentinel Butte	0-670	0-670	Silt, clay, sand, and lignite	5 to 100 gal/min in sandstone. 1 to 200 gal/min in lignite.
		Tongue River	140-750	350-490	Silt, clay, sand and lignite	Generally less than 100 gal/min in sandstone.
		Cannonball/Ludlow	500-1,150	550-660	Fine- to medium-grained sandstone, siltstone, and lignite	Generally less than 50 gal/min in sandstone.

*Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)*

Period	Formation	Depth Range (feet)	Thickness (feet)	Lithology	Water-Yielding Characteristics
Cretaceous	Hell Creek	1,000–1,750	200–300	Claystone, sandstone, and mudstone	5 to 100 gal/min in sandstone.
	Fox Hills	1,100–2,000	200–300	Fine- to medium-grained sandstone and some shale	Generally less than 200 gal/min in sandstone. Some up to 400 gal/min.

Sources: Croft 1985; Klausung 1979.  
gal/min = gallons per minute

Review of electronic records of the North Dakota State Water Commission (2011) revealed 30 existing water wells within 5 miles of the proposed well pad (Table 4-4). Of those wells, one well is for domestic use, three are test holes, five are surface water monitoring sites, nine are observation wells, and 12 are used for an unknown purpose. There are no existing water wells within 1 mile of the proposed well pad.

**Table 4-4. Existing Water Wells within 5 Miles of the Proposed Martin Fox #20-17H Well Pad.**

Water Well Number	Section	Township/Range	Type	Depth (feet)	Aquifer	Miles to Proposed Well Pad
<b>Martin Fox #20-17H</b>						
Undefined	17	T148N/R93W	Unknown	0	Sentinel Butte-Tongue River	4.69
Undefined	6	T148N/R94W	Unknown	0	Sentinel Butte-Tongue River	4.93
Undefined	13	T148N/R94W	Unknown	0	Sentinel Butte-Tongue River	4.15
Undefined	15	T148N/R94W	Surface Water Monitoring Site	0	Surface Water	4.89
Undefined	30	T149N/R92W	Surface Water Monitoring Site	0	Surface Water	4.87
Undefined	2	T149N/R93W	Unknown	0	Sentinel Butte-Tongue River	4.70
Undefined	5	T149N/R93W	Unknown	0	Sentinel Butte-Tongue River	2.92
Undefined	8	T149N/R93W	Unknown	0	Sentinel Butte-Tongue River	1.92
Undefined	9	T149N/R93W	Unknown	0	Sentinel Butte-Tongue River	2.07
Undefined	12	T149N/R93W	Surface Water Monitoring Site	0	Surface Water	4.71
Undefined	21	T149N/R93W	Unknown	0	Sentinel Butte-Tongue River	1.15

*Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)*

<b>Water Well Number</b>	<b>Section</b>	<b>Township/Range</b>	<b>Type</b>	<b>Depth (feet)</b>	<b>Aquifer</b>	<b>Miles to Proposed Well Pad</b>
Undefined	21	T149N/R93W	Surface Water Monitoring Site	0	Surface Water	1.02
Undefined	27	T149N/R93W	Surface Water Monitoring Site	0	Surface Water	2.15
Undefined	31	T150N/R93W	Unknown	0	Sentinel Butte-Tongue River	4.44
Undefined	33	T150N/R93W	Unknown	0	Sentinel Butte-Tongue River	4.42
Undefined	14	T149N/R94W	Unknown	0	Sentinel Butte-Tongue River	3.53
Undefined	14	T149N/R94W	Unknown	1,750	Fox Hills	3.48
Undefined	14	T149N/R94W	Observation Well	315	Tongue River	4.01
Undefined	28	T148N/R93W	Observation Well	320	Tongue River	4.47
Undefined	28	T149N/R94W	Observation Well	120	Sentinel Butte-Tongue River	4.47
Undefined	27	T149N/R94W	Domestic Well	36	Undefined	4.30
11351	22	T149N/R94W	Test Hole	140	No Obs Well Installed	4.39
11352	21	T149N/R94W	Observation Well - Destroyed	240	Undefined	4.49
11353	22	T149N/R94W	Test Hole	80	No Obs Well Installed	4.35
4596	4	T148N/R93W	Observation Well - Plugged	920	Sentinel Butte-Tongue River	4.15
4596	4	T148N/R93W	Observation Well - Plugged	0	Undefined	4.15
4596A	4	T148N/R93W	Observation Well	340	Tongue River	4.16
4596B	4	T148N/R93W	Observation Well	0	Sentinel Butte-Tongue River	4.17
4596B	4	T148N/R93W	Observation Well - Plugged	0	Unnamed	4.32
8174	1	T148N/R94W	Test Hole	80	No Obs Well Installed	3.06

The identified groundwater wells may have minimal hydrologic connections due to the depths at which these wells are being drilled. Water quality would be protected by drilling with freshwater to a point below the base of the Fox Hills Formation, implementing proper hazardous materials management, and using appropriate casing and cementing to permanently seal the well shaft from any surrounding aquifers. Drilling would proceed in compliance with Onshore Oil and Gas Order No. 2, Drilling Operations (43 CFR 3160).

#### 4.3.2.1 Hydraulic Fracturing Process

Hydraulic Fracturing (HF) is a well stimulation process used in North Dakota's Bakken and Three Forks formations to maximize the extraction of oil and gas. The process enhances subsurface fracture systems, allowing oil to move more freely through porous rock to production wells that bring the oil or gas to the surface (EPA 2011). During HF, fluids, commonly made up of water and chemical additives, are pumped down the well bore into these target formations at high pressure. The HF process uses large volumes of water under high pressure to fracture rock within the target formation to increase formation porosity and allow the flow of petroleum from the rock. Depending upon the characteristics of the well and the rock being fractured, a few million gallons of water can be required to complete a job (Arthur et al. 2008).

Only specific sections of the well within the target formation receive the full force of pumping. As pressure builds up in this portion of the well, water opens fractures, and the driving pressure extends the fractures deep into the rock unit. When pumping stops, these fractures quickly snap closed and the water used to open them is pushed back into the borehole, back up the well and is collected at the surface. The water returned to the surface is comprised of injected water mixed with the pore water that has been trapped in the rock unit for millions of years. The pore water is usually a brine with significant amounts of dissolved solids (Arthur et al. 2008).

When the pressure exceeds the rock strength, the fluids open or enlarge fractures that can extend several hundred feet from the well shaft, which is oriented laterally within the target formation. After the fractures are created, a propping agent is pumped into the fractures to keep them from closing when the pumping pressure is released. After HF is completed, the internal pressure of the geologic formation causes the injected HF fluids to rise to the surface where they are stored in disposal tanks (EPA 2011).

Proppants are small compression-resistant particles added to the HF fluids to assist in holding the fractures open and creating pore space through which petroleum can flow. Sand was the original proppant but now aluminum beads, ceramic beads, sintered aluminum (aka bauxite), and other materials are being used in the wells. Over one million pounds of proppants can be used while HF a single well (Arthur et al. 2008).

In addition to proppants, a variety of chemical additives are included with the water used in HF. Some chemicals are used to thicken the water into a gel that is more effective at opening fractures and carrying proppants deep into the rock unit. Other chemicals are added to reduce friction, keep rock debris suspended in the liquid, prevent corrosion of equipment, kill bacteria, control pH, and other functions (Arthur et al. 2008). Typical chemical additives used in the HF fluids are listed in Table 4-5.

**Table 4-5. Common Additives of Hydraulic Fracturing Fluid.**

Additive Type	Main Compound	Common Use of Main Compound
Acid	Hydrochloric acid or muriatic acid	Swimming pool chemical and cleaner
Biocide	Glutaraldehyde	Cold sterilant in health care industry
Breaker	Sodium chloride	Food preservative
Corrosion inhibitor	N,n-dimethyl formamide	Used as a crystallization medium in pharmaceutical industry
Friction reducer	Petroleum distillate	Cosmetics including hair, make-up, nail, and skin products
Gel	Guar gum or hydroxyethyl cellulose	Thickener used in cosmetics, sauces, and salad dressings
Iron control	2-hydroxy-1,2,3-propanetricarboxylic acid	Citric acid is used to remove lime deposits; lemon juice ~7% citric acid
Oxygen scavenger	Ammonium bisulfite	Used in cosmetics
Proppant	Silica, quartz sand	Play sand
Scale inhibitor	Ethylene glycol	Automotive antifreeze and de-icing agent

Source: Arthur et al. 2008.

### 4.3.3 Potential Impacts to Surface Water and Groundwater Resources

The proposed project area does not lie within the boundaries of the post-glacial outwash aquifers, and so low porosity bedrock near the project wells would act as confining layers to prevent impacts to groundwater resources. Additionally, well completion methods would prevent cross contamination between aquifers or the introduction of hazardous materials into aquifers.

Water quality of future wells in the vicinity would be protected by drilling with freshwater to a point below the base of the Fox Hills Formation, implementing proper hazardous materials management, and using appropriate casing and cementing to permanently seal the well shaft from any surrounding aquifers. Surface casing would be employed to a depth of 2,500 feet below ground surface to isolate and protect all near-surface aquifers from contamination during drilling, as described in Section 3.2.6 of this document, and to protect the potable water aquifers from any potential contamination during the drilling and operations phases.

Since the introduction of technological advances in HF, some environmental concerns have been published related to the use of chemical additives and their potential effect on groundwater resources. These concerns, reviewed in Arthur et al. (2008), include the following.

1. Fractures produced in the well might extend directly into shallow rock units that are used for drinking water supplies, or fractures produced in the well might communicate with natural fractures that extend into shallow rock units that are used for drinking water supplies.
2. The casing of a well might fail and allow fluids to escape into shallow rock units used for drinking water supplies.

3. Accidental spills of HF fluids or fluids expelled during HF might seep into the ground or contaminate surface water.

The EPA recently studied the effects of coalbed methane well fracturing, publishing the results in a report entitled *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs* (EPA 816-R-04-003) in 2004 (EPA 2004). The report has received both internal and external peer review, and public comment on its research design and incident information. Based on its research, the EPA concluded that there was negligible risk of HF fluid contaminating underground sources of drinking water during HF of coalbed methane production wells, which are significantly shallower than the Bakken and Three Forks formations. However, the EPA continues to monitor the effects of hydraulic fracturing in coalbed methane well completion (EPA 2004). The EPA is currently undertaking a study to evaluate of the effect of oilfield HF technology, processes, and fluids on potable water aquifers. The EPA study is expected to be completed in 2012 (EPA 2011).

Oil-bearing formations typically occur much deeper than potable water aquifers; approximately 8,700 feet of intervening rock formations occur between the Bakken Formation and the deepest groundwater wells within 1 mile of the proposed wells. In addition, the unique geological position of the Bakken Formation places it immediately beneath the Madison Group (Figure 4-2). The Madison group of Mississippian age includes three geological formations that have properties that greatly limit the possibility of HF fractures extending vertically into shallower geological formations containing potable water. The following characteristics of the three members of the Madison Group show extremely high resistance to fracturing or vertical transmission of fluids.

#### 4.3.3.1 Lodgepole Limestone Sequence

This is a sequence of primarily Mississippian limestone, with scattered interbedded shales approximately 900 feet thick. It lies immediately above the Bakken Formation. This sequence of rocks is characterized as hard and very dense, requiring significant pressure to initiate fractures (Energy Information Administration 2006).

#### 4.3.3.2 Mission Canyon Limestone

Like the Lodgepole Limestone, the Mission Canyon is a dense limestone formation with very low porosity that ranges from 500 to 800 feet thick. Any HF pressures within the Bakken Formation that might be sufficient to initiate fracturing of the Lodgepole Limestone are assumed to be greatly reduced before reaching the Mission Canyon Limestone Formation, and very unlikely to cause any fracturing or transmission of fluids.

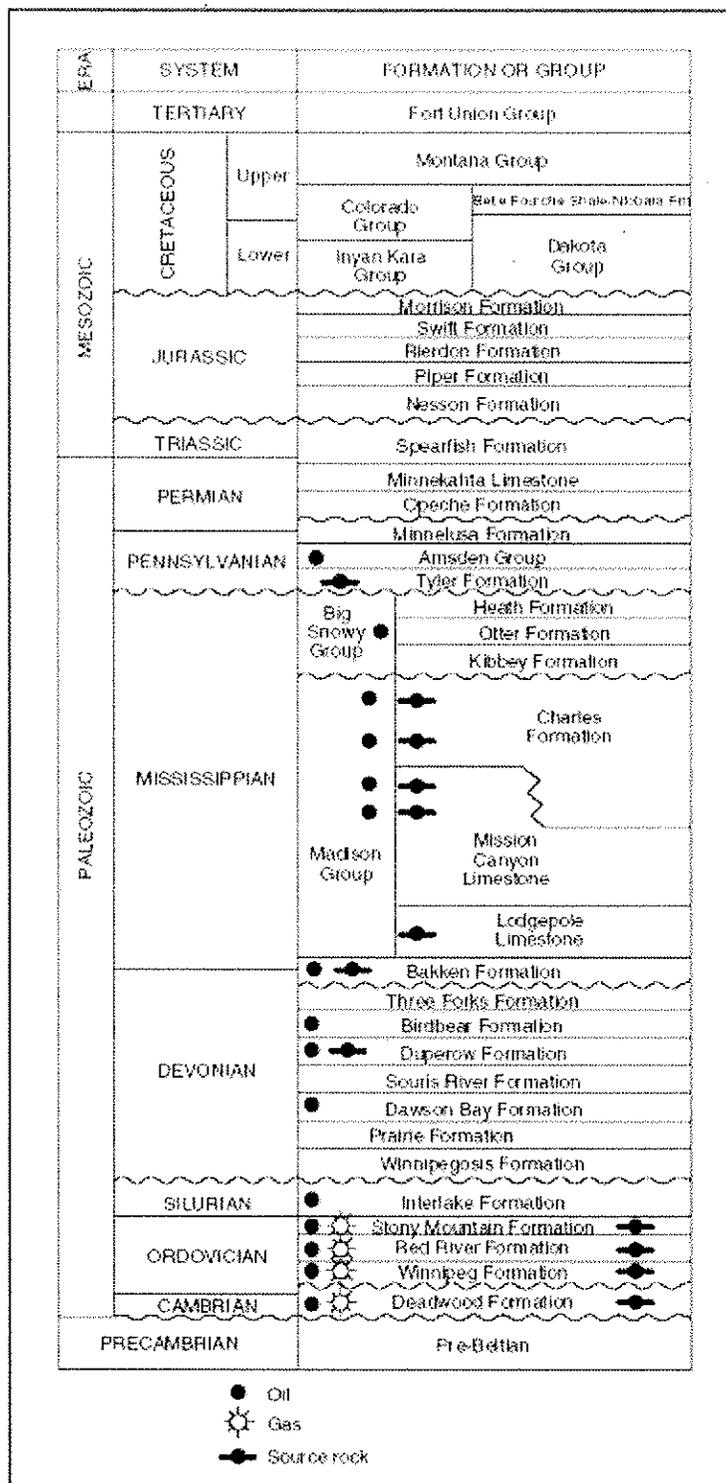


Figure 4-2. Typical stratigraphic column of the Williston Basin, with oil and gas bearing formations (Peterson 1995).

#### 4.3.3.3 Charles Salt

The Charles Salt is ubiquitous throughout a great portion of the Williston Basin in both Montana and North Dakota and lies immediately above the limestone described above. This salt formation is approximately 600 feet thick. At the depth below the surface and the associated pressures, this salt is ductile, and would flow slowly to fill any void created by drilling or other pressure. This “flow characteristic,” although very challenging to well drilling, would serve to seal any potential fracture that might be propagated artificially through HF. The salt would flow completely around the HF fluids or proppant, thereby eliminating any opportunity for the artificially induced fracture to stay open. Further, the water from the Bakken is almost fully salt-saturated; even with water flow from the Bakken to the Charles Salt Formation, there could be almost no dissolution to enhance any fracture, and the formation would form a barrier, or cap, for any potential HR fracture.

Above the Charles Salt lies greater than 6,000 feet of limestone, siltstone, interbedded salt, sandstone, and shale, which tend to be soft and incompetent, providing a serious impediment to any fracture height growth and redirecting and attenuating any fracture that is started. The multiple layers encountered would also serve to dissipate any energy from a fracture stimulation resulting in very limited fracture competency.

Potable water aquifers lie approximately 4,000 feet above the Bakken Formation. In general, almost any of the intervening rock packages appear to be able to independently act as an effective impediment to fracture growth in a vertical direction. Although large volumes of sand (proppant) are used in the modern, multi-stage fracture stimulations, relatively small amounts of proppant are used per stage and are specifically designed to limit fracture growth. This technology is highly unlikely to result in fractures that could expand through the Madison Group limestone or reach the Charles Salt Formation.

No direct or indirect impacts to surface water or groundwater resources is anticipated from drilling of the proposed wells, HF completions, or operation of the proposed wells due to the following.

- The geological setting of the Bakken and Three Forks formations with extremely tight capping formations of the Madison Unit forming an impermeable barrier to upward fracturing or fluid movement.
- The use of closed-loop drilling without a cuttings pit, construction BMPs, and spill prevention planning during the construction phase of the project.
- Implementation of site-specific measures to reduce long-term erosion and runoff into nearby streams and Lake Sakakawea.
- The use of protective casings on the well shafts to protect shallow water-bearing rock formations during drilling and operation of the oil wells.

Several groundwater protective measures have been included in the drilling and production, such as drilling with freshwater to a point below the base of the Fox Hills Formation, implementing proper hazardous materials management, and using appropriate casing and cementing. The intent of the Proposed Action is to minimize the risks associated with saltwater and hydrocarbon pollution. Based on the location, design, and the drilling methods

that would be used on the proposed well pad, no significant adverse impacts to surface water or groundwater resources are anticipated from the Proposed Action.

#### **4.4 SOILS**

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

##### **4.4.1 Natural Resources Conservation Service Soil Data**

The Natural Resources Conservation Service (NRCS 2011) soil series present on the well pad, access road, and utility corridor locations, and their respective acreages, are illustrated in Figure 4-3 and listed in Table 4-6. The acreage shown in Table 4-6 is based on the spatial extent of soil series combinations derived from NRCS data; therefore, the acreage is approximate and used as a best estimate of soil series distribution at each of the proposed project areas.

**Table 4-6. Percentage of the Project Area Comprised of Specific Soil Types.**

<b>Feature</b>	<b>Soil Series</b>	<b>Acres</b>	<b>% of Location</b>
<b>Martin Fox #20-17H</b>			
Well Pad	Williams loam, 6 to 9 percent slopes	8.0984	92.30%
	Williams loam, 3 to 6 percent slopes	0.6754	7.70%
Access Road	Williams loam, 3 to 6 percent slopes	2.2230	47.70%
	Zahl-Williams loams, 9 to 15 percent slopes	2.0245	43.44%
	Williams extremely stony loam, 0 to 9 percent slopes	0.4129	8.86%
Utility Corridor	Williams loam, 6 to 9 percent slopes	9.2911	53.43%
	Amor loam, 6 to 9 percent slopes	3.7837	21.76%
	Amor-Shambo loams, 3 to 6 percent slopes	2.3122	13.30%
	Zahl-Williams loams, 9 to 15 percent slopes	2.0021	11.51%



Figure 4-3. Approximate spatial extent of soil types within and around the proposed Martin Fox #20-17 well pad.

The following soil series descriptions represent individual soil series reported to exist within the proposed project area (NRCS 2011). Each individual soil series does not exist individually within the project area, but rather in combination with other soil types (Table 4-6).

#### 4.4.1.1 Amor

The Amor series consists of well-drained, moderately permeable soils that are moderately deep to soft sandstone bedrock. They formed in material weathered from stratified soft sandstone, siltstone, and mudstone. These soils are on uplands and have slopes of 0 to 25 percent. Mean annual air temperature found throughout the spatial extent of this soil type is 42°F, and mean annual precipitation is 15 inches. These soils are commonly cropped to small grains, flax, corn, hay, and grass in a crop summer fallow rotation. Native vegetation is mid and short prairie grasses such as green needlegrass (*Nasella viridula*), needle-and-thread (*Herostipa comata*), western wheatgrass (*Pascopyrum smithii*), and blue grama (*Bouteloua gracilis*) (NRCS 2011).

#### 4.4.1.2 Shambo

The Shambo series consists of deep and very deep, well drained, moderately permeable soils that formed in calcareous alluvium mainly from soft sandstone, mudstone and shale. These soils are on terraces and fans along stream valleys and are on fans on uplands. Slope ranges from 0 to 35 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 15 inches. Soils are cropped to small grains, hay and pasture. Some is irrigated and some are in native rangeland. Native vegetation includes *Nasella viridula* (green needlegrass), *Hesperostipa comata* (needle and thread), *Pascopyrum smithii* (western wheatgrass), *Koeleria macrantha* (Junegrass), *Bouteloua gracilis* (blue grama), and a variety of forbs (NRCS 2011).

#### 4.4.1.3 Williams

The Williams series consists of very deep, well-drained, slowly permeable soils found on glacial till plains and moraines with slopes at approximately 0 to 35 percent. Mean annual air temperature found throughout the spatial extent of this soil type is 42°F, and mean annual precipitation is 14 inches. This soil type is largely used for cultivation. Native vegetation species common to this soil type include green needlegrass, needle and thread, western wheatgrass, and blue grama (NRCS 2011).

#### 4.4.1.4 Zahl

The Zahl series consists of very deep, slowly permeable, well-drained soils found on glacial till plains, moraines, and valley side slopes at approximately 1 to 60 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 40°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass, little bluestem, and needle and thread (NRCS 2011).

### 4.4.2 **Potential Impacts from Soil Erosion**

#### 4.4.2.1 General

Precautions would be taken during construction activities to prevent erosion. Proven BMPs are known to significantly reduce erosion of various types of soil, including those in the

project area (BLM Instruction Memorandum 2004-124, [www.blm.gov/bmp](http://www.blm.gov/bmp); BLM and USFS 2007; Grah 1997).

The soil types are not expected to create unmanageable erosion issues or interfere with reclamation of the area. Topsoil stripped from areas of new construction would be retained for use during reclamation. Any areas stripped of vegetation during construction would be seeded once construction activities have ceased. The implementation of BMPs by the operator would reduce project effects and maintain negligible levels of erosion; therefore, no significant adverse impacts to soil resources are anticipated.

#### 4.4.2.2 Martin Fox #20-17H

The proposed well pad is dominated by soils found within 9 to 25 percent slopes. Care would be taken during construction to minimize soil erosion impacts.

1. The soil types found at the well pad location have variable run-off depending on the slope, which ranges between 0 and 25 percent (NRCS 2011).
2. Reclamation of vegetative communities should be obtainable due to the affinity of native grassland species to the soil types present (NRCS 2011).
3. The sites would be monitored during and after construction and BMPs would be used to prevent erosion, minimize runoff and loss of sediment, and ensure soil stabilization.

#### 4.4.2.3 BMPs Designed to Reduce Impacts

Unlike well pads, active roadways are not typically reclaimed, thus sediment yield from roads can continue indefinitely at rates two to three times the background rate. The Proposed Action would create approximately 354.38 feet of new and improved roads in the CIAA, adding incrementally to existing and future impacts to soil resources, dust deposition, and erosion processes. New well field developments would be speculative until APDs are submitted to the BLM and BIA for approval. Additional wells are likely to be drilled in the same general area as the Proposed Action, using many of the same main access roads and minimizing the disturbance as much as possible.

WPX is committed to using BMPs to mitigate the potential effects of erosion. BMPs would include implementing erosion and sedimentation control measures, such as installing culverts with energy dissipating devices at culvert outlets to avoid sedimentation in ditches, constructing water bars alongside slopes, and planting cover crops to stabilize soil following construction and before permanent seeding takes place. Additional information regarding BMPs is provided in Section 4.12, Mitigation and Monitoring.

Specific erosion control measures would be implemented at the proposed well pad. Specifically, 24-inch berms would be installed along the outer edges of the well pad, in addition to secondary containment (topsoil stockpile) in drainages. Straw waddles (as needed) and matting or hydroseeding on all fill slopes would be used to prevent erosion, and corners would be rounded as needed.

## 4.5 WETLANDS

Figure 3-1 illustrates the surface water runoff direction for the proposed well pad. The nearest perennial water-body is Squaw Creek, approximately 6.04 river miles from the project area. Lake Sakakawea is 20.70 river miles from the project area. WPX has committed to using a pit-less closed-loop drilling system due to the proximity of the well pad to Lake Sakakawea and as a general construction standard going forward. WPX would also take precautions to maintain influential runoff by constructing and maintaining a 2-foot-high berm surrounding the perimeter of the well pad.

National Wetland Inventory maps maintained by the U.S. Fish and Wildlife Service (USFWS) identify the nearest wetland as one freshwater emergent wetland approximately 295.68 feet southwest of the proposed well pad (USFWS 2009). Any wetlands observed along the proposed access road or near the proposed well pad were avoided during the on-site meetings with the BIA. No wetlands or other special aquatic sites would be impacted by the Proposed Action.

## 4.6 VEGETATION AND NOXIOUS WEEDS

### 4.6.1 Vegetation Data

The proposed project area occurs in the northwestern Great Plains ecoregion (River Breaks) (U.S. Geological Survey 2010), which is a western mixed-grass and short-grass prairie ecosystem (Bryce et al. 1998). Native grasses include big bluestem, little bluestem, blue grama, and western wheatgrass. Common wetland vegetation includes various sedge species (*Carex* spp.), bulrush (*Scirpus* spp.), and cattails (*Typha* spp.). Common plant species found in woody draws, coulees, and drainages include Juniper (*Juniperus* spp.), silver buffaloberry (*Shepherdia argentea*), and western snowberry (*Symphoricarpos occidentalis*).

#### 4.6.1.1 Martin Fox #20-17H

Herbaceous vegetation noted at the project area includes big bluestem and little bluestem. Shrubby vegetation noted at the project area includes silver sage and western snowberry. Woody draws noted at the project area include green ash and silver buffaloberry (Figure 4-4).



**Figure 4-4. Vegetation at the Martin Fox #20-17H project area. Photo taken November 1, 2011.**

#### **4.6.2 Noxious Weeds**

“Noxious weeds” is a general term used to describe plant species that are not native to a given area, spread rapidly, and have adverse ecological and economic impacts. These species may have high reproduction rates and are usually adapted to occupy a diverse range of habitats otherwise occupied by native species. These species may subsequently out-compete native plant species for resources, causing a reduction in native plant populations.

Noxious weeds have the potential to detrimentally affect public health, ecological stability, and agricultural practices. North Dakota Century Code Chapter 63-01.1 and the North Dakota Department of Agriculture (NDDA) recognize 16 species as noxious, as shown in Table 4-7 (NDDA 2009). Each county has the authority to add additional species to their list of noxious weeds. In 2009, three state noxious weed species were found on 86,100 acres in Dunn County (Table 4-7). Dunn County does not maintain a list of other noxious species. However, 3,000 acres of black henbane (*Hyoscyamus niger*) were shown to occur in Dunn County in 2009 (NDDA 2009).

**Table 4-7. Recognized Noxious Weed Occupied Area in Dunn County, North Dakota.**

Common Name	Scientific Name	Dunn County (acres)
absinth wormwood	<i>Artemisia absinthium</i>	39,300
Canada thistle	<i>Cirsium arvense</i>	28,500
diffuse knapweed	<i>Centaurea diffusa</i>	0
leafy spurge	<i>Euphorbia esula</i>	18,300
musk thistle	<i>Carduus nutans</i>	0
purple loosestrife	<i>Lythrum salicaria</i>	0
Russian knapweed	<i>Acroptilon repens</i>	0
spotted knapweed	<i>Centaurea stoebe</i>	0
yellow toadflax	<i>Linaria vulgaris</i>	0
dalmatian toadflax	<i>Linaria dalmatica</i>	0
salt cedar	<i>Tamarix ramosissima</i>	0
black henbane	<i>Hyoscyamus niger</i>	3,000
common burdock	<i>Arctium minus</i>	0
houndstongue	<i>Cynoglossum officinale</i>	0
halogeton	<i>Halogeton glomeratus</i>	0
baby's breath	<i>Gypsophila muralis</i>	0

Efforts to reduce the spread of noxious weeds would be made during the project construction and maintenance processes. The following guidelines would be followed during construction, reclamation, and maintenance stages of the project to control the spread of noxious weeds.

- Construction equipment, materials, and vehicles would be stored at construction sites or at specified construction yards.
- All personal vehicles, sanitary facilities, and staging areas would be confined to a limited number of specified locations to decrease chances of incidental disturbance and spread of weeds.
- In areas with existing noxious weed infestations, vegetation, soils, and trench spoil material would be stockpiled adjacent to the removal point and, following construction, would be returned to its original locations to prevent spreading.
- Prompt re-establishment of the desired vegetation in disturbed areas is required. Seeding would occur during the frost-free periods after construction. Certified “noxious weed-free” seed would be used on all areas to be seeded.

#### 4.6.3 Potential Impacts on Vegetation and Noxious Weeds

The Proposed Action would result in the loss of native grassland vegetation and some improved livestock pasture vegetation. In addition to the removal of typical native grasslands, removal of existing vegetation may facilitate the spread of noxious weeds. The APD and this

EA require the operator to control noxious weeds throughout project areas. If a noxious weed community is found, it would be eradicated unless the community is too large, in which case it would be controlled or contained to prevent further growth. The services of a qualified weed control contractor would be utilized.

Surface disturbance and vehicular traffic must not take place outside approved ROWs for the well pad, access road, and gathering pipeline. Areas that are stripped of topsoil must be reseeded and reclaimed at the earliest opportunity. Additionally, certified weed-free straw and seed must be used for all construction, seeding, and reclamation efforts. Prompt and appropriate construction, operation, and reclamation are expected to maintain minimal levels of adverse impacts to vegetation and would reduce the potential establishment of invasive vegetation species.

The loss of acres, with implementation of BMPs and noxious weed management guidelines, would result in negligible levels of vegetation disturbance and would not result in significant adverse impacts to vegetation resources.

The Proposed Action would result in some loss of vegetation and ecological diversity of native mixed-grass prairie habitat. In addition, vegetation resources across the project area could be affected by foreseeable future energy development and surface disturbance in the CIAA. Continued oil and gas development within the CIAA could result in the loss, and further fragmentation, of native mixed-grass prairie habitat. Incremental impacts to quality native prairie may occur in the future from vegetation clearing and soil disturbance, soil loss, compaction, and increased encroachment of unmanaged invasive weed species. Past, present, and reasonably foreseeable future activities within the general area have reduced, and would likely continue to reduce, the amount of available habitat for certain listed species known to use native mixed-grass prairie habitats. Such impacts could be partially offset by avoidance of previously undisturbed prairie habitats, as well as implementation of soil and vegetation mitigation measures and BMPs. Cumulative impacts to vegetation and other biological resources are therefore expected to be minor.

## **4.7 WILDLIFE**

### **4.7.1 General Wildlife Species Occurrence and Habitat**

Small migratory birds were the only wildlife observed during the field visits. No eagles or nests were observed. Cumulatively, the potential impacts on various species and their habitats are minimal. Currently, no adverse impacts have been identified for either the Reservation or the adjacent areas.

### **4.7.2 Potential Impacts to Wildlife**

No impacts to listed species are anticipated because of the low likelihood of their occurrence within the proposed project area, confirmed by on-site assessments conducted by SWCA biologists. WPX has committed to using a closed-loop drilling system. For additional information on general BMPs and other operator-committed measures, please see Sections 3.2.3, Well Pad, and 4.12, Mitigation and Monitoring.

Minor impacts to unlisted wildlife species and their habitats could result from the construction of the well pad, access road, and utility corridor; increased vehicular traffic density; drilling activities; and long-term disturbances during commercial production. Ground clearing may impact habitat for small birds, small mammals, and other wildlife species. The Proposed Action may affect raptor and migratory bird species through direct mortality, habitat degradation, and/or displacement of individual birds. These impacts are regulated in part through the MBTA. Fragmentation of native prairie habitat can detrimentally affect grouse species; however, due to the ratio of each project area to the total landscape area, the overall disturbance would be negligible.

#### **4.7.3 Threatened and Endangered Species Occurrence and Habitat**

Several wildlife species that may exist in Dunn County (USFWS 2010) are listed as threatened or endangered under the Endangered Species Act (ESA) (16 USC 1531 et seq.). According to the USFWS, listed species in Dunn County, North Dakota, include the gray wolf, black-footed ferret, whooping crane, piping plover and its Designated Critical Habitat, interior least tern, and pallid sturgeon, as well as two federal candidate species, the Dakota skipper and the Sprague's pipit. In addition to the ESA, the Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668–668d, 54 Sta. 250) and the Migratory Bird Treaty Act of 1918 (MBTA) (916 USC 703–711) protect nesting migratory bird species. The listed species and their federal status are provided in Table 4-8 and discussed in detail in Appendix A. SWCA Environmental Consultants (SWCA) biologists did not observe any of these species or their habitats within the project area during surveys.

Several precautions that may limit or reduce the possible impact to all wildlife species include at the proposed well pad location include:

- locating the well pad over areas with existing disturbances;
- removing any oil found in pits and ponds; closed loop system is proposed for this location and no pits will be located at the site
- installing covers under drip buckets and spigots; and
- conducting interim reclamation of at least half the disturbed area.

Reclamation would begin without delay if a well is determined to be unproductive, or upon completion of commercial production.

Table 4-8. Summary of Potential Effects to Threatened and Endangered Species.

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Black-footed Ferret ( <i>Mustela nigripes</i> )	Endangered	Species is presumed extirpated from North Dakota.	None	No Effect
Gray Wolf ( <i>Canis lupus</i> )	Endangered	Nearest known gray wolf populations exist in Minnesota, Canada, Montana, and Wyoming. Western North Dakota sightings in the late twentieth century are speculated to be solitary, transient, young adult males seeking to establish territory.	None	May Affect, Is Not Likely to Adversely Affect
Whooping Crane ( <i>Grus americana</i> )	Endangered	Suitable habitat is present. However, no adverse impact is anticipated as a result of construction activities.	Drilling or construction activity would cease and the Bureau of Indian Affairs (BIA) and U.S. Fish and Wildlife Service would be notified if whooping cranes are sighted within 1 mile of the project area. Activities may commence when the birds have left the 1-mile buffer area.	May Affect, Is Not Likely to Adversely Affect
Piping Plover ( <i>Charadrius melodus</i> )	Threatened	Birds are unlikely to be present due to lack of suitable foraging or nesting habitat. The nearest suitable nesting and foraging habitat occurs on the shoreline and islands of Lake Sakakawea, approximately 4.86 straight line miles from the proposed well pad, access road, and utility corridor.	WPX would use a closed-loop drilling system for the proposed well pad and would surround the well pad with a containment berm designed to hold 110% of the largest tank plus one full day's daily production volume to prevent hazardous runoff or spills.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Designated Critical Habitat for Piping Plover	Designated Critical Habitat	Critical Habitat occurs within the watershed of the project area, on the shoreline and islands of Lake Sakakawea, between approximately 6.04 river miles from the proposed well pad, access road, and utility corridor.	WPX would implement all best management practices (BMPs), erosion control measures, and spill prevention practices required by the Clean Water Act.  WPX would use a closed-loop drilling system for the proposed well pad and would surround the well pad with a containment berm designed to hold 110% of the largest tank plus one full day's daily production volume to prevent hazardous runoff or spills.	May Affect, Is Not Likely to Adversely Affect
Interior Least Tern ( <i>Sterna antillarum</i> )	Endangered	The nearest suitable nesting and foraging habitat occurs on the shoreline and islands of Lake Sakakawea, approximately 6.04 river miles, and 4.86 straight line miles from the proposed well pad, access road, and utility corridor. Migrating or foraging interior least terns may transition through the project area.	See Designated Critical Habitat for Piping Plover Operator-Committed Measures.	May Affect, Is Not Likely to Adversely Affect
Pallid Sturgeon ( <i>Scaphirhynchus albus</i> )	Threatened	Lake Sakakawea is 6.04 river miles from the proposed well pad, access road, and utility corridor.	See Designated Critical Habitat for Piping Plover Operator-Committed Measures.	May Affect, Is Not Likely to Adversely Affect
Dakota Skipper ( <i>Hesperia dacotae</i> )	Candidate	Suitable habitat was noted within the project area. However, no adverse impact is anticipated as a result of construction activities.	The proposed well pad would be reclaimed as soon as possible after their lifespan is complete.  Impacted areas would be returned to pre-construction contours.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Sprange's Pipit ( <i>Anthus spragueii</i> )	Candidate	Suitable habitat was noted within the project area. However, no adverse impact is anticipated as a result of construction activities.	The proposed well pad would be reclaimed as soon as possible after their lifespan is complete. Impacted areas would be returned to pre-construction contours.	May Affect, Is Not Likely to Adversely Affect
<b>Other Federally Protected Species</b>				
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	Bald and Golden Eagle Protection Act (BGEPA) and Migratory Bird Treaty Act (MBTA)	Raptor habitat survey was conducted. SWCA observed no suitable nesting or foraging habitat within the project area. Transient individuals may enter the project area on occasion.	A 0.5-mile line of sight survey was conducted during the initial field survey and no suitable nesting habitat was observed within the project area.	No Adverse Effects Anticipated
Golden Eagle ( <i>Aquila chrysaetos</i> )	BGEPA and MBTA	No eagle nests were observed in the project area. Golden eagles may occasionally visit or forage within or around the project area.	A 0.5-mile line of sight survey was conducted during the initial field survey. The closest known golden eagle nest occurrence is approximately 3.97 miles southwest of the proposed well pad.	No Adverse Effects Anticipated
Migratory Birds	MBTA	Suitable habitat for nesting migratory grassland birds occurs in the project area.	See migratory bird protective measures in the wildlife section, Section 4.12.2.7.1	No Adverse Effects Anticipated

#### 4.8 CULTURAL RESOURCES

Historic properties, or cultural resources, on federal or tribal lands are protected by many laws, regulations, and agreements. Section 106 of the National Historic Preservation Act of 1966 (16 USC 470 et seq.) requires, for any federal, federally assisted, or federally licensed undertaking, that the federal agency take into account the affect of that undertaking on any district, site, building, structure, or object that is included in the National Register of Historic Places (National Register) before the expenditure of any federal funds or the issuance of any federal license. Cultural resources is a broad term encompassing sites, objects, or practices of archaeological, historical, cultural, and religious significance. Eligibility criteria (36 CFR 60.4) 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 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 (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 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. Thus, BIA consults and corresponds with the THPO regarding cultural resources on all projects proposed within the exterior boundaries of the Reservation.

A cultural resource inventory of this well pad and access road was conducted by personnel of SWCA Environmental Consultants, using an intensive pedestrian methodology. Approximately 91.72 acres were inventoried between November 1 and 10, 2011 (Herson 2012).\* No historic properties were located that appear to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.6) for inclusion on the National Register. As the lead federal agency, and as provided for in 36 CFR 800.5, on the basis of the information provided, BIA reached a determination of **no historic properties affected** for this undertaking. This determination was communicated to the THPO on March 7, 2012; however, the THPO did not respond within the allotted 30 day comment period.

\*N.B. This well pad was erroneously labeled the Martin Fox #30-17H well pad in the cultural resource inventory report.

If cultural resources are discovered during construction or operation, the operator shall immediately stop work, secure the affected site, and notify the BIA and THPO. Unexpected or inadvertent discoveries of cultural resources or human remains trigger mandatory federal procedures that include work stoppage and BIA consultation with all appropriate parties. Following any such discovery, operations would not resume without written authorization from the BIA. Project personnel are prohibited from collecting any artifacts or disturbing cultural resources in the area under any circumstance. Individuals outside the ROW are trespassing. No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required. The presence of qualified cultural resource monitors during construction activities is encouraged.

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

#### **4.9 PUBLIC HEALTH AND SAFETY**

Health and safety concerns include H<sub>2</sub>S gas that could be released as a result of drilling activities, hazards introduced by heavy truck traffic, and hazardous materials used or generated during construction, drilling, and/or production activities.

H<sub>2</sub>S is extremely toxic in concentrations above 500 parts per million, but it has not been found in measurable quantities in the Bakken/Three Forks Formation. Before reaching the Bakken/Three Forks, however, drilling would penetrate the Mission Canyon Formation, which is known to contain varying concentrations of H<sub>2</sub>S. Contingency plans submitted to the BLM comply fully with relevant portions of Onshore Oil and Gas Order No. 6 to minimize potential for gas leaks during drilling. Emergency response plans protect both the drilling crew and the general public within 1 mile of a well; precautions include automated sampling and monitoring by drilling personnel stationed at each well site.

Standard mitigation measures would be applied, and because release of H<sub>2</sub>S at dangerous concentration levels is very unlikely, no direct impacts from H<sub>2</sub>S are anticipated with implementation of the Proposed Action.

The number of tanker trips would depend on production, but WPX estimates approximately two trucks per day during the initial production period. Trucks for normal production operations would use the existing and proposed access roads. Produced water would be transported to an approved disposal site. All traffic would be confined to approved routes and conform to established load restrictions and speed limits for state and BIA roadways and haul permits would be acquired as appropriate.

The EPA specifies chemical reporting requirements under Title III of the Superfund Amendments and Reauthorization Act (SARA), as amended. No chemicals subject to reporting under SARA Title III (hazardous materials) in an amount greater than 10,000

pounds would be used, produced, stored, transported, or disposed of annually in association with the Proposed Action. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities would be used, produced, stored, transported, or disposed of in association with the Proposed Action. All operations, including flaring, would conform to instructions from BIA fire management staff.

Spills of oil, produced water, or other produced fluids would be cleaned up and disposed of in accordance with appropriate regulations. Sewage would be contained in a portable chemical toilet during drilling. All trash would be stored in a trash cage and hauled to an appropriate landfill during and after drilling and completion operations.

#### **4.9.1 Potential Impacts to Public Health and Safety**

With the implementation of the described reporting and management of hazardous materials, no adverse impacts to public health and safety are anticipated as a result of the proposed well pads. Other potential adverse impacts to any nearby residents from construction would be largely temporary. Noise, fugitive dust, and traffic hazards would be present for about 60 days during construction, drilling, and well completion as equipment and vehicles move on and off the site, and then diminish sharply during production operations. If a well proved productive, one small pumper truck would visit the well once a day to check the pump. Bakken/Three Forks wells typically produce both oil and water at a high rate initially. Gas would be flared initially and intermittently, while oil and produced water would be stored on the well pad in tanks and then hauled out by tankers until the well could be connected to gathering pipelines. Up to four 400-barrel oil tanks and one 400-barrel water tank would be located on the pad inside a berm of impervious compacted subsoil. The berm would be designed to hold 110% of the capacity of the largest tank plus one full day's production volume.

#### **4.10 SOCIOECONOMICS**

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

##### **4.10.1 Socioeconomic Analysis Area**

The scope of analysis for social and economic resources includes a discussion of current social and economic data relevant to the project area and surrounding communities of the Reservation and Dunn, McKenzie, McLean, and Mountrail counties, North Dakota. These counties were chosen for analysis because their proximity to the proposed well locations and overlap with the Reservation could result in socioeconomic impacts. These communities are collectively referred to as the analysis area.

##### **4.10.2 Population and Demographic Trends**

Historic and current population counts for the analysis area, compared to the state, are provided below in Table 4-9. The state population showed little change between the previous

two census counts (1990–2000); however, in 2010 the state population increased by 4.7% to 672,594 (U.S. Census Bureau 2011a). Populations in McKenzie and Mountrail counties have increased slightly from 2000 to 2009 while McLean and Dunn counties had a rate of decline of -10.8% and -6.5%, respectively (U.S. Census Bureau 2011b). These declines can be attributed to more people moving to metropolitan areas, which are perceived as offering more employment opportunities. However, population on or near the Reservation has increased approximately 13.3% from 2000 to 2005 (BIA 2005). While Native Americans are the predominant group on the Reservation, they are considered the minority in all other areas of North Dakota.

**Table 4-9. Population and Demographic Trends in the Analysis Area.**

County or Reservation	Population in 2009	% of State Population	% Change Between 1990–2000	% Change Between 2000–2009	Predominant Group in 2009 (%)	Predominant Minority in 2009 (Percent of Total Minority Population)
Dunn	3,365	0.5	-10.1	-6.5	Caucasian (85.3%)	American Indian (13.6%)
McKenzie	5,799	0.9	-10.1	1.1	Caucasian (76.7%)	American Indian (21.5%)
McLean	8,310	1.3	-11.0	-10.8	Caucasian (91.2%)	American Indian (7.1%)
Mountrail	6,791	1.0	-5.6	2.4	Caucasian (62.7%)	American Indian (35.1%)
On or near Fort Berthold Indian Reservation <sup>1</sup>	11,897	1.8	178.0 <sup>2</sup>	+13.3 <sup>3</sup>	American Indian (~73%)	Caucasian (~27%)
Statewide	672,594 <sup>4</sup>	100	0.5	4.7 <sup>4</sup>	Caucasian (91.1%)	American Indian (5.6%)

Source: U.S. Census Bureau 2011b.

<sup>1</sup> Population shown reflects the total enrollment in the tribe in 2005. 2008 data were unavailable. All information related to the Reservation reflects 2005 data, including state population. 11,897 reflects tribal enrollment on or near the Reservation. According to the BIA, near the Reservation includes those areas or communities adjacent or contiguous to the Reservation (BIA 2005).

<sup>2</sup> Reflects percent change between 1991 and 2001 (BIA 2001).

<sup>3</sup> Reflects percent change between 2001 and 2005.

<sup>4</sup> Reflects population levels in 2010 (U.S. Census Bureau 2011a).

As presented in Table 4-9, population growth on the Reservation (13.3%) exceeds the overall growth in the state of North Dakota (4.7%) and four counties in the analysis area. This trend in population growth for the Reservation is expected to continue in the next few years (Fort Berthold Housing Authority 2008).

### 4.10.3 Employment

The economy in the state of North Dakota, including the Reservation and four counties in the analysis area, has historically depended on agriculture, including grazing and farming. However, 2010 economic data indicate that the major employers in North Dakota include government and government enterprises, which employed 16.6%; health care and social assistance, which employed 11.9%; and retail trade, which employed 10.8% of the state's labor force (U.S. Bureau of Economic Analysis 2011a). Energy development and extraction, power generation, and services related to these activities have become increasingly important over the last several years and many service sector jobs are directly and indirectly associated with oil and gas development.

In 2010, total employment in the state of North Dakota was approximately 355,000 (Table 4-10). The average weekly wage for all employees on private nonfarm payrolls was \$697 in North Dakota. The four counties in the analysis area showed average weekly wages that were higher than the state and national average in 2010 (Table 4-10).

In 2010, the statewide unemployment rate was 3.8% of the workforce (Table 4-10). This is the lowest unemployment rate in the nation (Bureau of Labor Statistics 2011a). All counties in the analysis area experienced a decreased unemployment since 2005 (Table 4-10).

**Table 4-10. 2010 Total Employment, Average Weekly Wages, and Unemployment Rates.**

Location	Total Employment	Average Weekly Wage	Unemployment Rate	Change in Unemployment Rate (2005-2010)
United States	139,909,000	\$781	9.4%	+4.3%
North Dakota	355,000	\$697	3.8%	+0.4%
Dunn County	1,684	\$829	3.3%	-0.1%
McKenzie County	2,625	\$1,006	2.6%	-1.1%
McLean County	2,674	\$820	3.8%	-1.2%
Mountrail County	4,713	\$947	2.4%	-3.6%
On or near Fort Berthold Indian Reservation*	1,287	N/A	71%	N/A

Sources: Bureau of Labor Statistics 2011a, 2011b; U.S. Department of Agriculture 2011; BIA 2005.

\* Represents 2005 data only.

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

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

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

#### **4.10.4 Income**

Per capita income is often used as a measure of economic performance, but it should be used with changes in earnings for a realistic picture of economic health. Since total personal income includes income from 401(k) plans and other non-labor income sources like transfer payments, dividends, and rent, it is possible for per capita income to rise even if the average wage per job declines over time. The North American Industry Classification System is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. Per capita income, median household income, and poverty rates for the analysis area and North Dakota are presented in Table 4-11.

**Table 4-11. Income and Poverty in Analysis Area, 2008.**

<b>Unit of Analysis</b>	<b>Per Capita Income<sup>1</sup> (2000)</b>	<b>Per Capita Income<sup>1</sup> (2008)</b>	<b>Median Household Income<sup>2</sup> (2009)</b>	<b>Percent of all People in Poverty<sup>2</sup> (2009)</b>
Dunn County	\$21,031	\$29,558	\$44,681	11.2%
McKenzie County	\$22,269	\$36,862	\$49,465	12.8%
McLean County	\$23,125	\$42,466	\$49,212	10.3%
Mountrail County	\$23,045	\$34,590	\$49,884	12.4%
Fort Berthold Indian Reservation <sup>3</sup>	\$8,855	\$10,291 <sup>3</sup>	\$26,977 <sup>3</sup>	N/A
North Dakota	\$25,624	\$39,874	\$47,898	11.7%

<sup>1</sup>U.S. Bureau of Economic Analysis 2011a, 2011b.

<sup>2</sup>U.S. Census Bureau 2009a.

<sup>3</sup> Population shown reflects the total enrollment in the tribe in 2005. 2008 data were unavailable. All information related to the Reservation reflects 2005 data (BIA 2005).

From 2000 to 2008, per capita income increased by 28.8% for Dunn County, 39.6% for McKenzie County, 45.5% for McLean County, and 33.4% for Mountrail County. These

figures compare to a 35.7% increase for the State of North Dakota per capita personal income (U.S. Bureau of Economic Analysis 2009).

According to a 2008 report published by the Fort Berthold Housing Authority, the average per capita income for the Reservation was \$8,855 in 1999, compared to \$25,624 for the state and the national average of \$21,587 at that time (Fort Berthold Housing Authority 2008). The median household income on the Reservation was \$26,977, compared to the national median of \$41,994.

With the exception of McLean County, counties that overlap the Reservation tend to have per capita incomes below the North Dakota state average. In addition, Dunn County and the Reservation have median household incomes below the North Dakota state average. As presented in Table 4-10, Dunn, McKenzie, and Mountrail counties have unemployment levels below the state average of 3.8%. Subsequently, Reservation residents and MHA Nation members tend to have per capita incomes and median household incomes below the averages of the encompassing counties, as well as statewide; and higher unemployment.

#### **4.10.5 Housing**

Workforce-related housing can be a key issue associated with development. Historical information on housing in the four counties in the analysis area was obtained from the U.S. Census Bureau, 2000 Census, with 2009 updates (U.S. Census Bureau 2011c). Because the status of the housing market and housing availability changes often, current housing situations can be difficult to characterize quantitatively. Therefore, this section discusses the historical housing market. Table 4-12 provides housing unit supply estimates for the analysis area and the Reservation.

**Table 4-12. Housing Development Data for the Reservation and Encompassing Counties.**

Region	Total Housing Units						% Change 2000–2009
	Occupied	Owner Occupied	Renter Occupied	Vacant	Total	Total	
	2000	2000	2000	2000	2000	2009	
Dunn	1,378	1,102	276	587	1,965	1,985	+1.0
McKenzie	2,151	1,589	562	568	2,719	2,801	+2.9
McLean	3,815	3,135	680	1,449	5,264	5,461	+3.6
Mountrail	2,560	1,859	701	878	3,438	3,607	+4.7
Reservation	1,908	1,122	786	973	2,881	N/A	N/A
North Dakota	257,152	171,299	85,853	32,525	289,677	316,435	+8.5

Source: U.S. Census Bureau 2011c.

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

construction has recently increased within much of the analysis area, but availability remains low.

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

In addition to the relatively low percent change of the total housing units compared to the state average, these four counties are ranked extremely low for both the state and national housing starts and have minimal new housing building permits, as presented in Table 4-13.

**Table 4-13. Housing Development Data for the Encompassing Counties, 2000–2008.**

Housing Development	North Dakota County			
	Dunn	McKenzie	McLean	Mountrail
New private housing building permits 2003–2008	14	14	182	110
Housing starts / state rank	51 / 53	15 / 53	21 / 53	17 / 53
Housing starts / national rank	3,112 / 3,141	2,498 / 3,141	2,691 / 3,141	2,559 / 3,141

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

#### **4.10.6 Potential Impacts to Socioeconomics**

Impacts to socioeconomic resources of the analysis area would be incremental and therefore would not adversely impact the local area. Short-term impacts to socioeconomic resources would generally occur during the construction/drilling and completion phase of the proposed wells. Long-term effects would occur during the production phase, should the wells prove successful.

As presented in Table 4-14, implementation of the proposed wells is anticipated to employ approximately 10 to 35 workers per well during the five month construction and completion phase. If the wells prove successful, WPX would install production facilities and begin long-term production. To ensure successful operations, production activities require between one and four full-time employees to staff operations. It is anticipated that a mixture of local and WPX employees would work in the project area. Therefore, any increase in workers would result in a short-term increase in population in the project area required for short-term operations and would create an incremental increase in demand for services or infrastructure on the Reservation or the communities near the project area.

**Table 4-14. Duration of Employment During the Proposed Action Implementation.**

<b>Activity</b>	<b>Duration of Activity (average days per well)</b>	<b>Daily Personnel (average number per well)</b>
Construction (access road and well pad)	5–8 days	3–5
Drilling	30–35 days	8–15
Completion/Installation of facilities	Approx. 10 days	3–8
Production	Ongoing – life of well	1–4

Although some counties within the analysis area have experienced a recent decline in population between 2000 and 2009 (as shown in Table 4-9), the population on the Reservation itself has increased. This has not led to housing shortages. The historic housing vacancy rate (Table 4-12) indicates that housing has remained available despite the growth of the population on the Reservation. The levels of available housing are therefore anticipated to be able to absorb the projected slight increase in population related to this Proposed Action. As such, the Proposed Action would not have measurable impacts on housing availability or community infrastructure in the area. The Proposed Action also would not result in any identifiable impacts to social conditions and structures within the communities in the project area.

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

#### **4.11 ENVIRONMENTAL JUSTICE**

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

The EPA headed the interagency workgroup established by the 1994 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.

EJ is an evolving concept with potential for disagreement over the scope of analysis and the implications for federal responsiveness. Nevertheless, due to the population numbers, tribal members on the Great Plains qualify for EJ consideration as both a minority and low-income population. Table 4-15 summarizes relevant data regarding minority populations for the CIAA.

**Table 4-15. Minority Population Breakdown by North Dakota County and Race, 2000–2008<sup>1</sup>.**

Race	Dunn		McKenzie		McLean		Mountrail		North Dakota	
	2000	2008	2000	2008	2000	2008	2000	2008	2000	2008
Total Population	3,600	3,318	5,737	5,674	9,311	8,337	6,629	6,511	642,204	641,481
Non-Hispanic	3,573	3,275	5,679	5,581	9,230	8,191	6,542	6,327	634,418	628,254
Hispanic or Latino <sup>2</sup>	27	43	58	93	81	146	87	184	7,786	13,227
<b>Races</b>										
Caucasian	3,123	2,818	4,457	4,329	8,632	7,610	4,546	4,086	596,722	586,272
African American	1	2	4	30	2	9	7	27	4,157	6,956
American Indians and Alaska Natives	448	467	1,216	1,230	568	587	1,988	2,277	31,440	35,666
Asian / Pacific Islanders	8	3	4	10	12	19	17	20	3,912	5,095
Two or More Races	25	28	39	75	97	112	71	101	5,973	7,492
All Minorities	509	543	1,321	1,438	760	808	2,170	2,609	53,268	55,209
% Minority Population	14.1	16.4	23.0	25.3	8.2	9.7	32.7	40.1	8.3	8.6
Change in Minority Population (2000-2008)	+6.7%		+8.9%		+6.3%		+20.2%		+3.6%	

<sup>1</sup> U.S. Census Bureau estimates of population demographics were made in July 2008.

<sup>2</sup> Hispanic or Latino may be of any race.

Source: U.S. Census Bureau 2010a.

In July 2008, the U.S. Census estimated that North Dakota's total minority population comprised approximately 55,209 persons, or 8.6% of the state's total population (i.e., 641,481 residents). This represents an increase of 3.63% over the 2000 minority population of the state, even though the state's total population decreased during the same time. An even stronger trend of increased minority population, and decrease in overall population occurred in the CIAA during the same time period. As presented in Table 4-15, the number of Caucasian residents decreased, while minorities in nearly all categories increased, producing a strong increase in the percentage of minority population in each of the counties in the CIAA during the period from 2000 until 2008 (U.S. Census Bureau 2010a). The four counties of the CIAA showed an increase of 6.3% to 20.2% in minority population, compared with the statewide increase of 3.6%.

The American Indian and Alaska Native population is the largest minority in each of the counties, as well as for the state as a whole (North Dakota Indian Affairs Commission [NDIAC] 2010). The NDIAC reports that the American Indian population (race alone or in combination) in North Dakota has increased 12% from 31,440 in 2000 to 35,666 in 2008 (U.S. Census Bureau 2010a), with estimates for the future American Indian population (one race only) at 47,000 in 2015 and 59,000 in 2025 in North Dakota (NDIAC 2010). The Reservation had a total population of 5,915 in the 2000 census, with 67.4% American Indian, mostly with tribal affiliations with MHA Nation (NDIAC 2010).

Poverty rate data for the counties in the CIAA are summarized in Table 4-16. The data show that poverty rates have decreased in the CIAA during the period from 2000 to 2008 (U.S. Census Bureau 2010). However, except for McLean County, the poverty rates are higher and the median household incomes are lower for area residents in 2008, compared with the statewide poverty rate of 11.5% and median household income of \$45,996.

**Table 4-16. Poverty Rates and Median Household Income for the Analysis Area.**

<b>Location</b>	<b>2000</b>	<b>2008</b>	<b>2008 Median Household Income</b>
Dunn County	13.3%	12.2%	\$40,801
McKenzie County	15.7%	14.4%	\$44,704
McLean County	12.3%	11.1%	\$46,131
Mountrail County	15.7%	14.0%	\$41,551
North Dakota	10.4%	11.5%	\$45,996

Source: U.S. Census Bureau 2010b.

#### **4.11.1 Potential Impacts to Environmental Justice**

The CIAA, having larger and increasing minority populations, compared with statewide numbers, could result in disproportionately beneficial impacts from the proposed oil field development. These would derive from direct and indirect economic opportunities for tribal members. Generally, existing oil and gas leasing has already benefited the MHA Nation government and infrastructure from tribal leasing, fees, and taxes. Current oil and gas leasing on the Reservation has also already generated revenue to MHA Nation members who hold

surface and/or mineral interests. However, owners of allotted surface within the Analysis Area may not necessarily hold mineral rights. In such cases, surface owners do not receive oil and gas lease or royalty income, and their only related income would be compensation for productive acreage lost to road and well pad construction. Those with mineral interests also may benefit from royalties on commercial production if the wells prove successful. Profitable production rates at proposed locations might lead to exploration and development of additional tracts owned by currently non-benefitting allottees. In addition to increased revenue for land and mineral holders, exploration and development would increase employment on the Reservation with oversight from the Tribal Employment Rights Office, which would help alleviate some of the poverty prevalent on or near the Reservation. Tribal members without either surface or mineral rights would not receive any direct benefits, except through potential employment, should they be hired. Indirect benefits of employment and general tribal gains would be the only potential offsets to negative impacts. Poverty rates in the CIAA have already begun to decrease since oil and gas development began after 2000, as shown in Table 4-16. There is potential for adverse economic impacts to tribal members who do not reside within the Reservation and therefore do not share in direct or indirect benefits.

Potential adverse impacts could occur to tribes and tribal members, as well, such as the potential disturbance of any Traditional Cultural Properties and cultural resources. These potential impacts are reduced through surveys of proposed well locations and access road routes and thorough reviews and determinations by the BIA that there would be no effect to historic properties. Furthermore, nothing is known to be present that qualifies as a Traditional Cultural Property or for protection under the American Indian Religious Freedom Act. The possibility of disproportionate impacts to tribes or tribal members is further reduced by the requirement for immediate work stoppage following an unexpected discovery of cultural resources of any type. Mandatory consultation would take place during any such work stoppage, affording an opportunity for all affected parties to assert their interests and contribute to an appropriate resolution, regardless of their home location or tribal affiliation.

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

#### **4.12 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 on a case by case basis for all ground-disturbing activities. Each phase of construction and development through production would be monitored by the BLM, BIA, and representatives of the MHA Nation to ensure the protection of cultural, archaeological, and natural resources. In conjunction with 43 CFR 46.30, 46.145, 46.310, and 46.415, a report

would be developed by the BLM and BIA that documents the results of monitoring in order to adapt the projects to eliminate any adverse impact on the environment.

Mitigation opportunities can be found in general and operator-committed BMPs and mitigation measures. BMPs are loosely defined as techniques used to lessen the visual and physical impacts of development. The BLM has created a catalog of BMPs that, when properly implemented, can assist industry in a project's design, scheduling, and construction techniques. WPX would implement, to the extent possible, BMPs in an effort to mitigate environmental concerns in the planning phase, thereby allowing for smoother analysis, and possibly faster project approval. Many of these are required by the BLM when drilling federal or tribal leaseholds and can be found in the surface use plan in the APD. The regulatory agencies provide Conditions of Approval and enforcement would occur as a result of non-compliance which adds incentives for strict adherence to the BMPs.

#### **4.12.1 General BMPs**

Although largely project-specific, there are a number of BMPs that can, and should, be considered on development projects in general. The following are examples of general BMPs that WPX has committed to using.

- Planning roads and facility sites to minimize visual impacts.
- Using existing roads to the extent possible, upgrading as needed.
- Reducing the size of facility sites and types of roads to minimize surface disturbance.
- Minimizing topsoil removal.
- Stockpiling stripped topsoil and protecting it from erosion, by seeding with native grasses, until reclamation activities commence. At that time, the soil would be redistributed and seeded on the disturbed areas. The reclaimed areas would be protected and maintained until the sites are fully stabilized.
- Avoiding removal of, and damage to, trees, shrubs, and groundcover where possible.
- Clearing a facility or well site to accommodate vehicles or equipment.
- Maintaining buffer strips or using other sediment control measures to avoid sediment migration to stream channels as a result of construction activities.
- Planning for erosion control.
- Storing chemicals properly (including secondary containment).
- Keeping sites clean, including containing trash in a portable trash cage. The trash cage would be emptied at a state-approved sanitary landfill.
- Conducting snow removal activities in a manner that does not adversely impact reclaimed areas and areas adjacent to reclaimed areas.
- Avoiding or minimizing topographic alterations, activities on steep slopes, and disturbances within stream channels and floodplains to the extent possible.
- Maintaining buffers around work areas where there is a risk of fire as a result of construction activities.
- Keeping fire extinguishers in all vehicles.

- Planning transportation to reduce vehicle density.
- Posting speed limits on roads.
- Avoiding traveling during wet conditions that could result in excessive rutting.
- Painting facilities a color that would blend with the environment.
- Practicing dust abatement on roads.
- Re-contouring disturbed areas to approximate the original contours of the landscape.
- Developing a final reclamation plan that allows disturbed areas to be quickly absorbed into the natural landscape.

WPX commits to implementing all BMPs identified during the on-site inspection that can be used to mitigate environmental concerns specific to projects associated with below-ground linear alignments, such as those included in the proposed utility corridor. BMPs identified during the on-site inspection include the following.

- Locate the proposed well pad, access road, and utility corridor in areas with existing disturbances to the extent possible.
- Install covers under drip buckets and spigots.
- Use a closed-loop drilling system where there will be no pit unless there is an emergency. Any fluids and cuttings would be transported off-site to be disposed of at an approved facility.
- Construct berms and install straw waddles on the downslope sides of the proposed well pad.
- Follow the contour (form and line) of the landscape.
- Co-locate multiple utility lines in the same trench.
- Use natural (topography, vegetation) or artificial (berms) features to help screen facilities such as valves and metering stations.
- Paint facilities a color that would blend with the environment.
- Contour disturbed areas to approximate the original contours of the landscape.
- Implement proper storage of chemicals (including secondary containment).
- Keep sites clean, including containing trash in a portable trash cage. The trash cage would be emptied at a state-approved sanitary landfill.
- Avoid or minimize topographic alterations, activities on steep slopes, and disturbances within stream channels and floodplains to the extent possible.
- Keep a watering truck on site and water the access roads as necessary, especially during periods of high winds and/or low precipitation.
- Avoid construction and vehicle use during wet conditions that could result in excessive rutting.
- Avoid removal of, or damage to, trees and woody shrubs where possible.
- Mow the facility or well site instead of clearing vegetation to accommodate vehicles or equipment.

- Conduct interim reclamation of at least half the disturbed area.
- Conduct reclamation without delay if a well is determined to be unproductive, or upon completion of commercial production.
- Lay matting and/or conduct hydro seeding on the fill side of the pad.
- Grind trees and other woody material removed from the pad and add to the topsoil.
- Minimize topsoil removal and stockpile stripped topsoil and protect it from erosion until reclamation activities commence.
- During reclamation, redistribute and seed the topsoil on the disturbed areas, and protect and maintain reclaimed areas until the sites are fully stabilized.
- Develop a final reclamation plan that allows disturbed areas to be quickly absorbed into the natural landscape.
- Maintain buffer strips or use other sediment control measures to avoid sediment migration to stream channels as a result of construction activities.
- Implement an erosion control plan.
- Implement approved Stormwater Pollution Prevention Plan and BMPs for the construction of the access roadway and proposed well pad to prevent erosion and sedimentation.
- Install appropriately sized culverts or other stable stream crossings for any intermittent stream crossings.
- Design roads and facility sites to minimize visual impacts.
- Use existing roads to the extent possible, upgrading as needed.
- Minimize the size of facility sites and types of roads to reduce surface disturbance.
- Avoid locating ROWs on steep slopes.
- Share any common ROWs whenever possible.
- Plan transportation to reduce vehicle density.
- Post speed limits on roads.
- Conduct snow removal activities in a manner that does not adversely impact reclaimed areas and areas adjacent to reclaimed areas.
- Require construction crews to carry fire extinguishers in their vehicles and/or equipment.
- Require construction crews be trained in the proper use of fire extinguishers.
- Contract with the local fire district to provide fire protection.

WPX is committed to implementing these and/or other BMPs to the extent that they are technically feasible and would add strategic and measurable protection to the project area, as well as all specific items identified at the on-site inspections for the proposed well pad, access road, and utility corridor.

#### **4.12.2 Mitigation and Safety Measures Committed to by WPX**

##### **4.12.2.1 Air Quality**

- Transportation BMPs to reduce the amount of fugitive dust and vehicle emissions
  - Use directional drilling to drill multiple wells from a single well pad;
  - use centralized water storage and delivery, well fracturing, gathering systems;
  - use telemetry to remotely monitor and control production;
  - use water or dust suppressants to control fugitive dust on all access roads and haul roads for the proposed project;
  - control road speeds; and
  - use van or carpooling.
- Drilling BMPs to reduce rig emissions
  - Use cleaner diesel (Tier 2, 3, and 4) engines;
  - use natural gas-powered engines; and
  - use “green” completions to recapture product that otherwise would have been vented or flared.
- Unplanned or emergency releases
  - Use high-temperature flaring if gas is not recoverable.
- Vapor recovery
  - Use enclosed tanks instead of open pits to reduce fugitive VOC emissions; and
  - use vapor recovery units on storage tanks.
- Inspection and maintenance
  - Use and maintain proper hatches, seals, and valves;
  - optimize glycol circulation and install a flash tank separator;
  - use selective catalytic reduction; and
  - replace high-bleed with low-bleed devices on pneumatic pumps.
- Monitoring and repair
  - Use directed inspection and maintenance methods to identify and cost-effectively fix fugitive gas leaks; and
  - install an air quality monitoring station.

##### **4.12.2.2 Dust Control**

During construction, a watering truck may be kept on site and the access roads would be watered as necessary, especially during periods of high winds and/or low precipitation.

##### **4.12.2.3 Utility Lines**

All utility lines, including gathering pipelines, and electric and fiber optic lines, essential to oil well operations, would be installed underground.

#### 4.12.2.4 Fire Control

WPX would implement fire prevention and control measures including, but not limited to:

- requiring construction crews to carry fire extinguishers in their vehicles and/or equipment;
- training construction crews in the proper use of fire extinguishers; and
- contracting with the local fire district to provide fire protection.

#### 4.12.2.5 Traffic

Construction personnel would stay within the approved ROW or would follow designated access roads.

#### 4.12.2.6 Closed-Loop System

WPX commits to using a closed-loop system for the proposed Martin Fox #20-17H well pad location.

#### 4.12.2.7 Wildlife

During an informal Section 7 consultation with the USFWS, the following mitigation measures were agreed upon to reduce the potential impact to protected species.

##### *4.12.2.7.1 Bald and Golden Eagle and Migratory Bird Protective Measures*

- SWCA biologists conducted a 0.5-mile line-of-sight survey for eagle individuals and nests during their on-site environmental survey. No eagles or nests were observed within 0.5 mile of the proposed project area.
- WPX would conduct all construction outside of the migratory bird breeding season (between July 16 and January 31); or, if construction occurs during bird breeding season, WPX would either:
  - mow and maintain vegetation within the project construction area (access road and well pad), weather permitting, prior to and during the breeding season to deter migratory birds from nesting in the project area until construction is underway; or
  - conduct an avian survey of the project area no greater than five days before construction begins, and if nests are discovered, notify BIA and USFWS.

##### *4.12.2.7.2 ESA Protective Measures*

- Piping Plover and its Designated Critical Habitat, Interior Least Tern, and Pallid Sturgeon: WPX commits to constructing a 2-foot high berm for controlling influential stormwater runoff and/or an oil spill event. Agreed to during the on-site inspection, this berm would be designed to hold a minimum 110% of the capacity of the largest tank plus one full day's production, placed around the location to prevent any accidental release of drilling fluids or hazardous materials into the watersheds of Lake Sakakawea. Migratory bird protective measures would be enforced.
- Whooping Crane: If a whooping crane is sighted within 1 mile of the proposed project area, work would be stopped and the BIA and USFWS would be notified. In coordination with the USFWS, work may resume after the bird(s) leaves the area.

It is the opinion of the USFWS that WPX's commitment to implement the avoidance measures described above demonstrates compliance with the ESA, MBTA, and BGEPA. Copies of the USFWS letters resulting from the informal Section 7 consultation are provided in Appendix C.

#### 4.12.2.8 Cultural Resources

WPX recognizes the need to protect cultural resources on the project locations and has committed to the following.

- Prohibiting all project workers from collecting artifacts or disturbing cultural resources in any area under any circumstances.
- Avoiding impacts to National Register-eligible or unevaluated cultural resources on well sites and access roads. If cultural resources are discovered during construction or operation, work shall immediately be stopped, the affected site be secured, and BIA and THPO notified. In the event of a discovery, work shall not resume until written authorization to proceed has been received from the BIA.

#### **4.13 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

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

#### **4.14 SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY**

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

#### **4.15 CUMULATIVE IMPACTS**

Environmental impacts may accumulate either over time or in combination with similar events in the area. Unrelated and dissimilar activities may also have negative impacts on critical elements, thereby contributing to the cumulative degradation of the environment. For purposes of this analysis, the CIAA is considered to be all lands within a 20-mile radius of the project area.

Past and current disturbances in the CIAA include farming, grazing, roads, and other oil and gas wells, both on the Reservation and off. Although the project area is surrounded on all

sides by Reservation lands, land ownership is not relevant to the assessment of cumulative impacts except as it is predictive of future impacts. Farming and grazing activities occur on the Reservation regardless of the density of oil and gas development, since undivided interests in the land surface, range permits, and agricultural leases are often held by different tribal members than those holding mineral rights, such that economic benefits of both agricultural and oil and gas activities currently co-exist.

Over the past several years, exploration has accelerated over the Bakken/Three Forks Formation. Existing oil and gas wells within 1 mile, 5 miles, 10 miles, and 20 miles of the project area are listed in Table 4-17. Existing oil and gas development has been occurring for several years on private fee land surrounding the Reservation, such that many more wells currently exist off the Reservation, as shown in Table 4-17 and Figure 4-5.

**Table 4-17. Number of Confidential, Active, and Permitted Wells Surrounding the Project Area.**

Martin Fox #20-17H Well Pad	1-mile CIAA		5-mile CIAA		10-mile CIAA		20-mile CIAA	
	on	off	on	off	on	off	on	off
Reservation (on/off)								
Active Wells	1	0	39	0	121	3	300	310
Confidential Wells	0	0	61	0	153	5	280	93
Permitted Wells	0	0	1	0	11	2	29	10
Cumulative total wells CIAA	1		101		295		1,022	

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

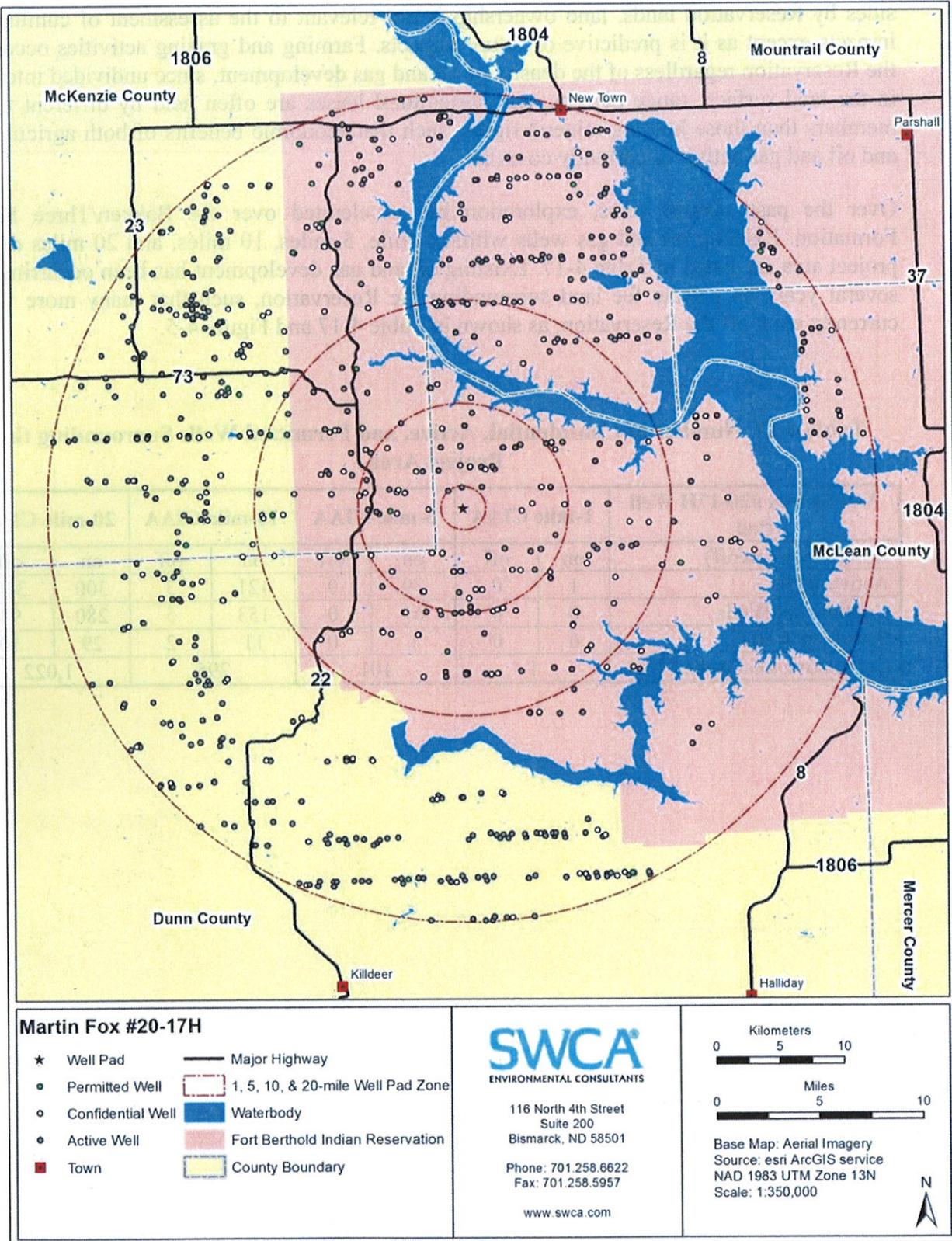


Figure 4-5. Existing and projected future oil and gas development within a 1-, 5-, 10-, and 20-mile radius of the proposed Martin Fox #20-17H well pad location.

Reasonably foreseeable impacts of future developments in the CIAA must also be considered. Should development of the proposed Martin Fox #20-17H well pad prove productive, it is likely that WPX and other operators would pursue additional development in the CIAA. For purposes of cumulative impact analyses, the density of active and permitted oil wells and associated facilities (including access and utility corridors) is expected to increase steadily within the CIAA over the next decade. Oil and gas development is expected to have a minor cumulative effect on land use patterns and the human and natural environment, due to the dispersed and passive nature of the development.

Within the Reservation and near the proposed project areas, development projects remain few and widely dispersed. Dispersed location of well pads is achieved through the use of federal planning units, called spacing units, designed to maintain productivity of future wells. The dominant spacing units are 1,280 acres, although 680-acre and 320-acre units also may exist. Given the expected dispersal of future oil and gas well development, the current pattern of farming and ranching activities is expected to continue as the secondary economic activity in the CIAA with little change because virtually all available acreage is already organized into range units to use surface resources for economic benefit. The same economic incentives for co-existing agricultural land uses and oil and gas development may not occur off the Reservation, and agriculture and grazing may be reduced in the future as the economic benefits of oil production increases.

If the pace and level of oil and gas development within this region of the state continues at the current rate over the next few years, it is expected to contribute incrementally to cumulative air quality impacts. The Proposed Action would incrementally contribute to emissions occurring within the region. In general, however, the increase in emissions associated with the Proposed Action would occur predominantly during construction and drilling operations and would therefore be localized, largely temporary, and limited in comparison with regional emissions. Since the AQI is exceptionally low in the CIAA (see Section 4.2), and the expected future development would be widely dispersed in time and space, the Proposed Action is not expected to impact attainment status based on any of the Primary and Secondary NAAQS for criteria pollutants or other regulated air emissions. Contribution of the proposal to incremental increases of unregulated GHG emissions is expected to be minor.

No surface discharge of water would occur under the Proposed Action, nor would any unpermitted use of surface water or groundwater occur as a result of project development. The Proposed Action, when combined with other future actions, such as cattle grazing, other oil and gas development, and agriculture in the CIAA would tend to increase sedimentation and runoff rates.

Sediment yield from active roadways could occur at higher rates than background rates and continue indefinitely. Thus, the Proposed Action could incrementally add to existing and future sources of water quality degradation in the Lucky Mound Creek Bay, Skunk Creek, and Upper Bear Den Creek sub-watersheds. However, any potential increase in degradation would be reduced by WPX's commitment to minimizing disturbance, using erosion control measures as necessary, and implementing BMPs designed to reduce impacts.

Unlike well pads, active roadways are not typically reclaimed, thus sediment yield from roads can continue indefinitely at rates two to three times the background rate. The Proposed Action would create approximately 1,539.70 feet of roads in the CIAA, adding incrementally to existing and future impacts to soil resources, dust deposition, and erosion processes. New well field developments would be speculative until APDs are submitted to the BLM and BIA for approval. Additional wells are likely to be drilled in the same general area as the Proposed Action, using many of the same main access roads and minimizing the disturbance as much as possible.

WPX is committed to using BMPs to mitigate the potential effects of erosion. BMPs would include implementing erosion and sedimentation control measures, such as installing culverts with energy dissipating devices at culvert outlets to avoid sedimentation in ditches, constructing water bars in conjunction with slopes, and planting cover crops to stabilize soil following construction and before permanent seeding takes place. Additional information regarding BMPs can be found in Section 4.12, Mitigation and Monitoring.

The Proposed Action would result in some loss of vegetation and ecological diversity of native mixed-grass prairie habitat. In addition, vegetation resources across the project area could be affected by foreseeable future energy development and surface disturbance in the CIAA. Continued oil and gas development within the CIAA could result in the loss, and further fragmentation, of native mixed-grass prairie habitat. Incremental impacts to quality native prairie may occur in the future from vegetation clearing and soil disturbance, soil loss, compaction, and increased encroachment of unmanaged invasive weed species. Past, present, and reasonably foreseeable future activities within the general area have reduced, and would likely continue to reduce, the amount of available habitat for certain listed species known to use native mixed-grass prairie habitats. Such impacts could be partially offset by avoidance of previously undisturbed prairie habitats, as well as implementation of soil and vegetation mitigation measures and BMPs. Cumulative impacts to vegetation and other biological resources are therefore expected to be minor.

Cumulatively, the potential impacts on various species and their habitats would be minimal. Currently, no adverse impacts have been identified for either the Reservation, or the adjacent areas. The BMPs designed to protect individual species and classes of species of interest would also protect most of the remaining species both locally and cumulatively.

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

The Proposed Action would incrementally add to existing and future socioeconomic impacts in the general area. The Proposed Action includes development of one new well pad, which would be an additional source of revenue for some residents of the Reservation. Increases in employment would be temporary during the construction, drilling, and completion phases of

the Proposed Action. Therefore, little change in employment would be expected over the long term.

No significant negative impacts are expected to affect any element of the human and natural environment; impacts would generally be low and mostly temporary from both a context and intensity standpoint. Current impacts from oil and gas-related activities are still fairly dispersed, and the required BMPs would limit potential impacts. The cumulative impacts from activities on the Reservation are still limited enough to not appear to be significant. This is being studied currently by a programmatic EA. Cumulative impacts over the entire field have not been assessed. Information available to the authors of this report from the State of North Dakota indicates all impacts are non-significant also by the standards in 40 CFR 1500.8.28.

Concerns regarding fracturing fluid contamination of aquifers in natural gas formations outside of the Bakken/Three Forks Formation that are commonly used for drinking water have been recently investigated by the EPA (EPA 2010e). Aquifers identified in Table 4-3 of this document include the Sentinel Butte Formation which is used for drinking water and occurs at depths of 0 to 670 feet below ground surface, while the deepest aquifer identified in the project area, the Fox Hills Formation, occurs at depths of 1,100 to 2,000 feet below ground surface. By contrast, the oil wells proposed in this undertaking would achieve depths no shallower than 9,200 feet below ground surface, well below any known aquifer in the project area. Additionally, as discussed in Section 3.2.7 of this document, surface casing would be employed to a depth of 2,500 feet below ground surface to isolate all near surface aquifers. Potentially as a result of the disparity in depths of the aquifers and oil wells, no direct or indirect impacts have yet been identified with fracturing in the Bakken/Three Forks Formation.

WPX has committed to implementing interim reclamation of the access road, utility corridor, and well pad immediately following construction and completion. Implementation of both interim and permanent reclamation measures would decrease the magnitude of cumulative impacts.

## **5.0 CONSULTATION AND COORDINATION**

The BIA must continue to make efforts to solicit the opinions and concerns of all stakeholders. For the purpose of this EA, a stakeholder is considered any agency, municipality, or individual person to which the proposed action may affect either directly or indirectly in the form of public health, environmental, or socioeconomic issues. A scoping letter declaring the location of the proposed project areas and explaining the actions proposed at each site was sent in advance of this EA to allow stakeholders ample time to submit comments or requests for additional information. The comments and suggestions received from stakeholders are shown in Table 5-1. Additionally, a copy of this EA would be submitted to all cooperating federal agencies and also to those agencies with interests in or near the proposed actions that could be affected by those actions. The USFWS concurrence letter is provided in Appendix D.

**Table 5-1. Scoping Comments.**

<b>Name</b>	<b>Organization</b>	<b>Comment</b>	<b>Response to Comment</b>
Bagley, Lonny	BLM	No Comment	
Bercier, Marilyn	BIA	No Comment	
Berg, George	NoDak Electric Cooperative, Inc.	No Comment	
Boyd, Bill	Midcontinent Cable Company	No Comment	
Brugh, V. Judy	MHA Nation	No Comment	
Cayko, Richard	McKenzie County	No Comment	
Chevance, Nick	National Parks Service	No Comment	
Cimarosti, Dan	USACE	Response letter asking for Section 10/404 permit if required	
Crows Breast, Elgin	THPO, Three Affiliated Tribes	No Comment	
Danks, Marvin	Fort Berthold Rural Water Director	No Comment	
Davis, Scott	Indian Affairs Commission	No Comment	
Dhieux, Joyce	EPA	No Comment	
Dixon, Doug	Montana Dakota Utilities	No Comment	
Dressler, Patricia	Federal Aviation Administration	No Objection	
Erhardt, Toni	USACE, North Dakota Regulatory Office	Provided information on navigable/jurisdictional water, forms, and information regarding Section 10 permits.	
Ferris, Cade	Turtle Mountain Band of Chippewa	No Comment	
Fox, Fred	MHA Nation	No Comment	
Glatt, David	North Dakota Department of Health	Impacts will be minor and can be controlled by proper construction methods including air quality controls, testing for erionite, minimize impacts to streams and water sources, and storm water permitting and control.	See Sections 3.2.3, Well Pad, and 4.12, Mitigation and Monitoring, for site-specific details and BMPs.

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

Name	Organization	Comment	Response to Comment
Hanson, Jesse	North Dakota Parks and Recreation	1) The project as defined does not affect state park lands or Land and Water Conservation Fund recreation projects. 2) Project area approx. 1-mile to Killdeer Mountain Four Bears Scenic Byways, and should be completed with the least amount of visual impact.	See Sections 3.2.1.1, Reclamation, 4.5, Wetlands, 4.6, Vegetation and Noxious Weeds, 4.7, Wildlife, and 4.12, Mitigation and Monitoring, for more information.
Head, Jennifer	WPX Energy Williston, LLC	No Comment	
Hauck, Reinhard	Dunn County	No Comment	
Hefferman, Dan	EPA	No Comment	
Hoffman, Warren	Killdeer, Weydahl Field	No Comment	
Hudson-Schenfisch, Julie	McLean County Board of Commissioners	No Comment	
Hynek, David	Chair, Mountrail Board of County Commissioners	No Comment	
Jarski, Tim	Reservation Telephone Cooperative	No Comment	
Johnson, Harley	New Town Municipal Airport	No Comment	
Kadrmas, Ray	Dunn County	No Comment	
Kuehn, John	Parshall-Hankins Field Airport	No Comment	
Laux, Eric	USACE	The USACE recommends closed loop drilling system	WPX uses closed-loop drilling systems as standard.
Link, Greg	ND Game and Fish Department	Recommends construction be avoided to extent possible in native prairie, wooded draws, riparian corridors, and wetland areas.	See Affected Environment Sections 4.5, Wetlands, 4.6, Vegetation and Noxious Weeds, and 4.7, Wildlife.
Klitzka, Nelson	WPX Energy Williston, LLC	No Comment	
Kynner, Dave	FEMA	Recommends contacting the local Floodplain Manager for Dunn County for guidance retarding possible permits required	BIA, WPX, and SWCA held on-site meetings to ensure best well pad and access road placement.
Manager of Engineering Services	McKenzie Electric Cooperative	No Comment	
Massad, Mary	Southwest Water Authority	No Comment	

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

Name	Organization	Comment	Response to Comment
McKenna, Mike	North Dakota Game and Fish Department	Recommend construction be avoided where possible in native prairie, wooded draws, riparian areas, and wetlands. Botanical and raptor surveys suggested.	See Affected Environment Sections 4.5, Wetlands, 4.6, Vegetation and Noxious Weeds, and 4.7, Wildlife.
McPhillips, Kelly	Bureau of Reclamation	Project components could affect BOR facilities (rural water pipelines). Coordinate with the FBIR Rural Water director.	See Section 3.2.4, Access Roads and Utility Corridor.  WPX would consult with the Rural Water Director if the project components should cross or otherwise affect any BOR rural water lines.
Murphy, Charles	Chairman, Standing Rock Sioux Tribe	No Comment	
Nash, Mike	BLM	No Comment	
Nelson, Richard	U.S. Bureau of Reclamation	No Comment	
Herman, Jeff	Petro-Hunt, LLC	No Comment	
Obenauer, Steve	FAA	No Comment	
Olson, Frances	McKenzie County	No Comment	
Overbey, Rachel	Enerplus Resources Corp.	No Comment	
Paaverud, Merl	State Historical Society	Consultation is with MHA Nation THPO	Letter has been sent to THPO
Packineau, Mervin	MHA Nation	No Comment	
Paulson, Gerald	Western Area Power Administration	No Comment	
Pearson, Myra	Spirit Lake Sioux Tribe	No Comment	
Peterson, Walter	North Dakota Department of Transportation	No Comment	
Poitra, Fred	MHA Nation	No Comment	
Prchal, Doug	North Dakota Parks and Recreation Department	No Comment	
Rudolph, Reginald	McLean Electric Cooperative, Inc.	No Comment	
Schelkoph, David	West Plains Electric Cooperative, Inc.	No Comment	
Schaar, Jerome	NRCS	Avoid impacts to Wetlands, if impact will occur, NRCS can conduct wetland determination	See Section 4.5, Wetlands

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

Name	Organization	Comment	Response to Comment
Selvage, Michael	Chairman, Sisseton-Wahpeton Sioux Tribe	No Comment	
Smith, Heather	EOG Resources, Inc.	No Comment	
Sorensen, Charles	USACE, Garrison Dam/Lake Sakakawea Project	USACE recommends: The installation of an impervious lined trench, use of a closed loop drilling design, and that all construction take place between August 15 <sup>th</sup> and April 1 <sup>st</sup> .	See Section 3.2.3, Well Pad, for information regarding berm and the use of a pit-less closed-loop drilling system.  WPX will construct a berm around the location to contain all hazardous materials.
Straus, D. Arnold	Three Affiliated Tribes	No Comment	
Svoboda, Larry	EPA	No Comment	
Sweeney, Paul	U.S. Department of Agriculture	No Comment	
Truskowski, Brent	EPA	No Comment	
Townner, Jeffrey	USFWS	See attached letter in Appendix D	Recommendations in Appendix D
Whitcalf, Frank	MHA Nation	No Comment	
Williams, Damon	MHA Nation	No Comment	
County Courthouse	Mercer County	No Comment	
Chief Missile Engineer	Minot Air Force Base	No Comment	
Garrison Project Office	USACE	No Comment	
Land Department Manager	Northern Border Pipeline Company	No Comment	
NAGRPA Office	Xcel Energy	No Comment	
Natural Resources Department	Three Affiliated Tribes	No Comment	
Hall, Tex	Three Affiliated Tribes	No Comment	
Manager	Three Affiliated Tribes	No Comment	

## **6.0 LIST OF PREPARERS**

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

### SWCA Environmental Consultants

- Courtney Lafferty, Environmental Specialist  
*Prepared the EA and conducted natural resource surveys for the well pad, access road, and utility corridor.*
- Damien Reinhart, Assistant Project Manager/Archaeologist  
*Reviewed the cultural resource report and assisted with cultural resource section.*
- Chandler Herson, Archaeologist  
*Prepared the cultural resource report.*
- Adam Leroy, Archaeologist  
*Conducted cultural resource surveys for the well pad, access road, and utility corridor.*
- Travis Genty, GIS Specialist  
*Created maps and spatially derived data.*
- Richard Wadleigh, NEPA Expert  
*Reviewed document for content and adequacy.*

### WPX Energy Williston, LLC

- Nelson Klitzka, Regulatory Specialist  
*Reviewed document for content and adequacy.*

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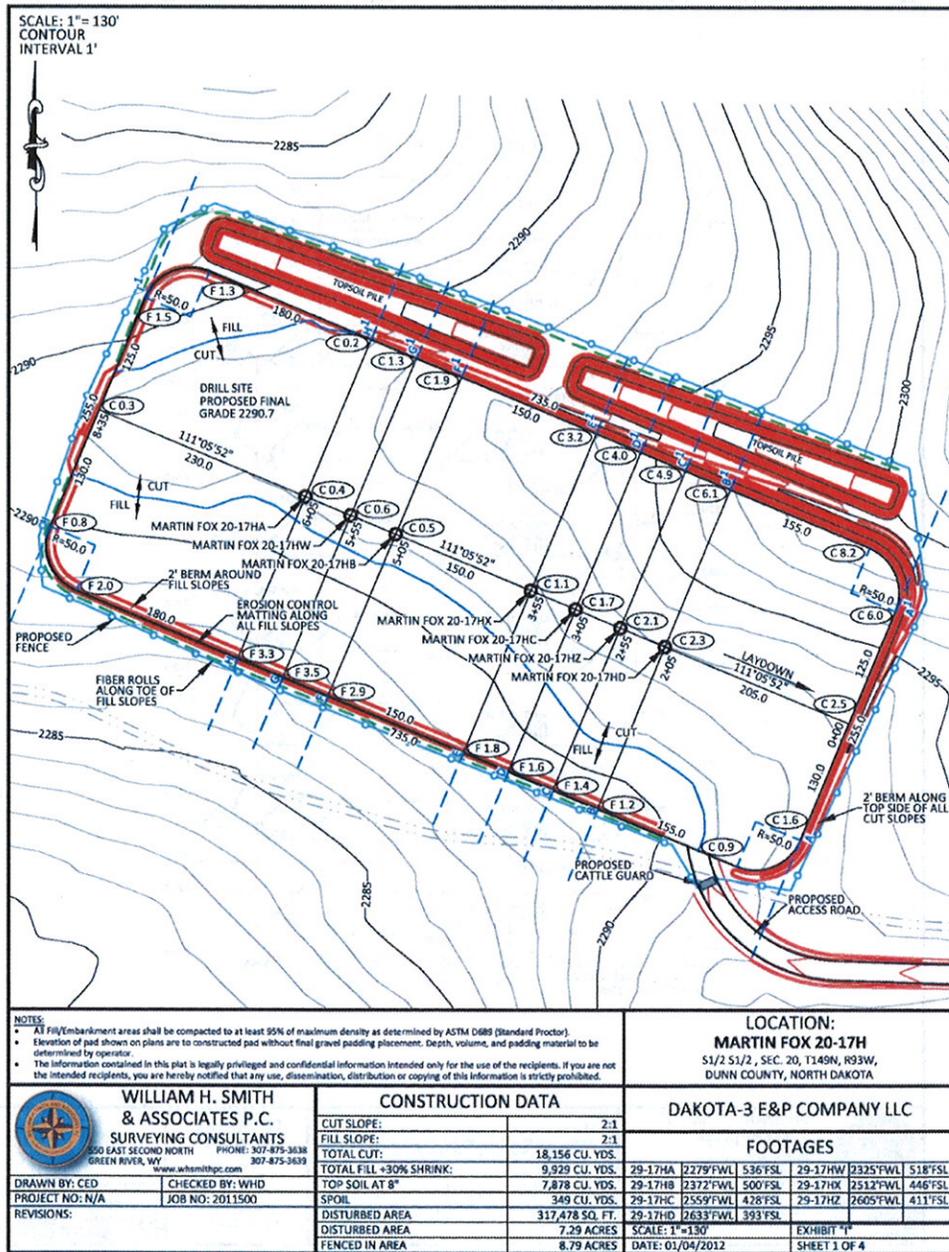
## 8.0 ACRONYMS

°F	degrees Fahrenheit
APD	Application for Permit to Drill
AQI	Air Quality Index
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH <sub>4</sub>	methane
CIAA	cumulative impact analysis area
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CWA	Clean Water Act
EA	environmental assessment
EJ	Environmental Justice
EPA	Environmental Protection Agency
ESA	Endangered Species Act
GHG	greenhouse gas
H <sub>2</sub> S	hydrogen sulfide
HAP	hazardous air pollutant
HUC	hydrologic unit code
MBTA	Migratory Bird Treaty Act
MHA Nation	Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara Nation
NAAQS	National Ambient Air Quality Standards
N <sub>2</sub> O	nitrous oxide
NDDA	North Dakota Department of Agriculture
NDDH	North Dakota Department of Health
NDIAC	North Dakota Indian Affairs Commission
NEPA	National Environmental Policy Act
NO <sub>2</sub>	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
O <sub>3</sub>	ozone
PM	particulate matter
psig	pounds per square inch gauge
ROW	right-of-way
SO <sub>2</sub>	sulfur dioxide
THPO	Tribal Historic Preservation Officer
TRNP	Theodore Roosevelt National Park
USC	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

**APPENDIX A**

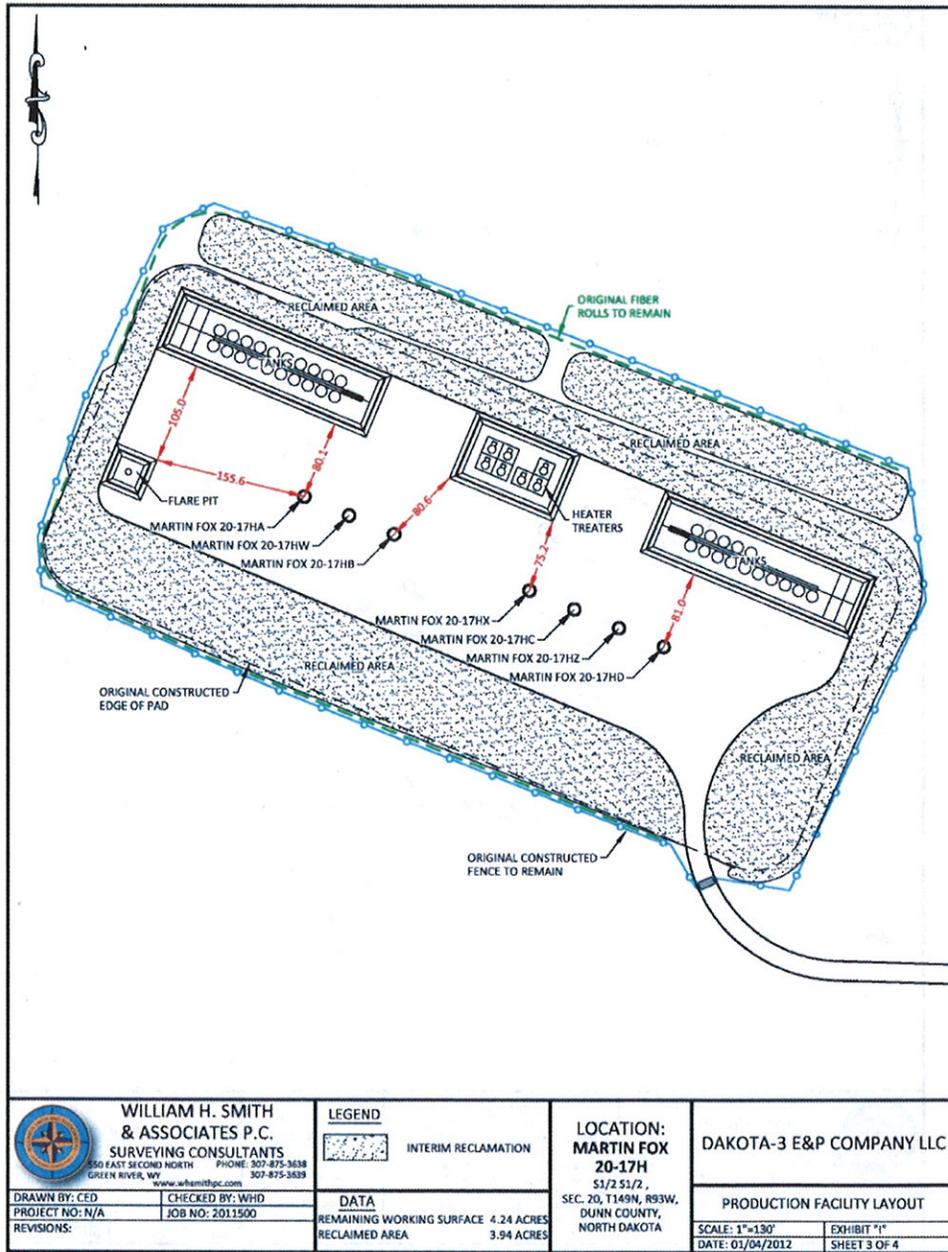
**Construction Schematics (Plats) for the Martin Fox #20-17H Well Pad,  
Access Road, and Utility Corridor (Date Received 03/01/12)**

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



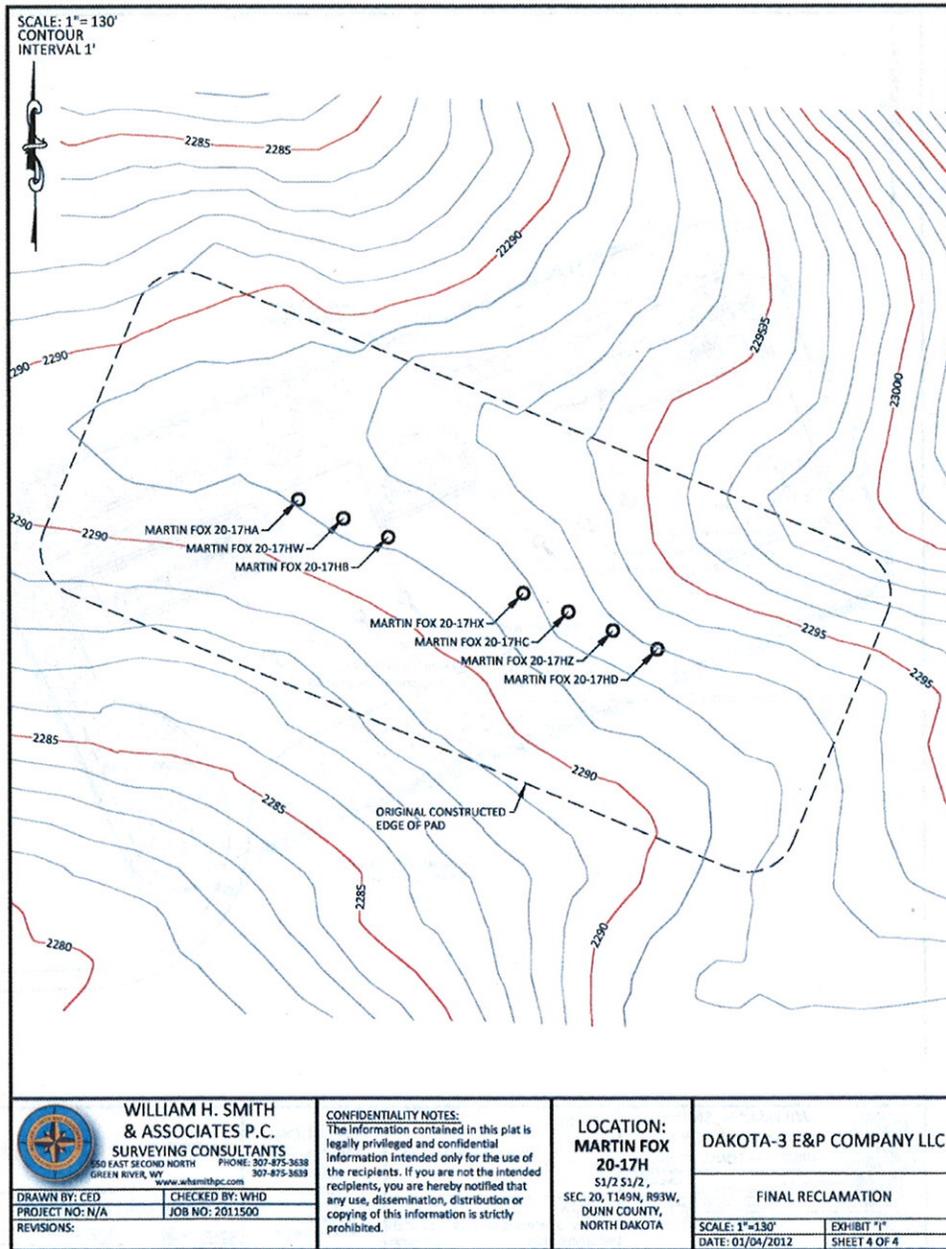


Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



 <p><b>WILLIAM H. SMITH &amp; ASSOCIATES P.C.</b> SURVEYING CONSULTANTS 650 EAST SECOND NORTH GREEN RIVER, WY PHONE: 307-875-3638 WWW.WHSMITHPC.COM</p>	<p><b>LEGEND</b></p> <p> INTERIM RECLAMATION</p>	<p><b>LOCATION:</b> <b>MARTIN FOX 20-17H</b> S1/2 S1/2, SEC. 20, T149N, R93W, DUNN COUNTY, NORTH DAKOTA</p>	<p><b>DAKOTA-3 E&amp;P COMPANY LLC</b></p>
	<p><b>DATA</b></p> <p>REMAINING WORKING SURFACE 4.24 ACRES RECLAIMED AREA 3.94 ACRES</p>	<p><b>PRODUCTION FACILITY LAYOUT</b></p> <p>SCALE: 1"=130' DATE: 01/04/2012</p>	<p>EXHIBIT "I" SHEET 3 OF 4</p>
<p>DRAWN BY: CED PROJECT NO: N/A REVISIONS:</p>	<p>CHECKED BY: WHD JOB NO: 2011500</p>		

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



**WILLIAM H. SMITH & ASSOCIATES P.C.**  
 SURVEYING CONSULTANTS  
 250 EAST SECOND NORTH GREEN RIVER, WY  
 PHONE: 307-875-3638 307-875-3639  
 www.williamhsmithpc.com

**CONFIDENTIALITY NOTES:**  
 The information contained in this plat is legally privileged and confidential information intended only for the use of the recipients. If you are not the intended recipients, you are hereby notified that any use, dissemination, distribution or copying of this information is strictly prohibited.

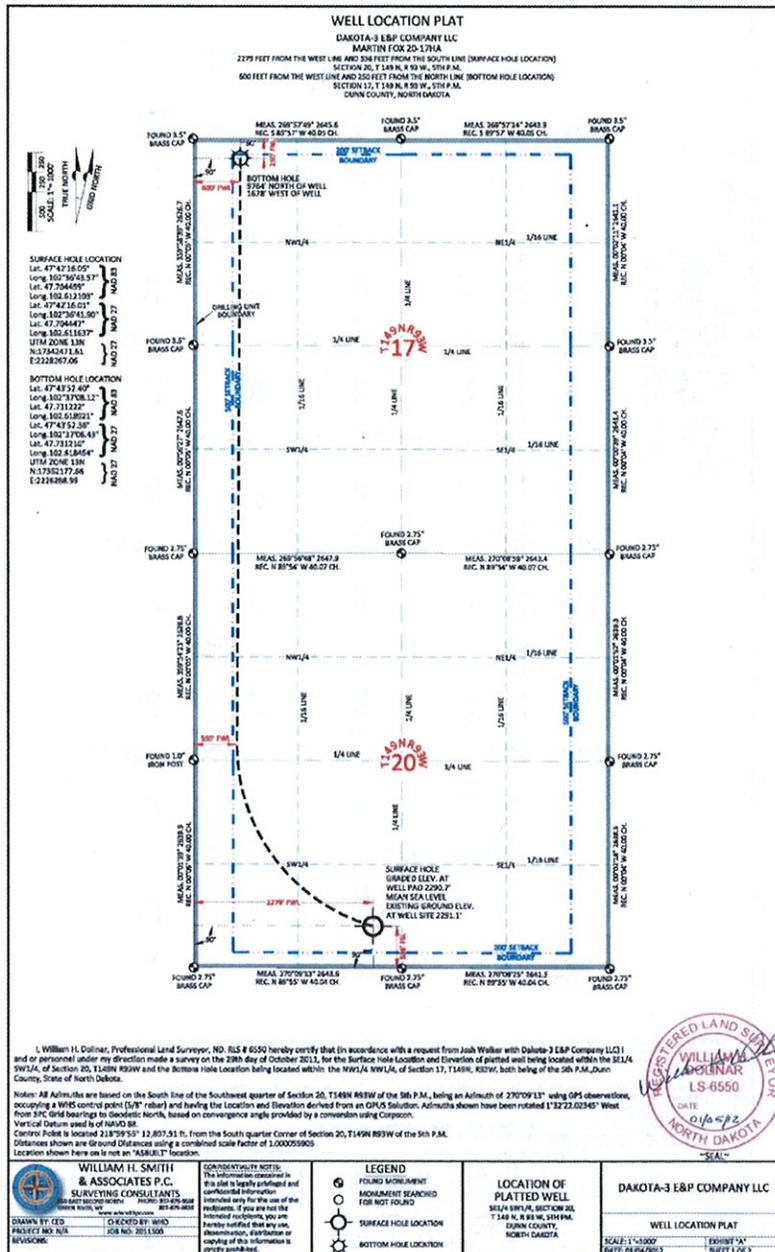
**LOCATION:**  
**MARTIN FOX 20-17H**  
 S1/2 S1/2,  
 SEC. 20, T149N, R93W,  
 DUNN COUNTY,  
 NORTH DAKOTA

**DAKOTA-3 E&P COMPANY LLC**

**FINAL RECLAMATION**  
 SCALE: 1"=130'  
 DATE: 01/04/2012  
 EXHIBIT "I"  
 SHEET 4 OF 4

DRAWN BY: CED  
 PROJECT NO: N/A  
 REVISIONS:  
 CHECKED BY: WHD  
 JOB NO: 2011500

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



I, William H. Collier, Professional Land Surveyor, NO. ELS # 6550 hereby certify that in accordance with a request from Josh Walker with Dakota-3 E&P Company LLC I and or personnel under my direction made a survey on the 28th day of October 2011, for the Surface Hole Location and Elevation of drilled well being located within the S6/4 SW/4 of Section 20, T148N R93W and the Bottom Hole Location being located within the NW1/4 NW1/4 of Section 17, T148N, R93W, both being of the 5th P.M., Dunn County, State of North Dakota.

Notes: All Azimuths are based on the South line of the Southwest quarter of Section 20, T148N R93W of the 5th P.M., being an Azimuth of 270°00'13" using GPS dimensions, occupying a NAD83 control point (5th P.M. rebar) and having the Location and Elevation derived from an GPS Station. Azimuths shown have been rotated 1°12'22.02345" West from 3 PC Grid bearings to Geodetic North, based on convergence angle provided by a conversion using Corcoran.

Vertical Datum used is NAVD83.

Control Point is located 218°59'53" 12,807.51 ft. from the South quarter Corner of Section 20, T148N R93W of the 5th P.M.

Location shown here on is not an "ADJUDICATED" location.

**WILLIAM H. SMITH & ASSOCIATES P.C.**  
 SURVEYING CONSULTANTS  
 1000 North 17th Street, Suite 200  
 Williston, ND 58850  
 Phone: 701-485-8888  
 Fax: 701-485-8888  
 E-mail: wsmith@wsmith.com

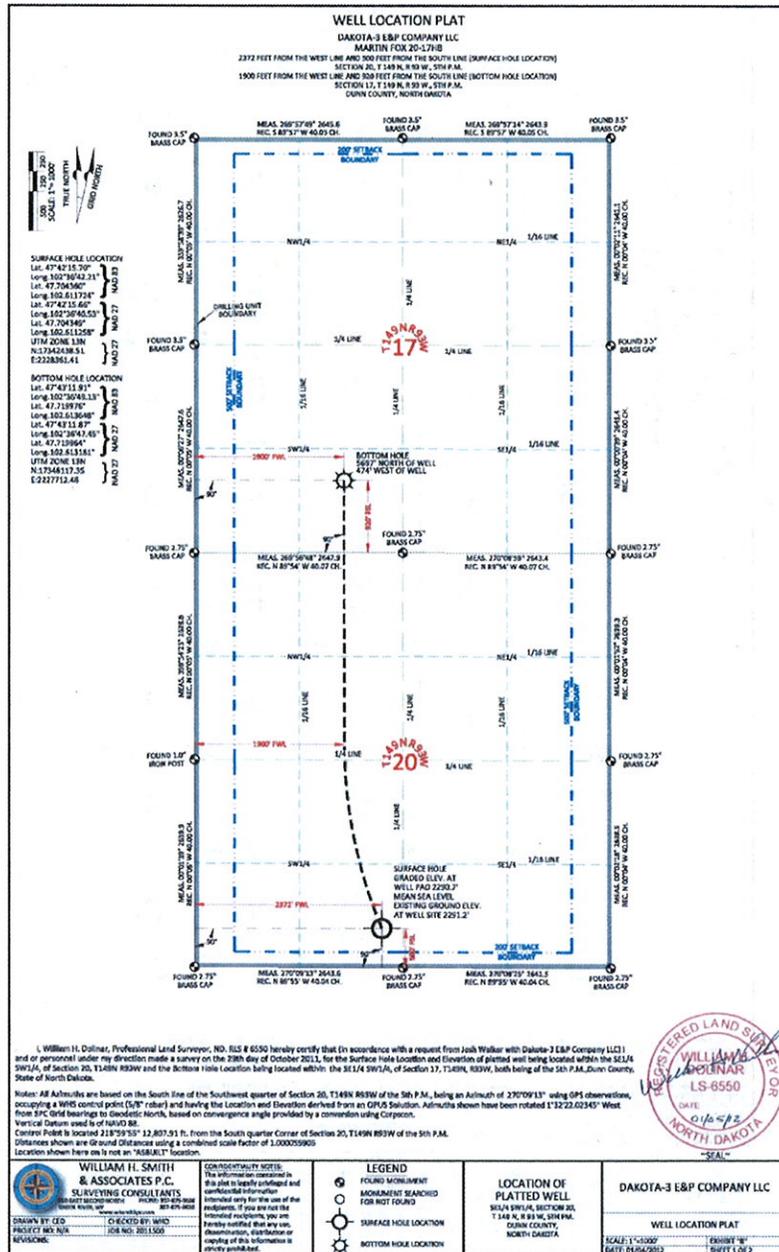
DRAWN BY: CES  
 CHECKED BY: WSM  
 PROJECT NO: N/A  
 REVISIONS:

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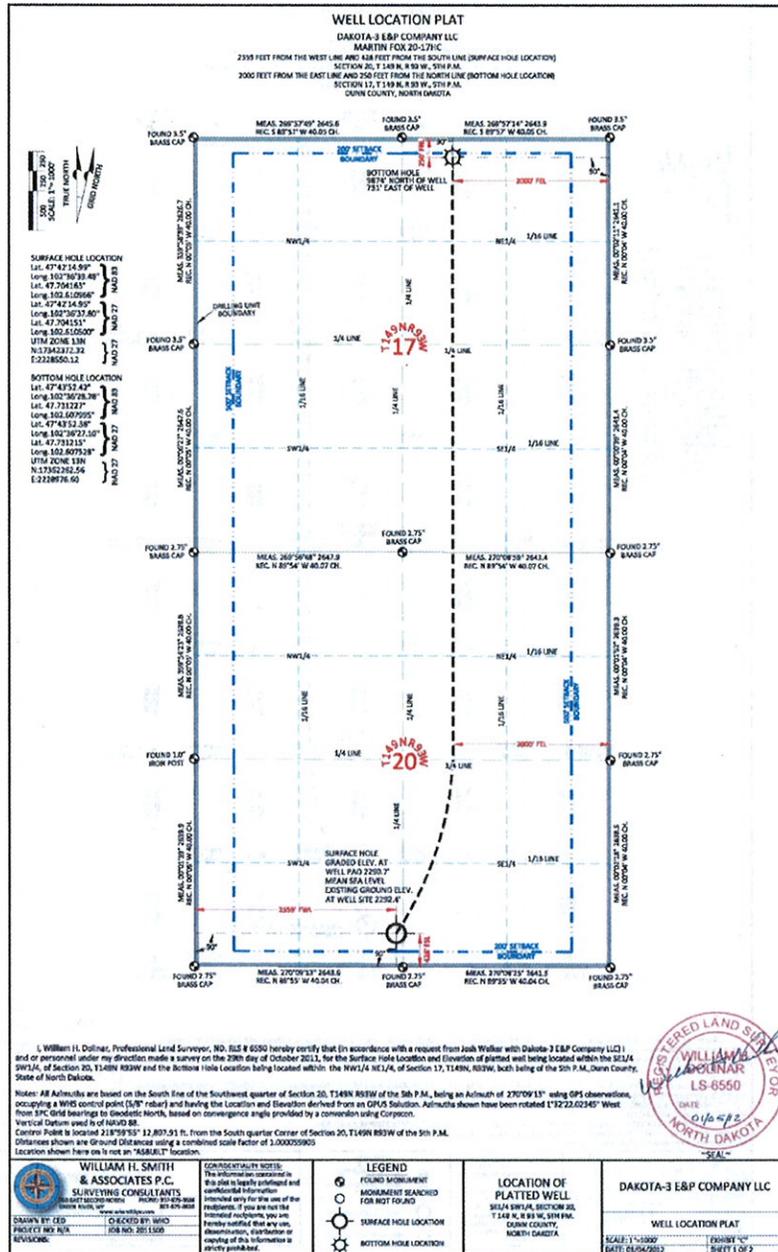


Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

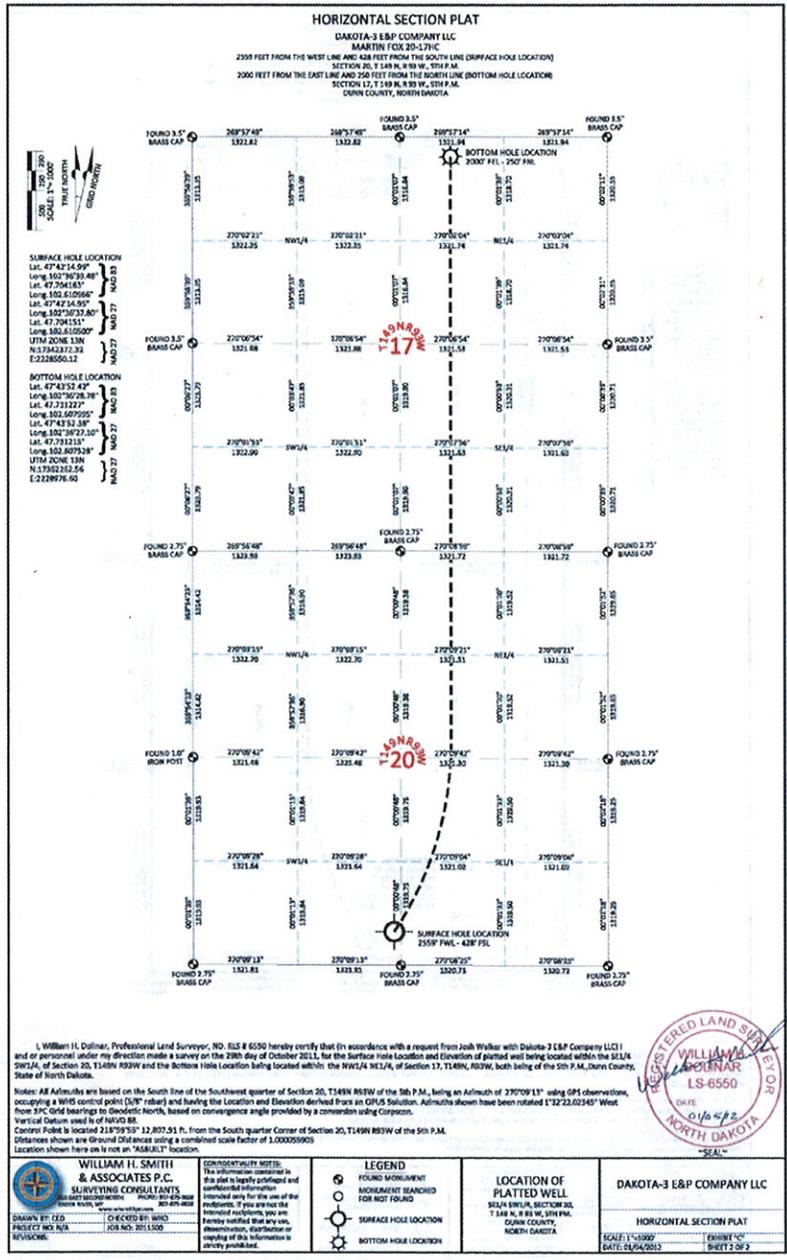




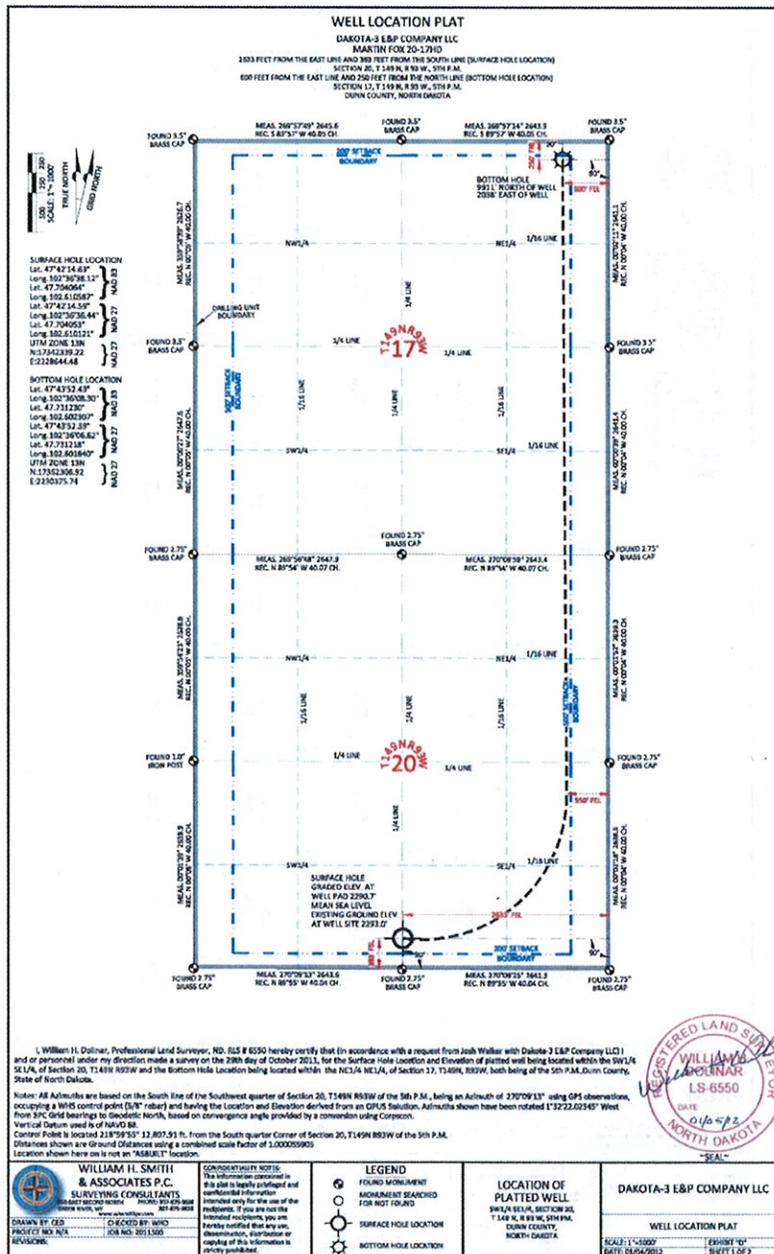
Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

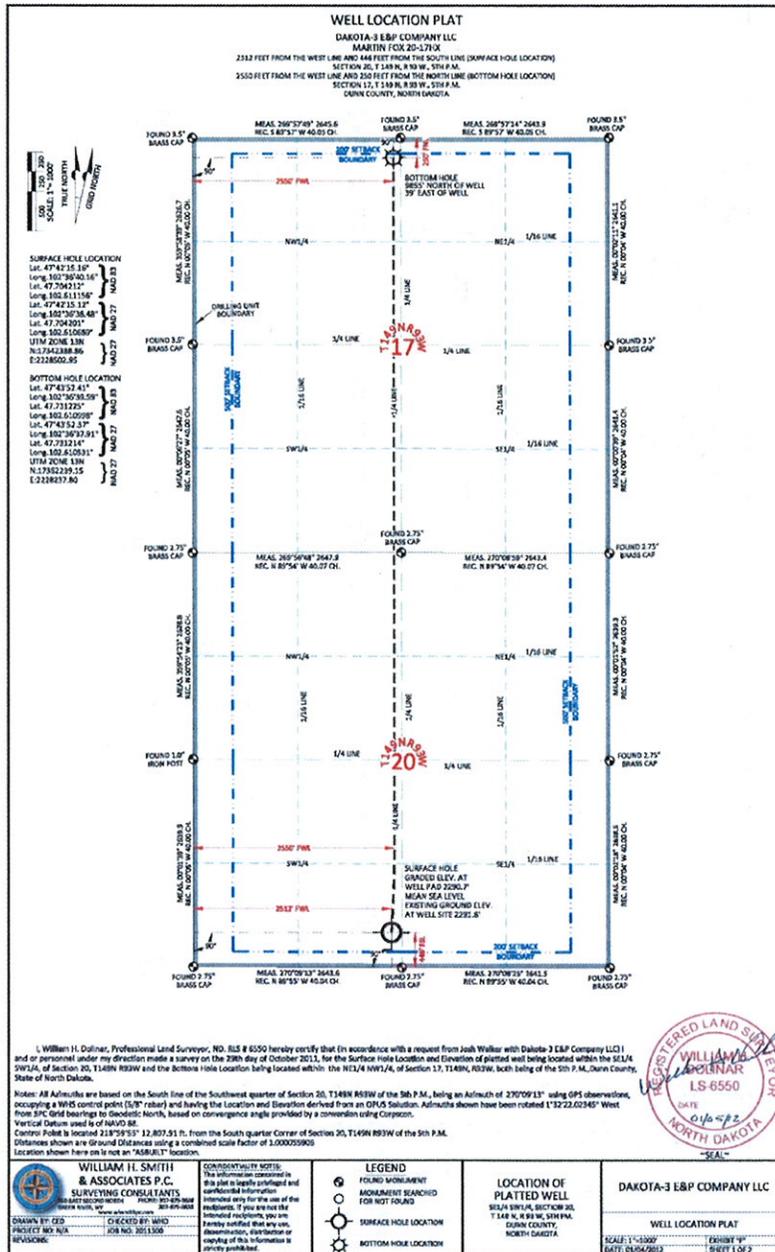




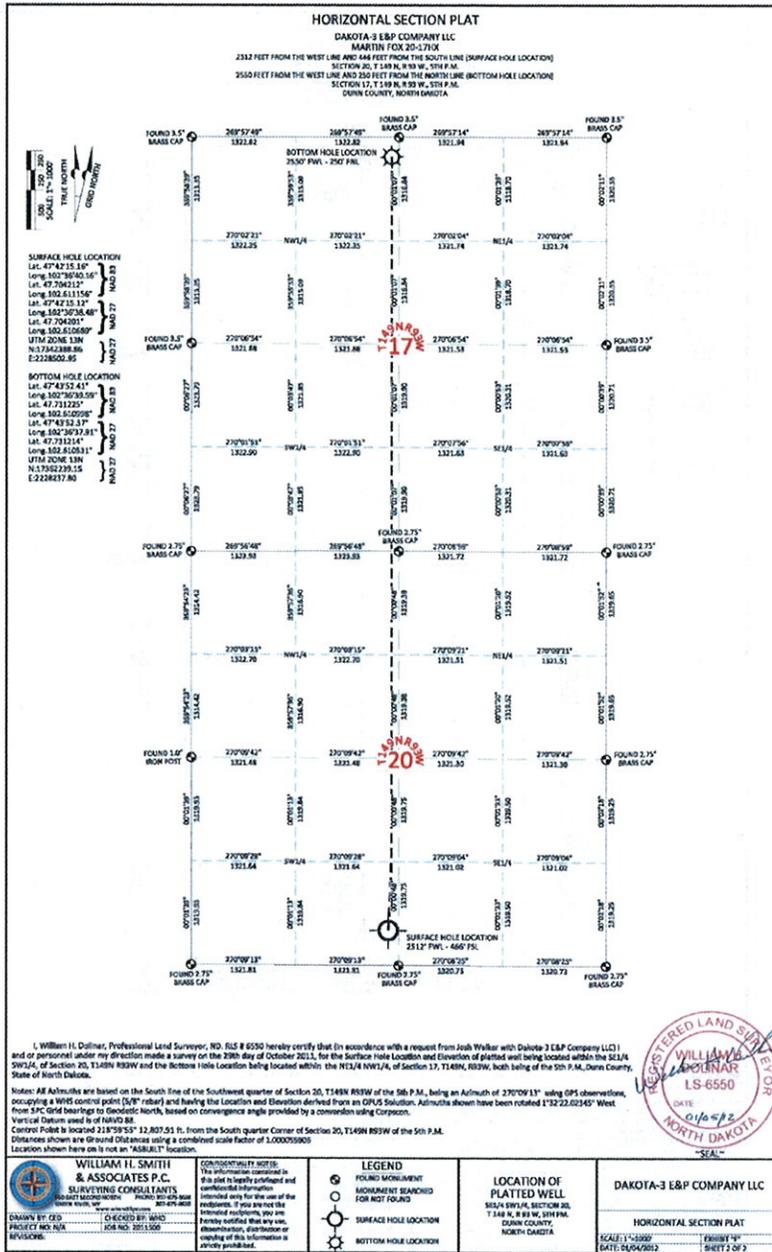




Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



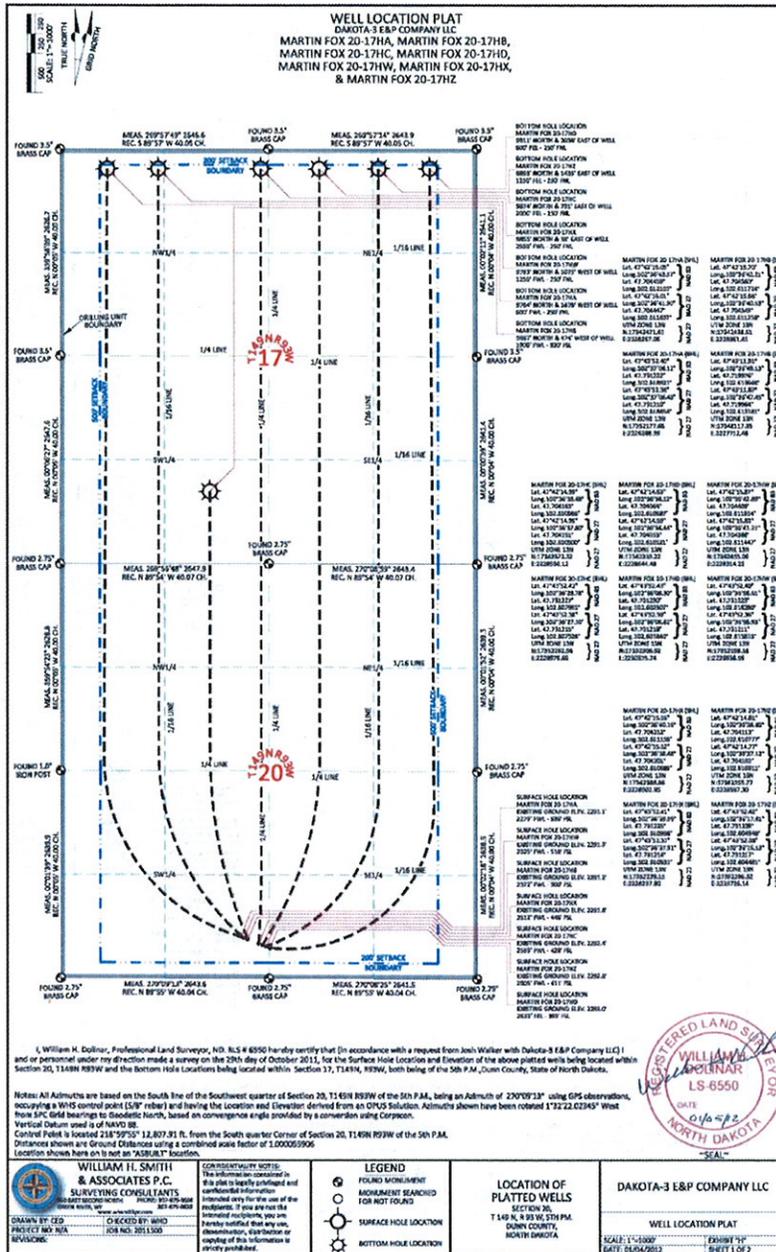
Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)







Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



I, William H. Smith, Professional Land Surveyor, ND, SLS # 8990 hereby certify that (in accordance with a request from Josh Walker with Dakota-3 E&P Company LLC) and of personal and my direction made a survey on the 29th day of October 2011, for the Surface Hole Location and Elevation of the above plat and well being located within Section 20, T148N R93W and the Bottom Hole Locations being located within Section 20, T148N, R93W, both being of the 56N P.M., Dunn County, State of North Dakota.

Notes: All Admitts are based on the South line of the Southwest quarter of Section 20, T148N R93W of the 56N P.M., being an Admitt of 20'00" 13" using GPS observations, occupying a WIS control point (CS\* rebar) and having the Location and Elevation derived from an OPCS Solution. Admitts shown have been rounded 1/2" West. Vertical Datum used is of NAVD 83. Control Point is located 218°59'55" 12,897.91 ft. from the South quarter Corner of Section 20, T148N R93W of the 56N P.M. Distances shown are Ground Distances using a combined axis factor of 1.00005906. Location shown here on is not an "AS-BUILT" location.

**WILLIAM H. SMITH & ASSOCIATES P.C.**  
 SURVEYING CONSULTANTS  
 1000 14th St SW  
 Grand Forks, ND 58201  
 PHONE: 701-775-4888  
 FAX: 701-775-4889  
 CHECKED BY: WJS  
 DATE: 04/04/12

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 This information is confidential. It is to be kept confidential and not to be disseminated or used for any other purpose. If you are not the intended recipient, you are notified that any use, dissemination, distribution or copying of this information is strictly prohibited.

**LEGEND**

- FOUND MONUMENT
- BACKSIGHT SEARCHED FOR NOT FOUND
- SURFACE HOLE LOCATION
- BOTTOM HOLE LOCATION

**LOCATION OF PLATTED WELLS**

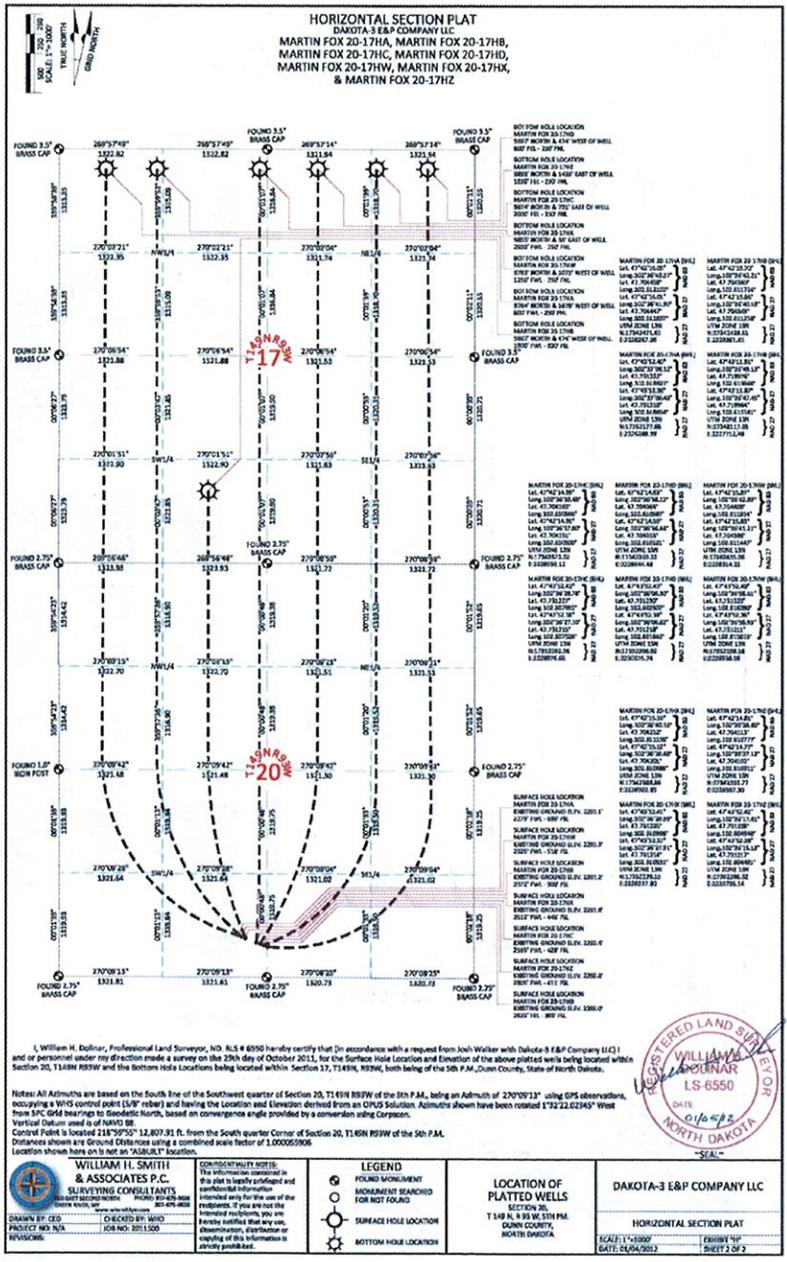
SECTION 20,  
 T148 N. & R101 E 27M PA.  
 DUNN COUNTY,  
 NORTH DAKOTA

**DAKOTA-3 E&P COMPANY LLC**

**WELL LOCATION PLAT**

SCALE: 1"=1000'  
 DATE: 04/04/12  
 SHEET 1 OF 2

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



I, William H. Smith, Professional Land Surveyor, No. RLS # 8590 hereby certify that in accordance with a request from Josh Walker with Dakota's E&P Company LLC I and or personnel under my direction made a survey on the 29th day of October 2011, for the Surface Hole Location and Elevation of the above platted wells being located within Section 20, T149N R93W and the bottom hole locations being located within Section 20, T149N R93W, both being of the 5th P.M., Dunes County, State of North Dakota.

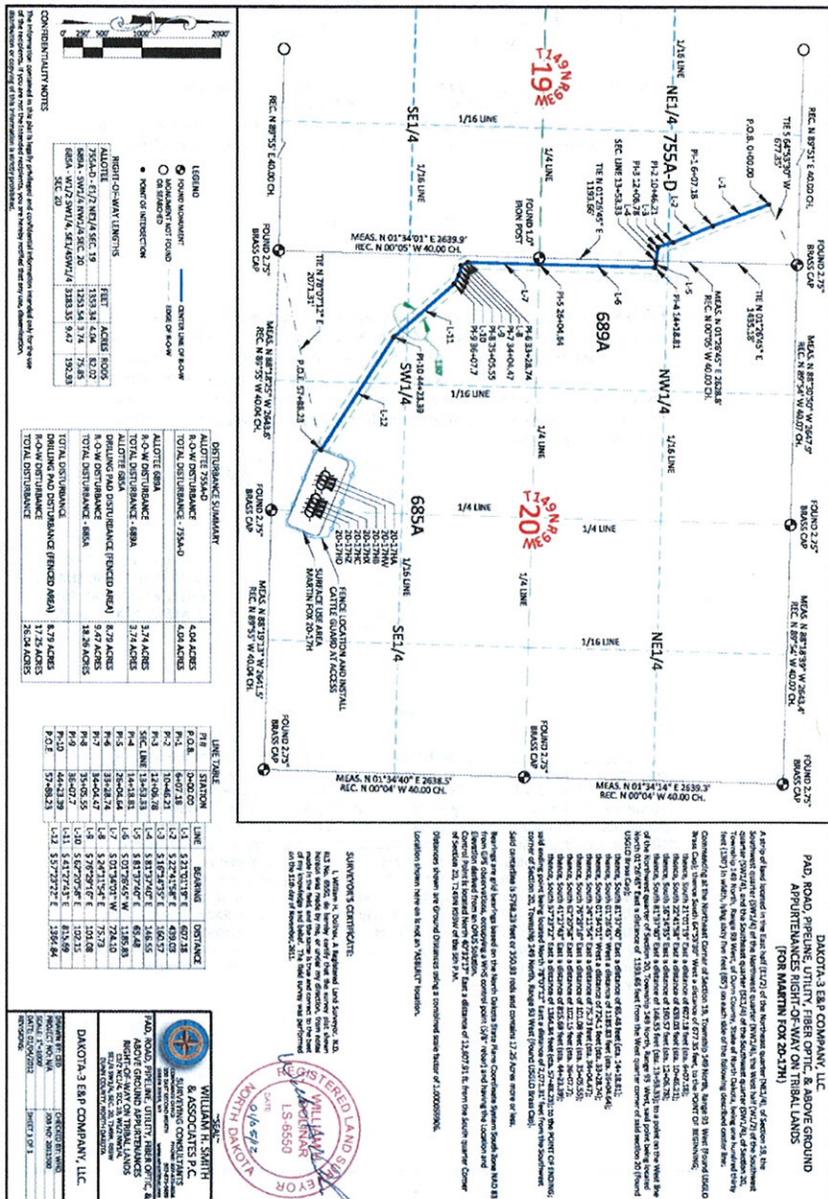
Notes: All Azimuths are based on the South line of the Southwest quarter of Section 20, T149N R93W of the 5th P.M., being an Azimuth of 270°00'13" using GPS observations, occupying a VHS control point (SVN 787) and having the Location and Elevation derived from an OPUS Solution. Azimuths shown have been rotated 1°32'22.6245" West from SPC 024 bearing to Goodrich North, based on convergence angle provided by a convergence using Geoplace.

Vertical Datum used is of NAVD 88  
 Control Point is located 218°59'55" 12,807.91 ft. from the South quarter Corner of Section 20, T149N R93W of the 5th P.M.  
 Distances shown are Ground Distances using a combined scale factor of 1.000059906  
 Location shown here is to not be "AS-BUILT" location.

<p><b>WILLIAM H. SMITH</b>          &amp; ASSOCIATES P.C.          SURVEYING CONSULTANTS          2001 13th Street SW          Grand Forks, ND 58201          (701) 772-4444          FAX: (701) 772-4444          www.williamhsmith.com</p> <p>DRAWN BY: CEO          PROJECT NO: 1011000          REVISIONS:</p>	<p><b>CONTRACTOR'S NOTES:</b>          The information contained in this plat is preliminary and confidential information intended only for the use of the recipients. If you are not the intended recipient, you are hereby notified that any use, dissemination, or reproduction of this information is strictly prohibited.</p>	<p><b>LOCATION OF PLATTED WELLS</b>          SECTION 20,          T 149 N. R 93 W. S7N PA.1,          DUMES COUNTY,          NORTH DAKOTA</p>	<p><b>DAKOTA'S E&amp;P COMPANY LLC</b>          HORIZONTAL SECTION PLAT          SCALE: 1"=100'          DATE: 04/04/2012          SHEET 2 OF 2</p>
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Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks  
Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

DAKOTA-3 E&P COMPANY, LLC.  
MARTIN FOX 20-17H  
PAD, ROAD, PIPELINE, UTILITY, FIBER OPTIC, & ABOVE GROUND APPURTENANCES RIGHT-OF-WAY  
SECTION 19 & 20, TOWNSHIP 149 NORTH, RANGE 93 WEST, 5TH P.M.  
DUNN COUNTY, NORTH DAKOTA

TOTAL PAD, ROAD, PIPELINE, UTILITY, FIBER OPTIC, & ABOVE GROUND APPURTENANCES  
RIGHT-OF-WAY ON TRIBAL LANDS

Total length of Right-Of-Way is 5,788.23 feet or 1.096 miles. Width of Right-Of-Way is 130'  
(65' perpendicular on each side of the centerline). Contains 17.25 Acres more or less.

SURVEYOR'S AFFIDAVIT

STATE OF NORTH DAKOTA } ss  
COUNTY OF DUNN

William H. Dolinar, being first duly sworn, deposes and states that he is the registered land surveyor for Dakota-3 E&P Company, LLC, that these surveys were made by him (or under his supervision); that he has examined the field notes of the surveys of the pad, road, pipeline, utility, fiber optic and above ground appurtenances right-of-way as described and shown on this map; that this map was prepared under his direction from said field notes; and that said right-of-way, 1.096 miles in length beginning and ending as shown on this map is accurately represented.



*William H. Dolinar*  
REGISTERED LAND SURVEYOR  
REGISTRATION NO. 6550  
STATE OF NORTH DAKOTA

APPLICANT'S CERTIFICATE

I, \_\_\_\_\_, do hereby certify that I am the agent for Dakota-3 E&P Company, LLC, hereinafter designated the applicant; That William H. Dolinar who subscribed to the foregoing Affidavit, is employed by the applicant as a land surveyor and that he was directed by the applicant to survey the location of this pad, road, pipeline, utility, fiber optic, & above ground appurtenances Right-Of-Way, 1.096 miles in length beginning at Sta. 0+00.00 and ending at Sta. 57+88.23, that said pad, road, pipeline, utility, fiber optic, & above ground appurtenances Right-Of-Way is accurately represented on this map; That such survey as represented on this map has been adopted by the applicant as the definite location of the Right-Of-Way thereby shown; and that the map has been prepared to be filed with the Secretary of the Interior or his duly authorized representative as part of the application for said Right-Of-Way to be granted the applicant, its successors and assigns, with the right to construct, maintain, and repair improvements, thereon and thereover, for such purposes, and with the further right in the applicant, its successors and assigns to transfer this Right-Of-Way by assigned, grant, or otherwise.

\_\_\_\_\_  
APPLICANT

\_\_\_\_\_  
TITLE



Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)

DAKOTA-3 E&P COMPANY, LLC.  
MARTIN FOX 20-17H  
PAD, ROAD, PIPELINE, UTILITY, FIBER OPTIC, & ABOVE GROUND APPURTENANCES RIGHT-OF-WAY  
SECTION 20, TOWNSHIP 149 NORTH, RANGE 93 WEST, 5TH P.M.  
DUNN COUNTY, NORTH DAKOTA

TOTAL PAD, ROAD, PIPELINE, UTILITY, FIBER OPTIC, & ABOVE GROUND APPURTENANCES  
RIGHT-OF-WAY ON TRIBAL LANDS

Total length of Right-Of-Way is 1527.23 feet or 0.289 miles. Width of Right-Of-Way is 130'  
(65' perpendicular on each side of the centerline). Contains 13.20 Acres more or less.

SURVEYOR'S AFFIDAVIT

STATE OF NORTH DAKOTA } ss  
COUNTY OF DUNN

William H. Dolinar, being first duly sworn, deposes and states that he is the registered land surveyor for Dakota-3 E&P Company, LLC, that these surveys were made by him (or under his supervision); that he has examined the field notes of the surveys of the pad, road, pipeline, utility, fiber optic and above ground appurtenances right-of-way as described and shown on this map; that this map was prepared under his direction from said field notes; and that said right-of-way, 0.289 miles in length beginning and ending as shown on this map is accurately represented.



*William H. Dolinar*  
REGISTERED LAND SURVEYOR  
REGISTRATION NO. 6550  
STATE OF NORTH DAKOTA

APPLICANT'S CERTIFICATE

I, \_\_\_\_\_, do hereby certify that I am the agent for Dakota-3 E&P Company, LLC, hereinafter designated the applicant; That William H. Dolinar who subscribed to the foregoing Affidavit, is employed by the applicant as a land surveyor and that he was directed by the applicant to survey the location of this pad, road, pipeline, utility, fiber optic, & above ground appurtenances Right-Of-Way, 0.289 miles in length beginning at Sta. 0+00.00 and ending at Sta. 15+27.23, that said pad, road, pipeline, utility, fiber optic, & above ground appurtenances Right-Of-Way is accurately represented on this map; That such survey as represented on this map has been adopted by the applicant as the definite location of the Right-Of-Way thereby shown; and that the map has been prepared to be filed with the Secretary of the Interior or his duly authorized representative as part of the application for said Right-Of-Way to be granted the applicant, its successors and assigns, with the right to construct, maintain, and repair improvements, thereon and thereover, for such purposes, and with the further right in the applicant, its successors and assigns to transfer this Right-Of-Way by assigned, grant, or otherwise.

\_\_\_\_\_  
APPLICANT

\_\_\_\_\_  
TITLE

**APPENDIX B**  
**Species Accounts and Effects Determinations**

## **Species Accounts and Affects Determinations**

### **Endangered Species Act**

#### **Black-footed Ferret (*Mustela nigripes*)**

Affects Determination: No Effect

Black-footed ferrets are nocturnal, solitary carnivores of the weasel family that have been largely extirpated from the wild primarily due to range-wide decimation of the prairie dog (*Cynomys* sp.) ecosystem (Kotliar et al. 1999). They have been listed by the U.S. Fish and Wildlife Service (USFWS) as endangered since 1967, and have been the object of extensive re-introduction programs (USFWS 2010a). Ferrets inhabit extensive prairie dog complexes of the Great Plains, typically composed of several smaller colonies in proximity to one another that provide a sustainable prey base. The Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act (USFWS 1989) states that ferrets require black-tailed prairie dog (*Cynomys ludovicianus*) towns or complexes greater than 80 acres in size, and towns of this dimension may be important for ferret recovery efforts (USFWS 1988a). Prairie dog towns of this size are not found in the project area. In addition, this species has not been observed in the wild for more than 20 years. The Proposed Action would have **no effect** on this species.

#### **Gray Wolf (*Canis lupus*)**

Affects Determination: May Affect, Is Not Likely to Adversely Affect

The gray wolf, listed as endangered in the United States in 1978 (USFWS 1978), was believed extirpated from North Dakota in the 1920s and 1930s with only sporadic reports from the 1930s to present (Licht and Huffman 1996). The presence of wolves in most of North Dakota consists of occasional dispersing animals from Minnesota and Manitoba (Licht and Fritts 1994; Licht and Huffman 1996). Most documented gray wolf sightings that have occurred within North Dakota are believed to be young males seeking to establish territory (Hagen et al. 2005). The Turtle Mountains region in north-central North Dakota provides marginal habitat that may be able to support a very small population of wolves. The closest known pack of wolves is the Minnesota population located approximately 28 kilometers (km) from the northeast corner of North Dakota.

The gray wolf uses a variety of habitats that support a large prey base, including montane and low-elevation forests, grasslands, and desert scrub (USFWS 2010b). Due to a lack of forested habitat and distance from Minnesota and Manitoba populations, as well as the troubled relationship between humans and wolves and their vulnerability to being shot in open habitats (Licht and Huffman 1996), the re-establishment of gray wolf populations in North Dakota is unlikely. Additionally, habitat fragmentation, in particular road construction as a result of oil and gas development, may further act as a barrier against wolf recolonization in western North Dakota. Therefore, the Proposed Action **may affect, but is not likely to adversely affect** the gray wolf.

### **Whooping Crane (*Grus americana*)**

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The whooping crane was listed as endangered in 1970 in the United States by the USFWS, and in 1978 in Canada. Historically, population declines were caused by shooting and destruction of nesting habitat in the prairies from agricultural development. Current threats to the species includes habitat destruction, especially suitable wetland habitats that support breeding and nesting, as well as feeding and roosting during their fall and spring migration (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007).

The July 2010 total wild population was estimated at 383 (USFWS 2010c). There is only one self-sustaining wild population, the Aransas-Wood Buffalo National Park population, which nests in Wood Buffalo National Park and adjacent areas in Canada, where approximately 83% of the wild nesting sites occur (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007; USFWS 2010c). Dunn and McKenzie counties, including the project area, are within the primary migratory flyway of whooping cranes.

Whooping cranes probe the soil subsurface with their bills for foods on the soil or vegetation substrate (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Whooping cranes are omnivores and foods typically include agricultural grains, as well as insects, frogs, rodents, small birds, minnows, berries, and plant tubers. The largest amount of time during migration is spent feeding in harvested grain fields (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Studies indicate that whooping cranes use a variety of habitats during migration, in addition to cultivated croplands, and generally roost in small palustrine (marshy) wetlands within 1 km of suitable feeding areas (Howe 1987, 1989). Whooping cranes have been recorded in riverine habitats during their migration, with eight sightings along the Missouri River in North Dakota (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007:18). In these cases, they roost on submerged sandbars in wide, unobstructed channels that are isolated from human disturbance (Armbruster 1990).

Suitable whooping crane foraging habitat (i.e., cultivated cropland) was observed near the project area. Project precautionary measures would be implemented if a whooping crane is sighted within 1 mile of the project area. WPX would cease all construction activities and notify the Bureau of Indian Affairs and USFWS of the sighting, should a whooping crane be spotted within 1 mile of the project area. As a result, the Proposed Action **may affect, but is not likely to adversely affect** the endangered whooping crane.

### **Piping Plover (*Charadrius melodus*)**

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The piping plover is a small shorebird which breeds only in three geographic regions of North America: the Atlantic Coast, the Northern Great Plains, and the Great Lakes. Piping plover populations were federally listed as threatened and endangered in 1985, with the Northern Great Plains and Atlantic Coast populations listed as threatened, and the Great Lakes population listed as endangered (USFWS 1985a).

Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands

of major river systems (USFWS 2002, 2010d). The shorelines of lakes of the Missouri River constitute significant nesting areas for the bird. Piping plovers nest on the ground, making shallow scrapes in the sand, which they line with small pebbles or rocks (USFWS 1988b). Anthropogenic alterations of the landscape along rivers and lakes where piping plover nest have increased the number and type of predators, subsequently decreasing nest success and chick survival (USFWS 2002, 2010d). The birds fly south by mid to late August to areas along the Texas coast and Mexico (USFWS 2002). The Northern Great Plains population has continued to decline despite federal listing, with population estimates of 1,500 breeding pairs in 1985 reduced to fewer than 1,100 in 1990. Low survival of adult birds has been identified as a factor (Root et al. 1992). Current conservation strategies include identification and preservation of known nesting sites, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 1988b, 2010d).

Suitable shoreline habitat for breeding and nesting plovers does not occur in the project area, and Lake Sakakawea is a minimum of approximately 6.04 river miles and 4.86 straight line miles away from the proposed project area. It is unlikely that migrating plovers would visit the project area during their migration. Therefore, the Proposed Action **may affect, but is not likely to adversely affect** piping plovers.

#### **Designated Critical Habitat of Piping Plover**

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The USFWS has designated critical habitat for the Great Lakes and Northern Great Plains populations of piping plover (USFWS 2002). Designated critical habitat for the piping plover includes 183,422 acres and 1,207.5 river miles of habitat, including areas near the Proposed Action, along the shoreline of Lake Sakakawea in McKenzie County, North Dakota (USFWS 2002).

It is unlikely that the project would modify, alter, disturb, or affect the shoreline of Lake Sakakawea. Therefore, the Proposed Action **may affect, but is not likely to adversely affect** designated critical habitat of the piping plover.

#### **Interior Least Tern (*Sterna antillarum*)**

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The population of the interior least tern is listed as endangered by the USFWS (1985b). This bird is the smallest member of the gull and tern family, measuring approximately 9 inches in length. Terns remain near flowing water, where they feed by hovering over and diving into standing or flowing water to catch small fish (USFWS 2010e).

Interior least terns breed in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems, where they nest in small colonies. From late April to August, terns nest in a shallow hole scraped in an open sandy area, gravel patch, or exposed flat and bare sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. The adults continue to care for chicks after they hatch. Least terns in North Dakota will often be found sharing sandbars with the piping plover, a threatened species (USFWS 2010e).

Census data indicate over 8,000 interior least terns in the population. In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe, and on the Missouri and Yellowstone rivers upstream of Lake Sakakawea (USFWS 1990a, 2010e). Approximately 100 pairs breed in North Dakota (USFWS 2010e). Details of their migration are not known, but their winter range is reported to include the Gulf of Mexico and Caribbean Islands (USFWS 1990a, 2010e).

Loss of suitable breeding and nesting habitat for terns has resulted from dam construction and river channelization on major rivers throughout the Mississippi, Missouri, and Rio Grande River systems. River and reservoir changes have led to reduced sandbar formation and other shoreline habitats for breeding, resulting in population declines. In addition, other human shoreline disturbances affect the species (USFWS 1990a). Critical habitat has not been designated for the species (USFWS 2010e).

Current conservation strategies include identification and avoidance of known nesting areas, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 2010e).

It is unlikely that terns would visit the upland habitats present in the project area. Therefore, the Proposed Action **may affect, but is not likely to adversely affect** endangered least terns.

#### **Pallid Sturgeon (*Scaphirhynchus albus*)**

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The pallid sturgeon was listed as Endangered in 1990 in the United States by the USFWS (1990b). The primary factor leading to the decline of this species is the alteration of habitat through river channelization, creation of impoundments, and alteration of flow regimes (USFWS 1990b). These alterations within the Missouri River have blocked movements to spawning, feeding, and rearing areas; destroyed spawning habitat; altered flow conditions which can delay spawning cues; and reduced food sources by lowering productivity (USFWS 2007a). The fundamental elements of pallid sturgeon habitat are defined as the bottom of swift waters of large, turbid, free-flowing rivers with braided channels, dynamic flow patterns, flooding of terrestrial habitats, and extensive microhabitat diversity (USFWS 1990b).

The pallid sturgeon population which is found near the project area occurs from the Missouri River below Fort Peck Dam to the headwaters of Lake Sakakawea and the lower Yellowstone River up the confluence of the Tongue River, Montana (USFWS 2007a). This population consists of approximately 136 wild adult pallid sturgeon (USFWS 2007a). Hatchery reared sturgeon have also been stocked since 1998. The pallid sturgeon has been found to utilize the 25 km of riverine habitat that would be inundated by Lake Sakakawea at full pool (Bramblett 1996 per USFWS 2007a). Larval pallid sturgeons have also been found to drift into Lake Sakakawea. While the majority of pallid sturgeons are found in the headwaters of Lake Sakakawea, North Dakota Game and Fish have caught and released pallid sturgeon in nets set in 80 to 90 feet of water between the New Town and Van Hook area. Based on this information, pallid sturgeon could be found throughout Lake Sakakawea (personal communication, email from Steve Krentz, Pallid Sturgeon Project Lead, U.S. Fish and

Wildlife Service, to Mike Cook, Aquatic Ecologist, SWCA Environmental Consultants, September 3, 2010).

Suitable habitat for pallid sturgeon does not occur in the project area, and Lake Sakakawea is a minimum of 6.04 river miles away from the proposed project area. Potential pollution and sedimentation occurring within the project area are concerns for downstream populations of endangered pallid sturgeon. Activities associated with the construction, production, or reclamation of the proposed project area are not anticipated to adversely affect water quality and subsequently the pallid sturgeon. Therefore, the Proposed Action **may affect, but is not likely to adversely affect** pallid sturgeon.

#### **Dakota Skipper (*Hesperia dacotae*)**

**Affect Determination:** May Affect, Is Not Likely to Adversely Affect

The Dakota skipper is a small butterfly with a 1-inch wingspan and is found primarily in undisturbed native tall grass and upland dry mixed grass prairie areas with a high diversity of wildflowers and grasses (Committee on the Status of Endangered Wildlife in Canada 2003). The Dakota skipper appears to require a range of precipitation-evaporation ratios between 60 and 105 and a soil pH between 7.2 and 7.9 (McCabe 1981). Larvae feed on grasses, favoring little bluestem. Adults commonly feed on nectar of flowering native forbs such as harebell (*Campanula rotundifolia*), wood lily (*Lilium philadelphicum*), and purple coneflower (*Echinacea angustifolia*). The species is threatened by conversion of native prairie to cultivated agriculture or shrublands, over-grazing, invasive species, gravel mining, and inbreeding (USFWS 2005).

Dakota skippers are not known to occur within the project area; however, suitable habitat does occur. The Proposed Action **may affect, but is not likely to adversely affect** this species. The use of best management practices and conservation guidelines (USFWS 2007b) during construction and operation and immediate reclamation of short-term disturbance should decrease direct, indirect, and cumulative impacts to this species.

#### **Sprague's Pipit (*Anthus spragueii*)**

**Affect Determination:** May Affect, Is Not Likely to Adversely Affect

The Sprague's pipit is a small passerine bird that is native to the North American grasslands. It is a ground nester that breeds and winters on open grasslands and feeds mostly on insects and spiders and some seeds. The Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in Minnesota, Montana, North Dakota, and South Dakota as well as south-central Canada (USFWS 2010f). Wintering occurs in the southern states of Arizona, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and New Mexico.

Sprague's pipits are not known to occur within the project area; however, suitable habitat does occur. The Proposed Action **may affect, but is not likely to adversely affect** this species. The use of best management practices and conservation guidelines (USFWS 2007b) during construction and operation and immediate reclamation of short-term disturbance should decrease direct, indirect, and cumulative impacts to this species.

**Migratory Bird Treaty Act / The Bald and Golden Eagle Protection Act**

**Bald Eagle (*Haliaeetus leucocephalus*)**

Status: Delisted in 2007; protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA)

Effects of Project: No adverse effects anticipated

Suitable nesting or foraging habitat for bald eagles includes old growth trees relatively close (usually less than 1.24 miles [Hagen et al. 2005]) to perennial water bodies. The project area does not contain old growth trees and is located, at the closest approximately, 4.86 straight line miles from Lake Sakakawea. No nests or eagles were observed within 0.5 mile line-of-sight during the field surveys. Therefore, no adverse effects are anticipated. However, the possibility of transient, flying bald eagle individuals traversing the project area does exist.

**Golden Eagle (*Aquila chrysaetos*)**

Status: Not Listed; protected under the MBTA and the BGEPA

Effects of Project: No adverse effects anticipated

No eagles or nests were observed during the field surveys; however, golden eagles may occur within or near the project area. The closest known golden eagle nest occurs approximately 3.97 miles southwest of the proposed well pad. The golden eagle prefers habitat characterized by open prairie, plains, and forested areas. Usually, golden eagles can be found in proximity to badland cliffs which provide suitable nesting habitat. However, no primary or secondary indication of golden eagle presence, including nests, was observed within or near the project area during the field survey. Therefore, the project is unlikely to cause any adverse effects to golden eagles.

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**APPENDIX C**  
**Consultation Reply from MHA THPO**

*Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks  
Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)*

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IN REPLY REFER TO:  
DESCRM  
MC-208

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS  
Great Plains Regional Office  
115 Fourth Avenue S.E., Suite 400  
Aberdeen, South Dakota 57401



MAR 07 2012

Elgin Crows Breast, THPO  
Mandan, Hidatsa and Arikara Nation  
404 Frontage Road  
New Town, North Dakota 58763

Dear Mr. Crows Breast:

We have considered the potential effects on cultural resources of a proposed oil well pad in Dunn County, North Dakota. Approximately 91.72 acres were intensively inventoried using a pedestrian methodology. Potential surface disturbances are not expected to exceed the area depicted in the enclosed report. No historic properties were located 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. No properties were located that appear to qualify for protection under the American Indian Religious Freedom Act (42 USC 1996).

As the surface management agency, and as provided for in 36 CFR 800.5, we have therefore reached a determination of **no historic properties affected** for this undertaking. Catalogued as **BIA Case Number AAO-2065/FB/12**, the proposed undertaking, location, and project dimensions are described in the following report:

Herson, Chandler S.  
(2012) A Class I and Class III Cultural Resource Inventory of the Martin Fox #30-17H Well Pad, Access Road and Utility Corridor, Fort Berthold Indian Reservation, Dunn County, North Dakota. SWCA Environmental Consultants for WPX Energy Williston, LLC, Tulsa, OK.

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

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

Sincerely,

Regional Director

Enclosure

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

**APPENDIX D**

**U.S. Fish and Wildlife Service Informal Section 7 Consultation and  
Concurrence Letters**

**SWCA** Bismarck Office  
ENVIRONMENTAL CONSULTANTS 116 N. 4<sup>th</sup> Street,  
Suite 200  
Bismarck, ND  
Sound Science. Creative Solutions.

January 24, 2012

Jeffrey K. Towner  
U.S. Fish and Wildlife Service  
3425 Miriam Avenue  
Bismarck, ND 58501

**RE: Request for Concurrence Letter**

Dear Mr. Towner,

The Bureau of Indian Affairs (BIA) is preparing an environmental assessment (EA) under the National Environmental Policy Act (NEPA), in cooperation with the Bureau of Land Management (BLM). The proposed action (Project) includes approval by the BIA and BLM for the construction, drilling, completion, and production of five exploratory oil and gas well pads, and their associated gathering pipelines (Etstatis #32-29, Kale Bad Brave #19H, Lucy Evans #29-32H, Martin Fox #20-17H, and Wilson Buffalo #9H) on the Fort Berthold Indian Reservation (Reservation) by Dakota-3 E&P Company, LLC (Dakota-3), a subsidiary of Williams.

The proposed surface locations for the five well pads are summarized below, and illustrated in Figures 1 through 6.

- **Etstatis #32-29H:** SW¼ SW¼ of Section 32, Township (T) 149 North (N), Range (R) 94 West (W), McKenzie County, North Dakota
- **Kale Bad Brave #19H:** SE¼ SW¼ of Section 19, T. 149N, R. 94W McKenzie County, North Dakota
- **Lucy Evans #29-32H:** NW¼ NW¼ of Section 29 T. 151N, R. 94W McKenzie County, North Dakota
- **Martin Fox #20-17H:** SE¼ SW¼ of Section 20, T. 149N, R. 93W Dumm County, North Dakota
- **Wilson Buffalo #9H:** NE¼ NW¼ of Section 9, T. 148N, R. 93W Dumm County, North Dakota



Bismarck Office  
116 N. 4<sup>th</sup> Street,  
Suite 200  
Bismarck, ND

U.S. FISH AND WILDLIFE SERVICE  
ECOLOGICAL SERVICES  
ND FIELD OFFICE

Project as described will have no significant impact on fish and wildlife resources. No endangered or threatened species are known to occupy the project area and/or are not likely to be adversely affected. IF PROJECT DESIGN CHANGES ARE MADE, PLEASE SUBMIT PLANS FOR REVIEW.

2-22-12 *Jeffrey K. Towner*  
Date Jeffrey K. Towner  
Field Supervisor

January 24, 2012

Jeffrey K. Towner  
U.S. Fish and Wildlife Service  
3425 Miriam Avenue  
Bismarck, ND 58501

**RE: Request for Concurrence Letter**

Dear Mr. Towner,

The Bureau of Indian Affairs (BIA) is preparing an environmental assessment (EA) under the National Environmental Policy Act (NEPA), in cooperation with the Bureau of Land Management (BLM). The proposed action (Project) includes approval by the BIA and BLM for the construction, drilling, completion, and production of five exploratory oil and gas well pads, and their associated gathering pipelines (Eistatis #32-29, Kale Bad Brave #19H, Lucy Evans #29-32H, Martin Fox #20-17H, and Wilson Buffalo #9H) on the Fort Berthold Indian Reservation (Reservation) by Dakota-3 E&P Company, LLC (Dakota-3), a subsidiary of Williams.

The proposed surface locations for the five well pads are summarized below, and illustrated in Figures 1 through 6.

- **Eistatis #32-29H:** SW¼ SW¼ of Section 32, Township (T) 149 North (N), Range (R) 94 West (W), McKenzie County, North Dakota
- **Kale Bad Brave #19H:** SE¼ SW¼ of Section 19, T. 149N, R. 94W McKenzie County, North Dakota
- **Lucy Evans #29-32H:** NW¼ NW¼ of Section 29 T. 151N, R. 94W McKenzie County, North Dakota
- **Martin Fox #20-17H:** SE¼ SW¼ of Section 20, T. 149N, R. 93W Dunn County, North Dakota
- **Wilson Buffalo #9H:** NE¼ NW¼ of Section 9, T. 148N, R. 93W Dunn County, North Dakota

**APPENDIX E**  
**General Scoping Letter**

Seven Potential Wells on the Martin Fox #20-17HA, HB, HC, HD, HW, HX, HZ Bakken/Three Forks Developmental Oil and Gas Well Pad, WPX Energy Williston, LLC (April 2012)



Sound Science. Creative Solutions.

Bismarck Office  
116 North 4<sup>th</sup> St, Ste 200  
Bismarck, ND 58501  
701.258.6622  
701.258.5298  
www.swca.com

January 17, 2012

Dear Interested Party:

The Bureau of Indian Affairs (BIA) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA), in cooperation with the Bureau of Land Management (BLM). The proposed action includes approval by the BIA for the construction of five exploratory oil and gas well pads on the Fort Berthold Reservation by Dakota-3 E&P Company, LLC (Dakota-3), a subsidiary of Williams. The BLM regulates the approval process associated with the drilling and subsequent extraction of minerals held in trust. The surface locations for these wells are proposed in the following locations and shown on the enclosed project location map.

- **Estatic #32-29H:** SW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 32, Township (T) 149 North (N), Range (R) 94 West (W), McKenzie County, North Dakota
- **Kale Bad Brave #19H:** SE $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 19, T149N, R94W McKenzie County, North Dakota
- **Lucy Evans #29-32H:** NW $\frac{1}{4}$  NW $\frac{1}{4}$  of Section 29 T151N, R94W McKenzie County, North Dakota
- **Martin Fox #20-17H:** SE $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 20, T149N, R.93W Dunn County, North Dakota
- **Wilson Buffalo #9H:** NE $\frac{1}{4}$  NW $\frac{1}{4}$  of Section 9, T148N, R93W Dunn County, North Dakota

All five proposed exploratory oil and gas well pads will contain wells that would be located within their own 1,280-acre spacing unit. The drilling of these well sites, pending BLM approval, is proposed to begin as early as April 17, 2012.

The associated facilities would include access roads, utility lines, production facilities (production tanks), and equipment storage facilities. In general, all utilities, gathering pipelines, and access roads would be built at the same time as well pad construction. Oil would be stored on location in tank batteries, and then sent via pipeline to a processing plant or sales point. Gas and produced water pipelines would be constructed along access roads to a future-found market for gas or an approved disposal well for produced water. Dakota-3 would utilize existing roads and previous disturbances to the greatest extent practicable. In total, Dakota-3 would construct approximately 3.71 miles of new or upgraded/improved roads to access the well pads.

To ensure that any affect on social, economic, and environmental issues are analyzed accurately, we solicit your views and comments on the proposed action, pursuant to Section 102(2) (D) (IV) of NEPA, as amended. We are interested in developments proposed or underway that should be considered in connection with the proposed project. We also ask your assistance in identifying any property or resources that you own, manage, oversee or otherwise value that might be adversely impacted. Please send your replies and requests for additional project information to:

SWCA Environmental Consultants  
Courtney Lafferty, Environmental Specialist  
116 North 4th Street, Suite 200  
Bismarck, North Dakota 58501  
(701) 258-6622  
[clafferty@swca.com](mailto:clafferty@swca.com)

Comments should be submitted before February 17, 2012 so that they may be addressed in the final document. Questions for the BIA can be directed to Marilyn Bercier, Regional Environmental Scientist, or Mark Herman, Environmental Engineer, at (605) 226-7656.

Sincerely,

A handwritten signature in blue ink that reads "Courtney Lafferty".

Courtney Lafferty

# **Notice of Availability and Appeal Rights**

WPX Energy: Seven Potential Wells on the Martin Fox #20-17H Bakken/Three Forks Developmental Oil and Gas Well Pad; HA, HB, HC, HD, HW, HX, HZ

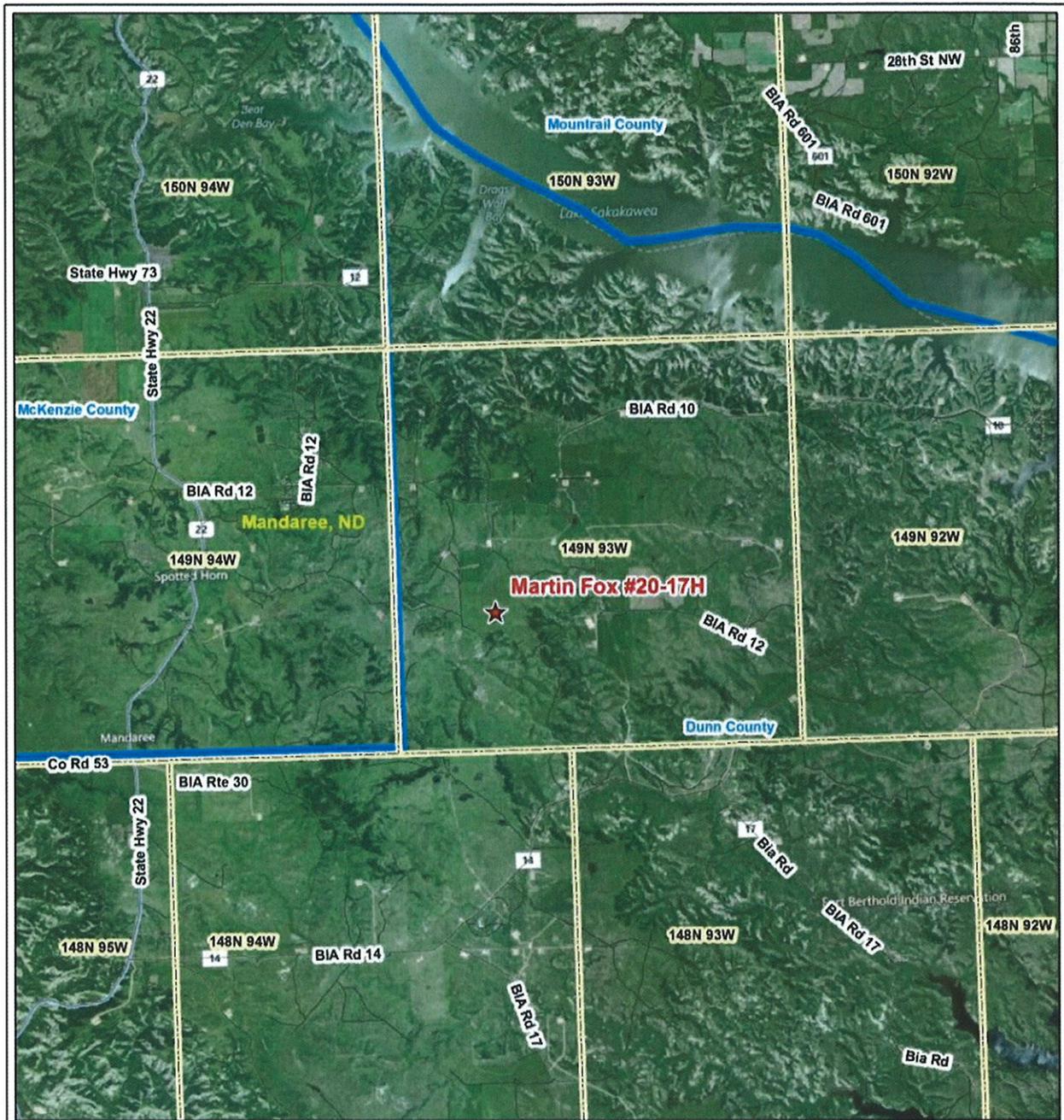
**The Bureau of Indian Affairs (BIA) is planning to issue administrative approvals to Authorize Land Use for the construction of seven oil and gas well on the Martin Fox #20-17H well pad on the Fort Berthold Reservation as shown on the attached map. Construction by WPX Energy is expected to begin in 2012.**

**An environmental assessment (EA) determined that proposed activities will not cause significant impacts to the human environment. An environmental impact statement is not required. Contact Earl Silk, Superintendent at 701-627-4707 for more information and/or copies of the EA and the Finding of No Significant Impact (FONSI).**

**The FONSI is only a finding on environmental impacts – it is not a decision to proceed with an action and *cannot* be appealed. BIA's decision to proceed with administrative actions *can* be appealed until May 10, 2012, by contacting:**

**United States Department of the Interior  
Office of Hearings and Appeals  
Interior Board of Indian Appeals  
801 N. Quincy Street, Suite 300, Arlington, Va 22203.**

**Procedural details are available from the BIA Fort Berthold Agency at 701-627-4707.**

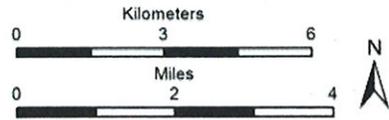


### Legend

- ★ Proposed Locations
- ▭ Counties
- Existing Roads



116 North 4th Street  
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 Fax: 701.258.5957  
 www.swca.com



Base Map: Aerial Imagery  
 Source: esri ArcGIS service  
 Dunn County, North Dakota

Scale: 1:120,000 NAD 1983 UTM Zone 13N

Project locations.