United States Department of the Interior

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

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IN REPLY REFER TO:
DESCRM
MC-208

MAR 2 8 2011

MEMORANDUM

TO: Superintendent, Fort Berthold Agency

FROM: Acting Regional Director, Great Plains Region

SUBJECT: Environmental Assessment and Finding of No Significant Impact

In compliance with the regulations of the National Environmental Policy Act (NEPA) of 1969, as amended, for two proposed oil and gas wells by Zenergy on the Fort Berthold Reservation, an Environmental Assessment (EA) has been completed and a Finding of No Significant Impact (FONSI) has been issued.

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

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

Tim LaPointe

Attachment

cc: Tex Hall, Chairman, Three Affiliated Tribes (with attachment)
Elgin Crows Breat, THPO (with attachment)
Derek Enderud, BLM, Dickenson, ND (with attachment)
John Shelman, US Army Corps of Engineers
Jeffrey Hunt, Virtual One Stop Shop

Finding of No Significant Impact

Zenergy Operating Company, LLC

Environmental Assessment for Two Bakken Exploratory Oil Wells:

Dakota-3 Plenty Sweet Grass #18-19H and Dakota-3 Spotted Horn #26-35H

Fort Berthold Indian Reservation McKenzie County, North Dakota

The U.S. Bureau of Indian Affairs (BIA) has received a proposal to drill up to two exploratory oil/gas wells, access roads and related infrastructure on the Fort Berthold Indian Reservation to be located in NW¼ of the NE¼, Section 18, Township (T) 149 North (N), Range (R) 94 West (W), McKenzie County, North Dakota and NE¼ of the NW¼, Section 26, T149N, R94W, McKenzie County, North Dakota. Associated federal actions by BIA include determinations of effect regarding cultural resources, approvals of leases, rights-of-way and easements, and a positive recommendation to the Bureau of Land Management regarding the Applications for Permit to Drill.

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

This determination is based on the following factors:

1. Agency and public involvement was solicited and environmental issues related to the proposal were identified.
2. Protective and prudent measures were designed to minimize impacts to air, water, soil, vegetation, wetlands, wildlife, public safety, water resources, and cultural resources. The remaining potential for impacts was disclosed for both the Proposed Action and the No Action Alternative.
3. Guidance from the U.S. Fish and Wildlife Service has been fully considered regarding wildlife impacts, particularly in regard to threatened or endangered species. 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 actions are designed to avoid adverse effects to historic, archeological, cultural and traditional properties, sites and practices. The Tribal Historic Preservation Officer has concurred with BIA's determination that no historic properties will be affected.
5. Environmental justice was fully considered.
6. Cumulative effects to the environment are either mitigated or minimal.
7. No regulatory requirements have been waived or require compensatory mitigation measures.
8. The proposed projects will improve the socio-economic condition of the affected Indian community.

Tim LaPointe

Acting Regional Director

3-28-2011

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

Zenergy Operating Company, LLC

Two Bakken Exploratory Oil Wells:

Dakota-3 Plenty Sweet Grass #18-19H and
Dakota-3 Spotted Horn #26-35H

Fort Berthold Indian Reservation

March 2011

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

Environmental Assessment: Two Bakken Exploratory Oil Wells; Zenergy Operating Company, LLC

Dakota-3 Plenty Sweet Grass #18-19H and Dakota-3 Spotted Horn #26-35H

Prepared for

United States Department of the Interior
Bureau of Indian Affairs

Prepared by

SWCA Environmental Consultants

March 25, 2011

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1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

Zenergy Operating Company, LLC (Zenergy) has acquired the leases and is proposing the construction, drilling, completion, and production of two exploratory oil and gas wells on the Fort Berthold Indian Reservation (the Reservation). Developments have been proposed on lands held in trust by the United States in McKenzie County, North Dakota. The Bureau of Indian Affairs (BIA) is the surface management agency for potentially affected tribal lands and individual allotments. The BIA manages lands held in title by the tribe and tribal members to subsurface mineral rights. Development has been proposed in a location that targets specific areas in the Middle Bakken member of the Bakken Formation, a known oil reserve. The following proposed well pads, shown in Figure 1-1, will be located within the Reservation:

- **Dakota-3 Plenty Sweet Grass #18-19H well**: NW¼ of the NE¼, Section 18, Township (T) 149 North (N), Range (R) 94 West (W), McKenzie County, North Dakota
- **Dakota-3 Spotted Horn #26-35H well**: NE¼ of the NW¼, Section 26, T149N, R94W, McKenzie County, North Dakota

A new 0.3-mile access road would be constructed connecting the Dakota-3 Plenty Sweet Grass #18-19H well pad to a proposed access road that will service the Mandaree #07-17H and Mandaree #6-20H well pads. These proposed access roads would place the Dakota-3 Plenty Sweet Grass #18-19H well pad approximately 2.1 miles from a point along Highway 22 that is 1.9 miles west of the town of Mandaree.

A new 0.29-mile access road would be constructed connecting the Dakota-3 Spotted Horn #25-35H well pad to a proposed access road that will service the Wolf #3-27H and Lucy Lone Fight #16-22H well pads. These proposed access roads would place the Dakota-3 Spotted Horn #25-35H well pad approximately 1.59 miles from a point along Highway 22 that is 3.5 miles south of the town of Mandaree.

The well pads would be constructed to accommodate drilling activities and well operations. The proposed locations would also include support facilities and a gathering pipeline system, if the wells are completed for long-term commercial production. Oil, gas, and water pipelines may potentially be constructed on trust land should the wells prove to be productive, however no alignments are currently being proposed in this document.

All components (e.g., road, well pads, gathering lines, and supporting facilities) would be reclaimed upon final abandonment unless formally transferred, with federal approval, to either the BIA or the landowner. The proposed wells are exploratory; should they prove productive, further exploration of surrounding areas is possible

This environmental assessment (EA) addresses the potential impacts associated with the construction, and possible long-term operation, of the above-listed wells and directly related

infrastructure and facilities. Further oil and gas exploration and development would require additional National Environmental Policy Act of 1969 (NEPA) analysis and federal actions.

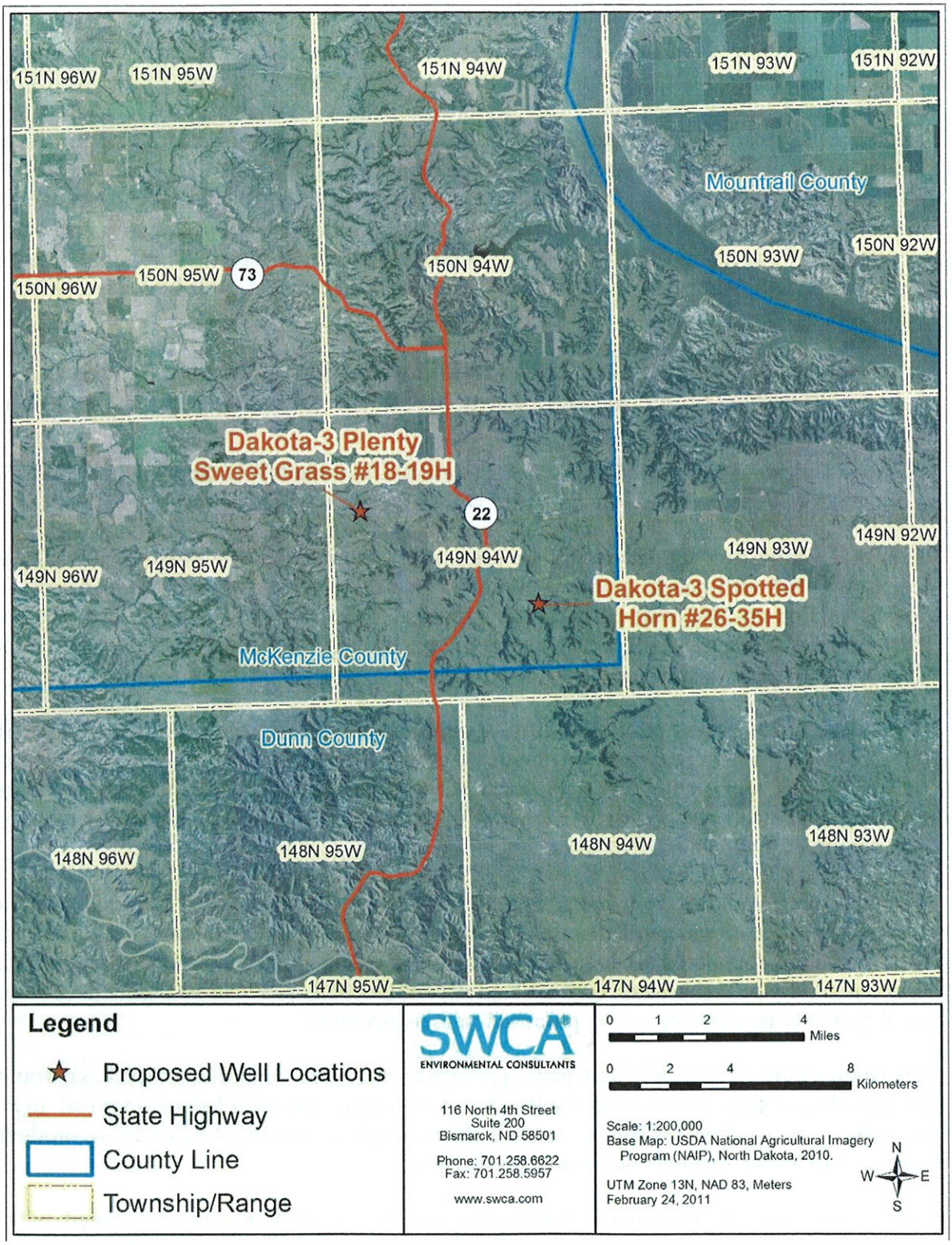


Figure 1-1. Project overview map.

1.2 FEDERAL AND OTHER RELEVANT REGULATIONS AND AUTHORITIES

The BIA's general mission is to represent the interests, including the trust resources, of members of the Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara (MHA) Nation, as well as 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. 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 project includes approving easements, leases, and rights-of-way (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 Applications for Permit to Drill (APDs) after receiving recommendations for approval from the BIA. The BLM is also tasked with on-site monitoring of construction and production activities as well as resolution of any dispute that may arise as a result of any of the aforementioned actions.

Compliance with Section 10 of the Rivers and Harbors Act (33 USC 403) is required when impacting navigable waters of the United States (which includes work over, under, or in such waters). The U.S. Army Corps of Engineers requires that an Application for Department of the Army Permit (33 CFR 325) be submitted. The Department of the Army Corps of Engineers will determine if a permit is required.

The procedures and technical practices described in the APD supporting documents and in the EA describe potential impacts to the project area. This EA analyzes potential impacts to elements in the natural and human environment for both the No Action Alternative (described in Section 2.1) and the Proposed Action. Impacts may be beneficial or detrimental, direct or indirect, and short-term or long-term. The EA also analyzes the potential for cumulative impacts and ultimately makes a determination as to the significance of any impacts.

In the absence of significant negative consequences, this EA would result in a Finding of No Significant Impact (FONSI). 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 (EIS). It should be noted that a significant impact from the project does not necessarily require preparation of an EIS. 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.

Zenergy will comply with all applicable federal, state, and tribal laws, rules, policies, regulations, and agreements. Zenergy 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 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.

2.1 THE NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed project (including the well pads, wells, gathering lines, and access road) would not be constructed, drilled, installed, or operated. The BIA would not approve easements, leases, or ROWs for the proposed locations and the BLM would not approve the 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 this well location.

2.2 THE PROPOSED ACTION

In addition to the No Action Alternative, this document analyzes the potential impacts of two new exploratory oil and gas wells and their associated infrastructure located in the south-eastern portion of the Reservation in McKenzie County, North Dakota. The proposed wells would test the commercial potential of the Middle Bakken Dolomite member of the Bakken Formation in this vicinity.

2.2.1 Well Pad and Infrastructure Locations and Disturbance

Well pad and infrastructure locations 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 May 13 and November 8, 2010, to review the well pad locations and proposed access roads and gathering pipelines. The on-site meetings were attended by the surveyor, natural and cultural resource specialists, the Zenergy representative, the BIA representative, and the Tribal Historic Preservation Office (THPO) monitor. Surveys were conducted at that time to determine potential impacts to resources;

topography, potential drainage issues, erosion control measures, and pad and related facility locations (access roads, gathering pipelines, topsoil/subsoil stockpiles, dry cuttings pits, tanks, etc.) were also discussed at the on-site meetings in order to minimize effects to natural and cultural resources. The combined disturbance of the project is estimated to be approximately 16.09 acres, as shown in Table 2-1.

Table 2-1. Proposed Well Pad and Infrastructure Disturbance.

Infrastructure Type	Detailed Disturbance	Approximate Total Disturbance (Acres)
Dakota-3 Plenty Sweet Grass #18-19H Well Pad and Access Road	Well Pad Site: 5.32 acres Access Road: 2.36 acres	7.68
Dakota-3 Spotted Horn #26-35H Well Pad and Access Road	Well Pad Site: 4.87 acre Access Road: 3.54 acres	8.41
Total Disturbed Acreage		16.09

2.2.2 Well Pads

The proposed well pads would include a leveled area (pad) that would be used for the drilling rig and equipment. Both well pads would use a semi-closed-loop system. The pad would be stripped of topsoil and vegetation and then graded. The topsoil would be stockpiled and stabilized with a cover crop until it could be used to reclaim and revegetate the disturbed area. The subsoils would be used in the construction of the pad and the finished pad would be graded to ensure that water drains away from the pad. Erosion control BMPs would be implemented and could include surface drainage controls, soil surface protection methodologies, and sediment capture features.

The Dakota-3 Plenty Sweet Grass #18-19H well pad measures approximately 430 by 330 feet (3.25 acres). Cut-and-fill slopes and stockpiled topsoil placed on the edge of the pad would result in approximately 2.07 acres of additional surface disturbance. The well pad would be surrounded by a fence. At the point where the access road and fence meet, a cattle guard would be installed. The fence would encompass the entire potential well site disturbance acreage (including the well pad, stockpiled topsoil, and cut and fill slopes) and would be approximately ±6.5 acres. Details of pad construction and reclamation can be found in the APD.

The Dakota-3 Spotted Horn #26-35H well pad measures approximately 430 by 310 feet (3.06 acres). Cut-and-fill slopes and stockpiled topsoil placed on the edge of the pad would result in approximately 1.81 acres of additional surface disturbance. The well pad would be surrounded by a fence. At the point where the access road and fence meet, a cattle guard would be installed. The fence would encompass the entire potential well site disturbance acreage (including the well pad, stockpiled topsoil, and cut and fill slopes) and would be approximately ±4.8 acres. Details of pad construction and reclamation can be found in the APD.

2.2.3 Access Road and Utility Corridor

Approximately 1,584 feet (i.e., 0.3 mile) of new access road would be constructed to access the Dakota-3 Plenty Sweet Grass #18-19H well pad. Approximately 1,531.2 feet (i.e., 0.29 mile) of new access road would be constructed to access the Dakota-3 Spotted Horn #26-35H well pad. A maximum disturbed ROW width of 66 feet for the access roads would result in up to 4.57 acres of new surface disturbance. Signed agreements would be in place allowing road construction across affected private and allotted land surfaces, and any applicable approach permits and/or easements would be obtained prior to any construction activity.

Zenergy will likely in the future propose to construct and install oil, gas, and water gathering pipelines. A buried electric line would be installed in the future, if production is warranted. Efforts will be made to co-locate utility and gathering lines with the access road ROWs.

Construction would follow road design standards outlined in the BLM Gold Book (BLM and U.S. Forest Service [USFS] 2007). At a minimum, 6 inches of topsoil would be removed from the access road corridors. This stockpiled topsoil would then be placed on the outside slopes of the ditches following road construction. The ditches would be reseeded as quickly as possible using a seed mixture determined by the BIA. Care would be taken during road and pipeline construction to avoid disturbing or disrupting any buried utilities that may exist along Highway 22. 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 well. Details of road construction are addressed in the APD. A diagram of typical road cross sections is provided in Figure 2-1.

2.2.4 Drilling

After securing mineral leases, Zenergy submitted the APDs to the BLM on the following dates:

- **Dakota-3 Plenty Sweet Grass #18-19H:** February 15, 2011
- **Dakota-3 Spotted Horn #26-35H:** February 15, 2011

The BIA's office in New Town, North Dakota, will receive a copy of the APD from the BLM North Dakota Field Office. Construction will begin when the BIA completes the NEPA process and the APD is then approved by the BLM.

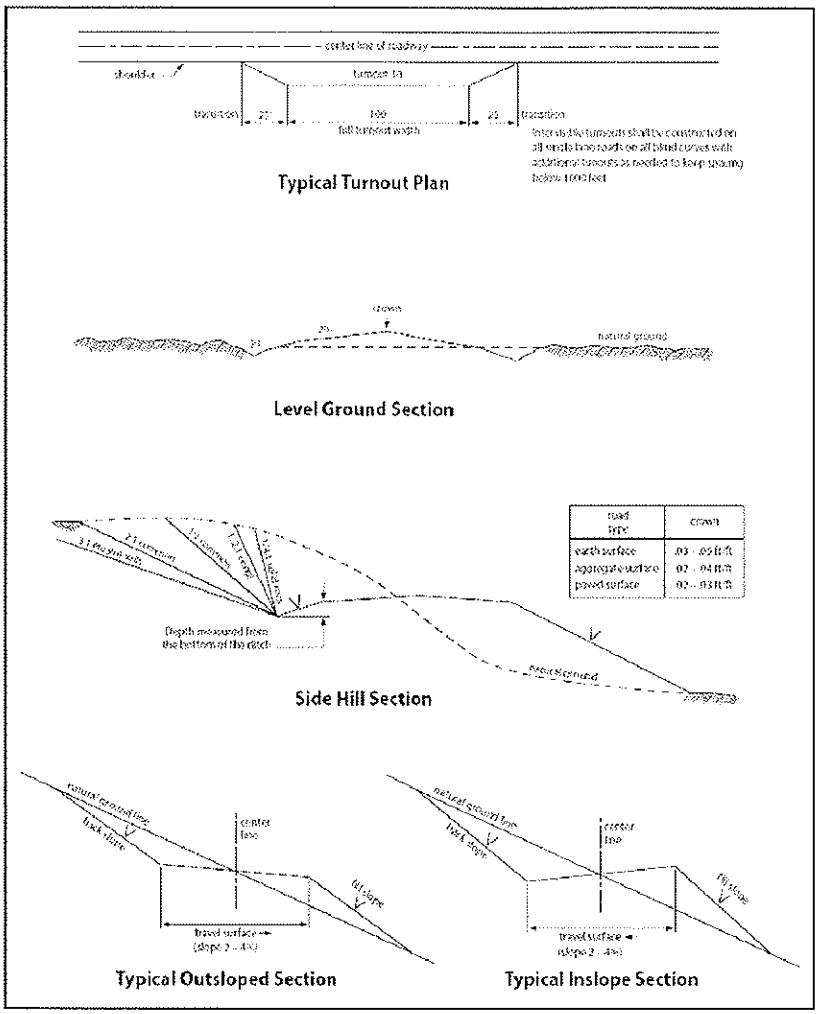


Figure 2-1. Typical road cross sections (BLM and USFS 2007).

Rig transport and on-site assembly would take roughly seven days; a typical drill rig is shown in Figure 2-2. Drilling would require approximately 35 days per well to reach target depth, using a rotary drilling rig rated for drilling to 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.

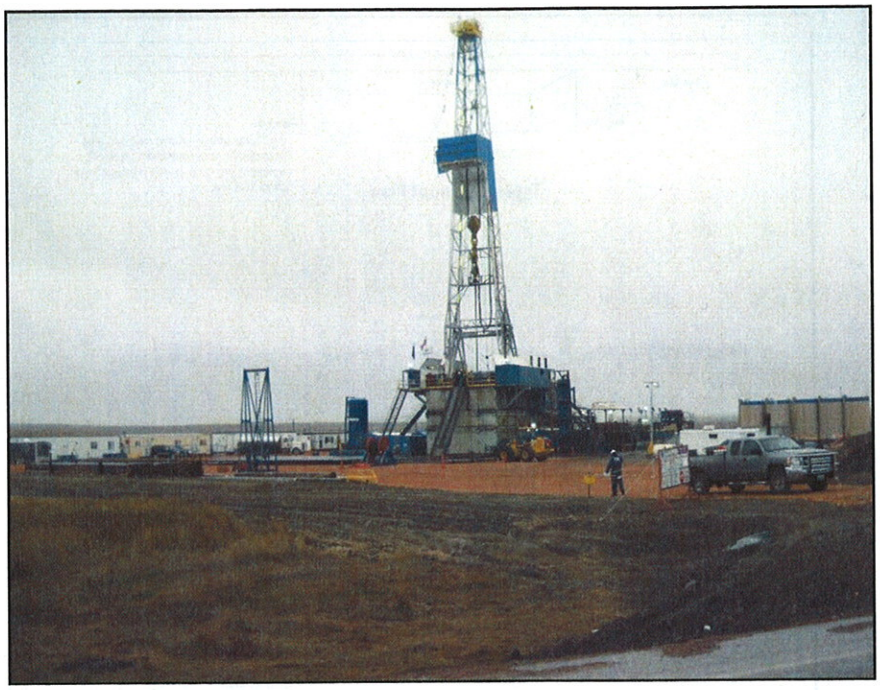


Figure 2-2. Typical drilling rig (Ruffo 2009).

2.2.5 Casing and Cementing

Surface casing would be set at an approximate depth of 2,500 feet and cemented back to the surface during drilling, 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 10,271 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).

2.2.6 Completion and Evaluation

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

2.2.7 Commercial Production and Gathering Pipelines

If drilling, testing, and production support commercial production from any of the two proposed locations, additional equipment would be installed, including a pumping unit at the well head, a vertical heater/treater, tanks (usually 400-barrel steel tanks), and a flare pit (Figure 2-3). 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.

Figure 2-3. Typical producing oil well pad (Sobotka 2008).

Future construction of oil, gas, and water pipelines would be buried in either 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® or similar material. All construction disturbance would likely occur within a 100-foot temporary ROW and permanent surface disturbance would likely occur within a 50-foot ROW corridor. Pipeline disturbance would be reclaimed as soon as practical following construction, resulting in no long-term disturbance. Any produced water would be captured in tanks and periodically trucked to an approved disposal site. The frequency of trucking activities for both oil and produced water would depend upon volumes and rates of production.

The duration of production operations cannot be reliably predicted, but some oil wells have pumped for more than 100 years. The operator estimates that 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 frac fluids and is expected to become minimal after two years.

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

2.2.8 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 and transported to, and disposed of at, state-approved facilities.

2.2.9 Construction Details

2.2.9.1 Dakota-3 Plenty Sweet Grass #18-19H Well Pad

The proposed Dakota-3 Plenty Sweet Grass #18-19H well pad, shown in Figure 2-4, is located approximately 4 miles west of Mandaree, North Dakota, in the NW¼ NE¼ of Section 18, T149N, R94W, McKenzie County, North Dakota. A new access road approximately 0.3 mile long would be constructed to the proposed well pad. The new road would disturb approximately 2.4 acres and the proposed well pad would disturb approximately 5.32 acres; the total anticipated new disturbance would be approximately 7.68 acres. The well pad would be surrounded by a fence. The fence would be approximately 2,163 feet long and occupy approximately 6.45 acres.

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the S½ of the S½ of Section 19, T149N, R94W (Figure 2-5). Vertical drilling would be completed at approximately 10,271 feet, at which point drilling would turn roughly horizontal to an approximate total vertical depth (TVD) of 9,721 feet and total measured depth (TMD) of 10,021 feet. The complete drilling string would measure approximately 19,021 feet, including approximately 8,000 to 9,000 feet of lateral reach into the Middle Bakken Formation. The drilling target is located approximately 1,800 feet from the east line and 300 feet from the north line, approximately 9,697 feet north-northwest of the surface hole location. A setback of at least 550 feet would be maintained.

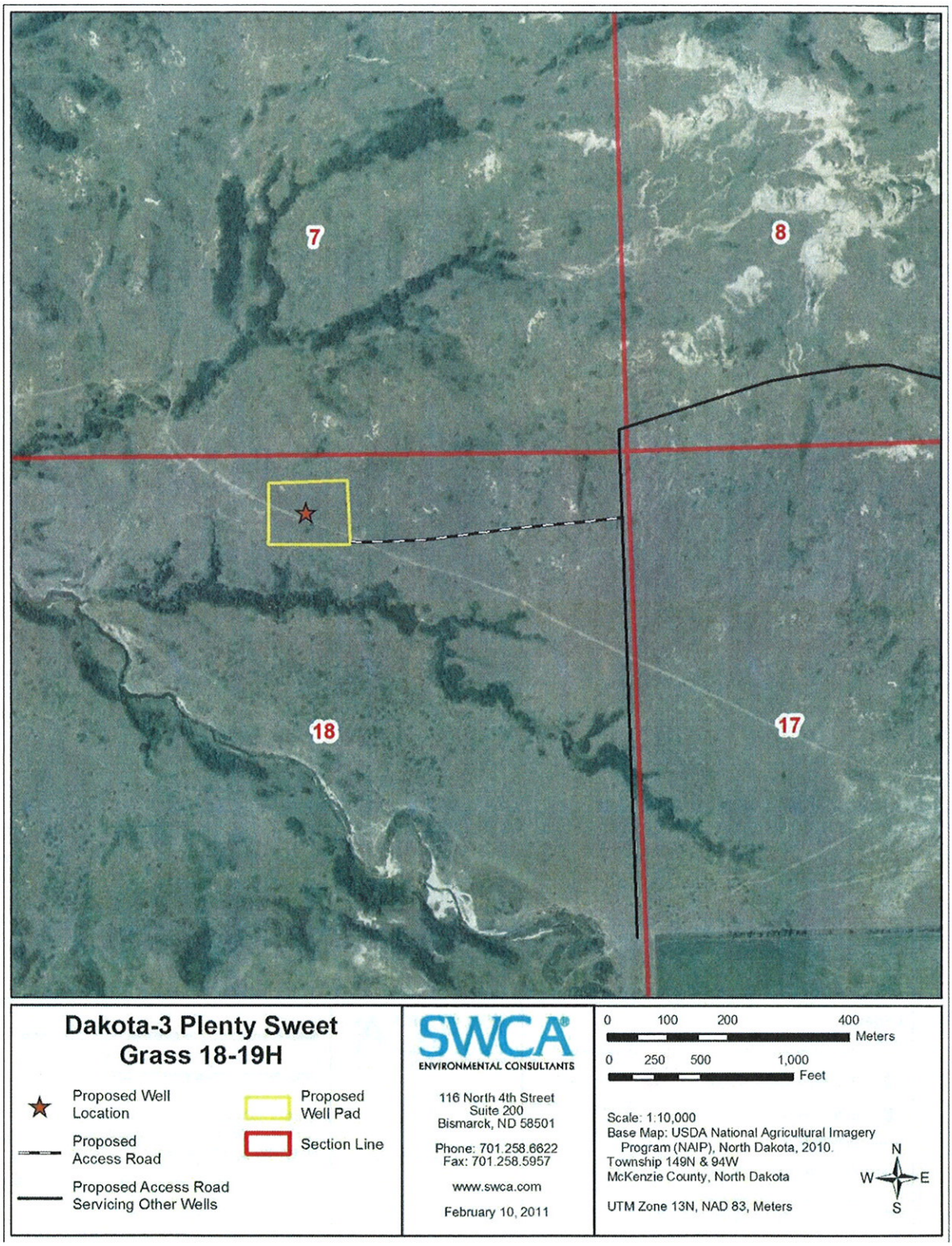


Figure 2-4. Proposed Dakota-3 Plenty Sweet Grass #18-19H well pad.

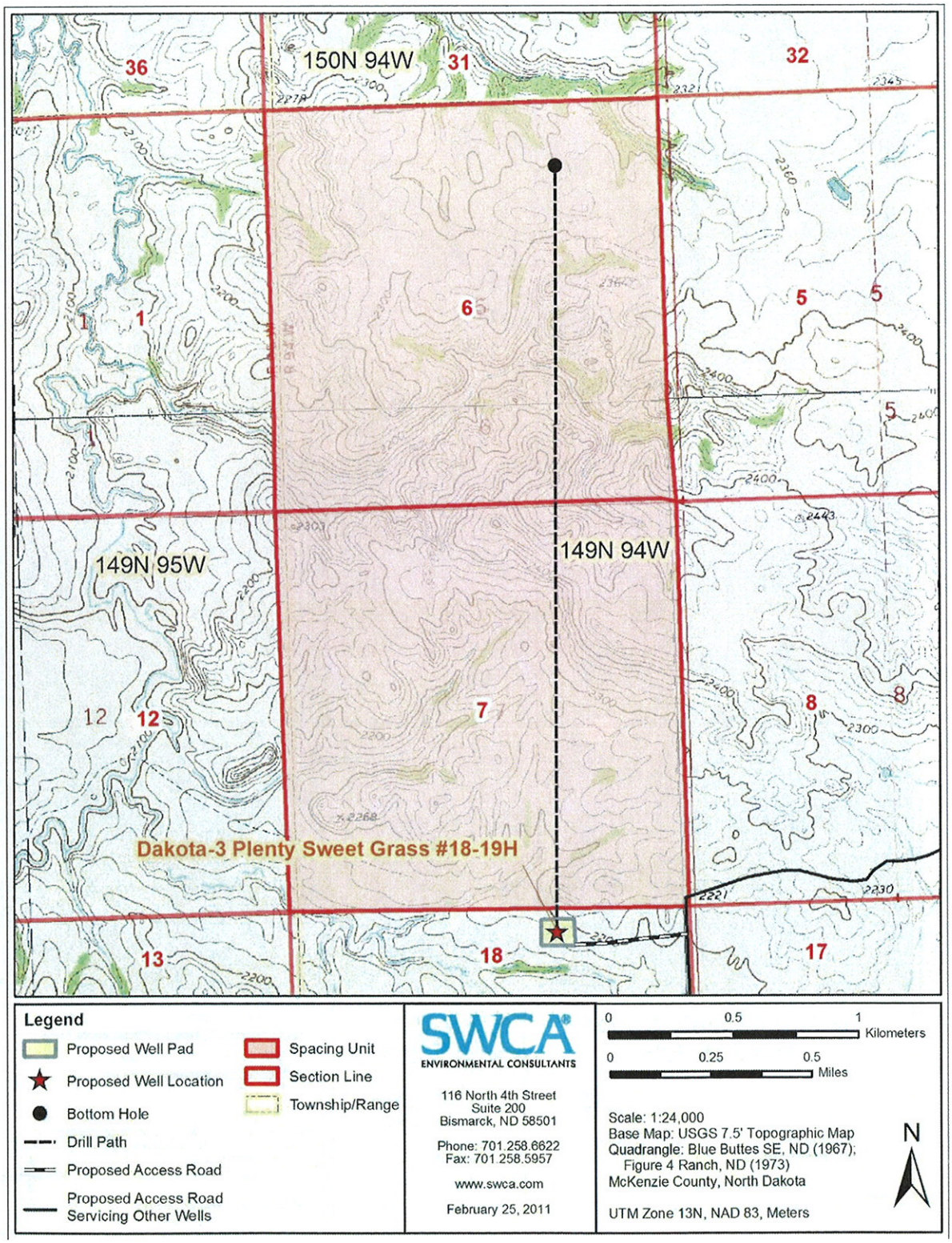


Figure 2-5. Proposed Dakota-3 Plenty Sweet Grass #18-19H infrastructure location and spacing unit boundary.

2.2.9.2 Dakota-3 Spotted Horn #26-35H Well Pad

The proposed Dakota-3 Spotted Horn #26-35H well pad, shown in Figure 2-6, is located approximately 5.09 miles south of Mandaree, North Dakota, in the NE¼ NW¼ of Section 26, T149N, R94W, McKenzie County, North Dakota. A new access road approximately 1,531.2 feet long would be constructed to the proposed well pad. The new road would disturb approximately 3.54 acres and the proposed well pad would disturb approximately 4.87 acres; the total anticipated new disturbance would be approximately 8.41 acres. The well pad would be surrounded by a fence. The fence would be approximately 1,850 feet long and occupy approximately 4.87 acres.

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the SE¼ SE¼ of Section 35, T149N, R94W (Figure 2-7). Vertical drilling would be completed at approximately 10,271 feet, at which point drilling would turn roughly horizontal to an approximate TVD of 9,721 feet and TMD of 10,021 feet. The complete drilling string would measure approximately 19,921 feet, including approximately 8,000 to 9,000 feet of lateral reach into the Middle Bakken Formation. The drilling target is located approximately 1,320 feet from the west line and 340 feet from the north line, approximately 9,977.68 feet northwest of the surface hole location. A setback of at least 550 feet would be maintained.

2.2.10 Reclamation

2.2.10.1 Interim Reclamation

Interim reclamation would consist of reclaiming all areas not needed for production operations for the life of a well. Immediately after well completion, all equipment and materials unnecessary for production operations would be removed from a location and surrounding area. Topsoil would be spread along the cut and fill slopes of a road. Due to semi-closed-loop systems on both well locations, dry cuttings pits would need to be reclaimed.

If commercial production equipment is installed, the well pad would be reduced in size to approximately 425 by 250 feet; the portion of the well pad not needed for production would be recontoured, covered with 6 inches of topsoil, and reseeded using methods and seed mixtures determined by the BIA.

The working area of the well pad and the running surface of the access road would be surfaced with scoria or crushed rock obtained from a previously approved location. The outslope portions of the road would be covered with stockpiled topsoil and reseeded with a seed mixture determined by the BIA, reducing the residual access-related disturbance to a width of approximately 66 feet. Zenergy would control noxious weeds within the ROW, well pad, or other applicable facilities by approved chemical or mechanical methods.

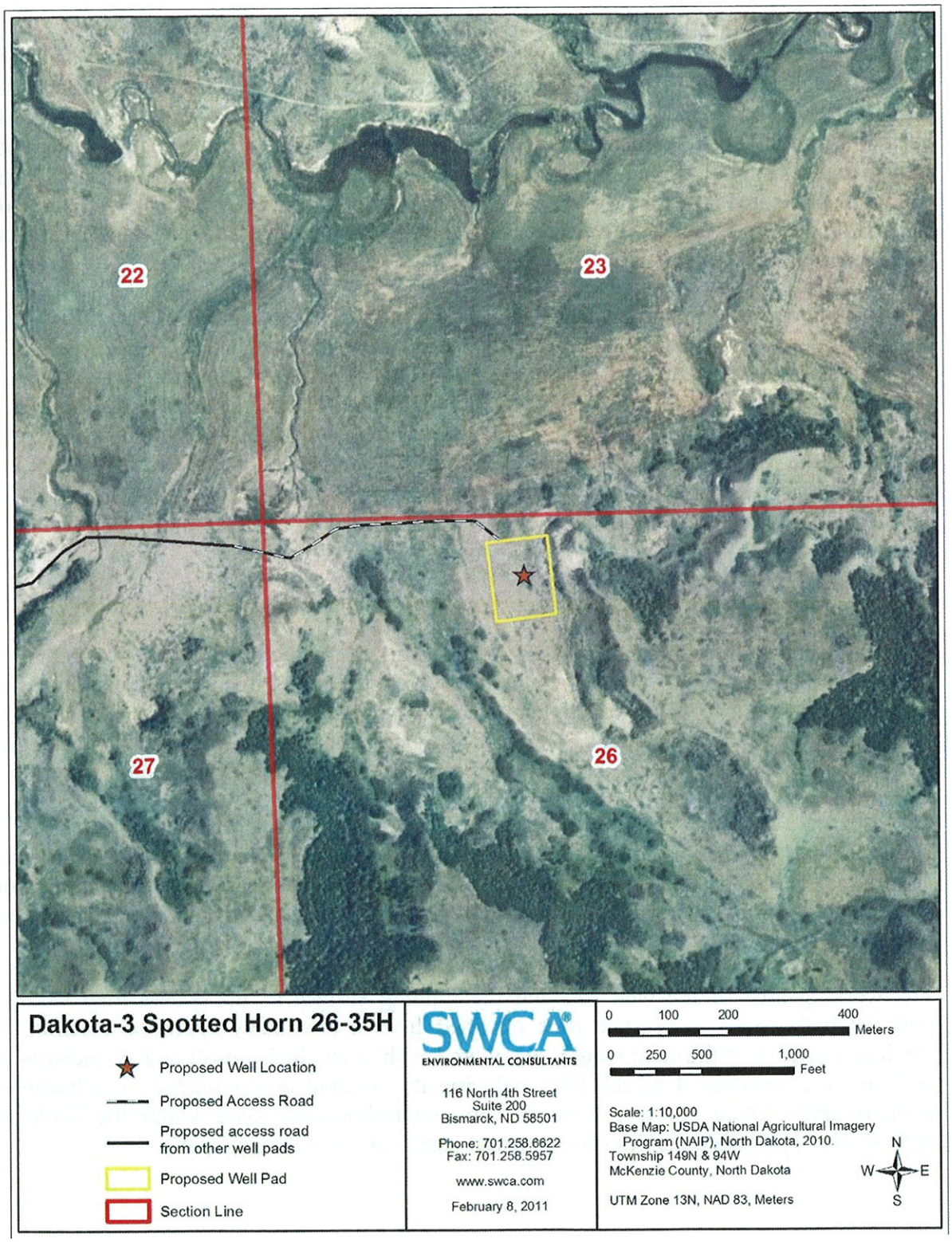


Figure 2-6. Proposed Dakota-3 Spotted Horn #26-35H well pad.

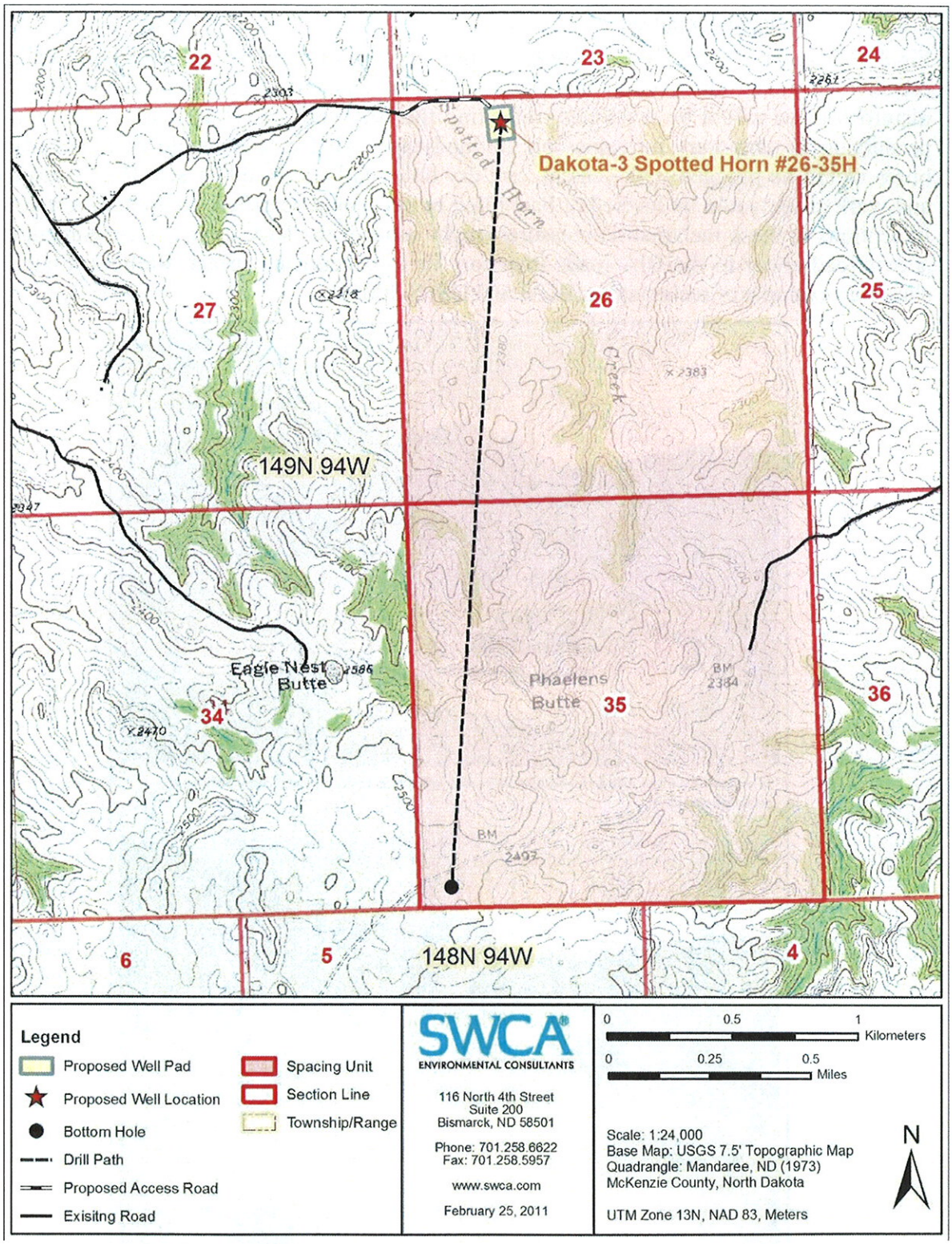
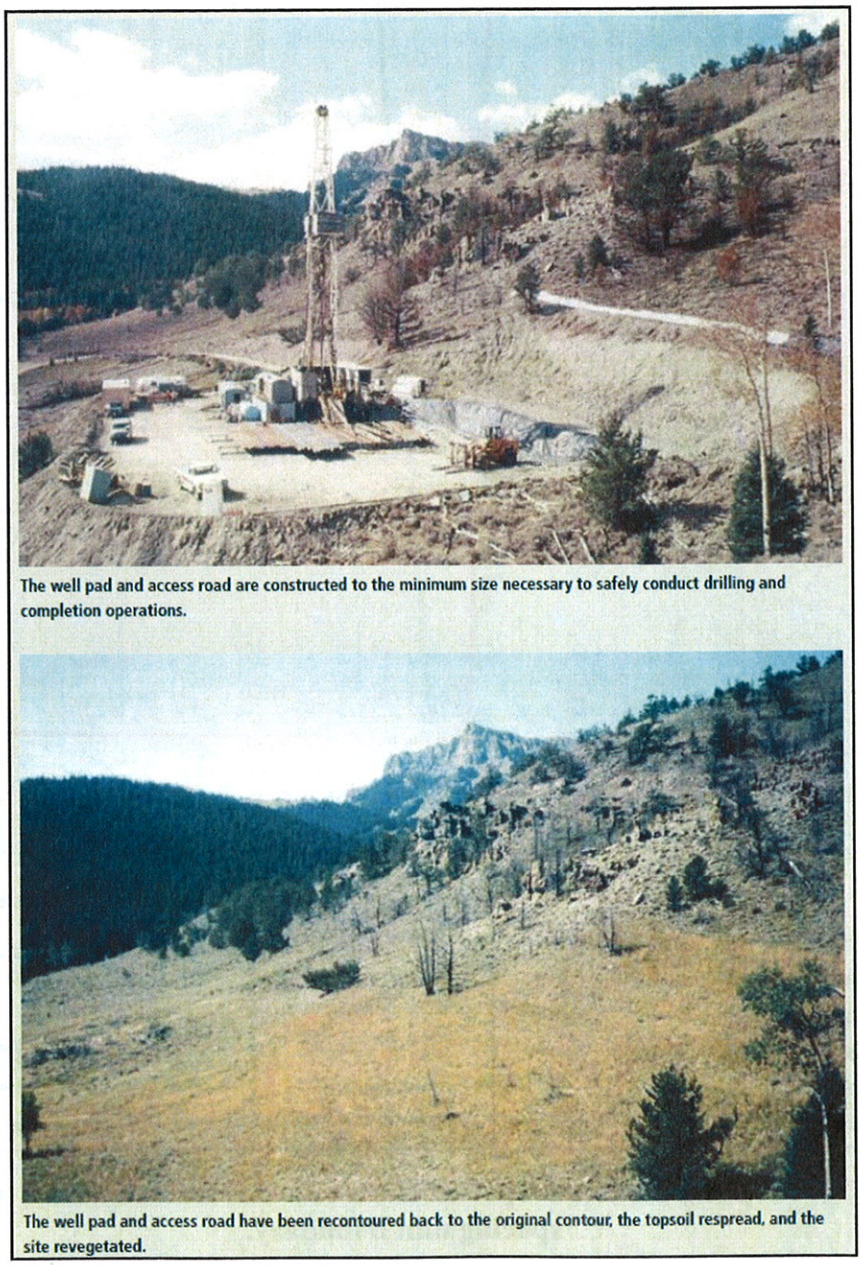


Figure 2-7. Proposed Dakota-3 Spotted Horn #26-35H infrastructure location and spacing unit boundary.

2.2.10.2 Final Reclamation

Final reclamation would occur either in the very short term if the proposed wells are commercially unproductive, or later upon final abandonment of commercial operations. All disturbed areas would be reclaimed, reflecting the BIA view of oil and gas exploration and production as temporary intrusions on the landscape. All facilities would be removed, well bores would be plugged with cement, and dry hole markers would be set. The access roads and work areas would be leveled or backfilled as necessary, scarified, contoured, 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 2-8 shows an example of reclamation (BLM and USFS 2007).



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

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

Figure 2-8. Example of reclamation from the BLM Gold Book (BLM and USFS 2007).

2.3 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 locations.

3.0 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.

3.1 PHYSICAL SETTING

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

The Reservation is within the northern Great Plains ecoregion, which consists of four physiographic units: 1) the Missouri Coteau Slope north of Lake Sakakawea; 2) the Missouri River trench (not flooded); 3) the Little Missouri River badlands; and 4) the Missouri Plateau south and west of Lake Sakakawea (Williams and Bluemle 1978). Much of the Reservation is on the Missouri Coteau Slope. Elevations of the glaciated, gently rolling landscape range from a normal pool elevation of 1,838 feet at Lake Sakakawea to over 2,600 feet on Phaelan's Butte near Mandaree. Annual precipitation on the plateau averages between 15 and 17 inches. Mean temperatures fluctuate between -3 and 21 degrees Fahrenheit (°F) in January and between 55°F and 83°F in July, with 95 to 130 frost-free days each year (Bryce et al. 1998; High Plains Regional Climate Center 2008).

3.2 AIR QUALITY

3.2.1 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. NAAQS 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 TRNP is located approximately 16 miles south of Watford City, North Dakota, and approximately 30 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 (NDDH 2010).

Criteria pollutants and their health effects include the following.

- **Sulfur dioxide (SO_2):** SO_2 is a colorless gas with a strong, suffocating odor. SO_2 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_2 emissions are also a primary cause of acid rain and plant damage (EPA 2010a).
- **Inhalable Particulate Matter (PM10 and PM2.5):** PM10 and PM2.5 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: PM10 is the fraction of total particulate matter 10 microns or smaller, and PM2.5 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_2):** NO_2 is a reddish-brown gas with an irritating odor. Primary sources include motor vehicles, industrial facilities, and power plants. In

the summer months, NO_2 is a major component of photochemical smog. NO_2 is an irritating gas that may constrict airways, especially of asthmatics, and increase the susceptibility to infection in the general population. NO_2 is also involved in ozone smog production (EPA 2010a).

- **Ozone (O_3):** O_3 is a colorless gas with a pungent, irritating odor and creates a widespread air quality problem in most of the world's industrialized areas. Ozone smog is not emitted directly into the atmosphere but is primarily formed through the reaction of hydrocarbons and nitrogen oxides (NOx) in the presence of sunlight. Health effects associated with O_3 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_3 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 3-1. 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 3-1. NAAQS and Other Air Quality Standards.

Pollutant	Averaging Period	Primary Standard (NAAQS)	Secondary Standard (National Parks)	North Dakota AAQS
SO_2 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
PM10 in micrograms per cubic meter of air ($\mu g/m^3$)	24-hour	150	-	150
	Expected Annual Mean	50		50
PM2.5 ($\mu g/m^3$)	24-hour	35	35	-
	Weighted Annual Mean	15	15	-
NO_2 (ppm)	Annual Mean	0.053	0.053	0.053
CO (ppm)	8-hour	9	-	9
	1-hour	35	-	35

Pollutant	Averaging Period	Primary Standard (NAAQS)	Secondary Standard (National Parks)	North Dakota AAQS
O_3 (ppm)	8-hour	0.075	0.075	-
	1-hour	-	-	0.12
Lead ($\mu g/m^3$)	Quarterly Mean	1.5	1.5	1.5
Hydrogen Sulfide (H_2S) (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_2 and hydrogen sulfide (H_2S). 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).

3.2.2 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_2)**: CO_2 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_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH_4)**: CH_4 is emitted during the production and transport of coal, natural gas, and oil. CH_4 emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- **Nitrous Oxide (N_2O)**: N_2O 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_2 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_2 or CO_2e' has been developed. CO_2e is the amount of CO_2 that would cause the same level of radiative forcing as a unit of one of the other GHGs. For example, one ton of CH_4 has a CO_2e of 22 tons; therefore, 22 tons of CO_2 would cause the same level of radiative forcing as one ton of CH_4. N_2O has a CO_2e 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_2e values (EPA 2010c). This document incorporates by reference cited studies and reports from the Pew Center (2009) and the Intergovernmental Panel on Climate Change (IPPC) (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 (PSD) 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 PSD 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_4), with a high radiative forcing CO_2e 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.

3.2.3 Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are a class of compounds known to cause cancer, mutation, or other serious health problems. HAPs are usually a localized problem near the emission source. HAPs are regulated separately from criteria air pollutants. There are several hundred HAPs 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.

3.2.4 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 the 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_2, PM10, NO_2, and O_3. Lead and CO are not monitored by any of the three stations. Table 3-2 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.

Table 3-2. 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_2 (parts per million [ppm])	24-hour	0.14	0.006	0.004	0.004
	Annual Mean	0.03	0.0005	0.0004	0.0011
PM10 (micrograms per cubic meter [$\mu g/m^3$])	24-hour	150	54	108	57.4
	Expected Annual Mean	50	11.3	14.2	13.2

Criteria Pollutant	Averaging Period	Primary Standard (NAAQS)	Maximum Reported Level from Dunn Center and TRNP-NU Monitoring Stations		
			2009	2008	2007
PM2.5 ($\mu g/m^3$)	24-hour	35	15	35.7	22.2
	Weighted Annual Mean	15	3.4	3.7	3.6
NO_2 (ppm)	Annual Mean	0.053	0.0015	0.0018	0.0015
O_3 (ppm)	8-hour	0.08	0.057	0.0063	0.0071

Source: NDDH 2010.

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 and McKenzie County 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.

3.2.5 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_2, 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_2S, 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.

3.2.6 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.

3.2.7 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 Zenergy's commitment to implementation of BMPs identified in

Section 3.2.6, the Proposed Action would not produce significant increases in criteria pollutants, GHGs, or HAPs.

3.3 WATER RESOURCES

This section identifies the existing water resources within the project area and potential effects of the project. 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 project on these water resources.

3.3.1 Surface Water

The surface water resources in the project area would be managed and protected according to existing federal law 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.

Surface water is present within the project area, as shown in Figure 3-1. The proposed Zenergy wells and associated access roads would occur within the Upper Squaw Creek and Upper Bear Den Creek sub-watersheds (hydrologic unit code [HUC] 101102050607 and 101101012001, respectively) which occur in the Lower Little Missouri River and Lake Sakakawea watersheds (HUC 10110205 and 10110101, respectively). Runoff from the Dakota-3 Plenty Sweet Grass #18-19H well would flow west 1.46 miles until meeting with Bear Den Creek, which eventually drains into Bear Den Bay on Lake Sakakawea, approximately 16.13 miles away from the well pad (Figure 3-2). Runoff from the Dakota-3 Spotted Horn #26-35H well would flow west 2.36 miles until meeting with Squaw Creek, which eventually drains into Lake Sakakawea, approximately 17.93 miles away from the well pad (Figure 3-3).

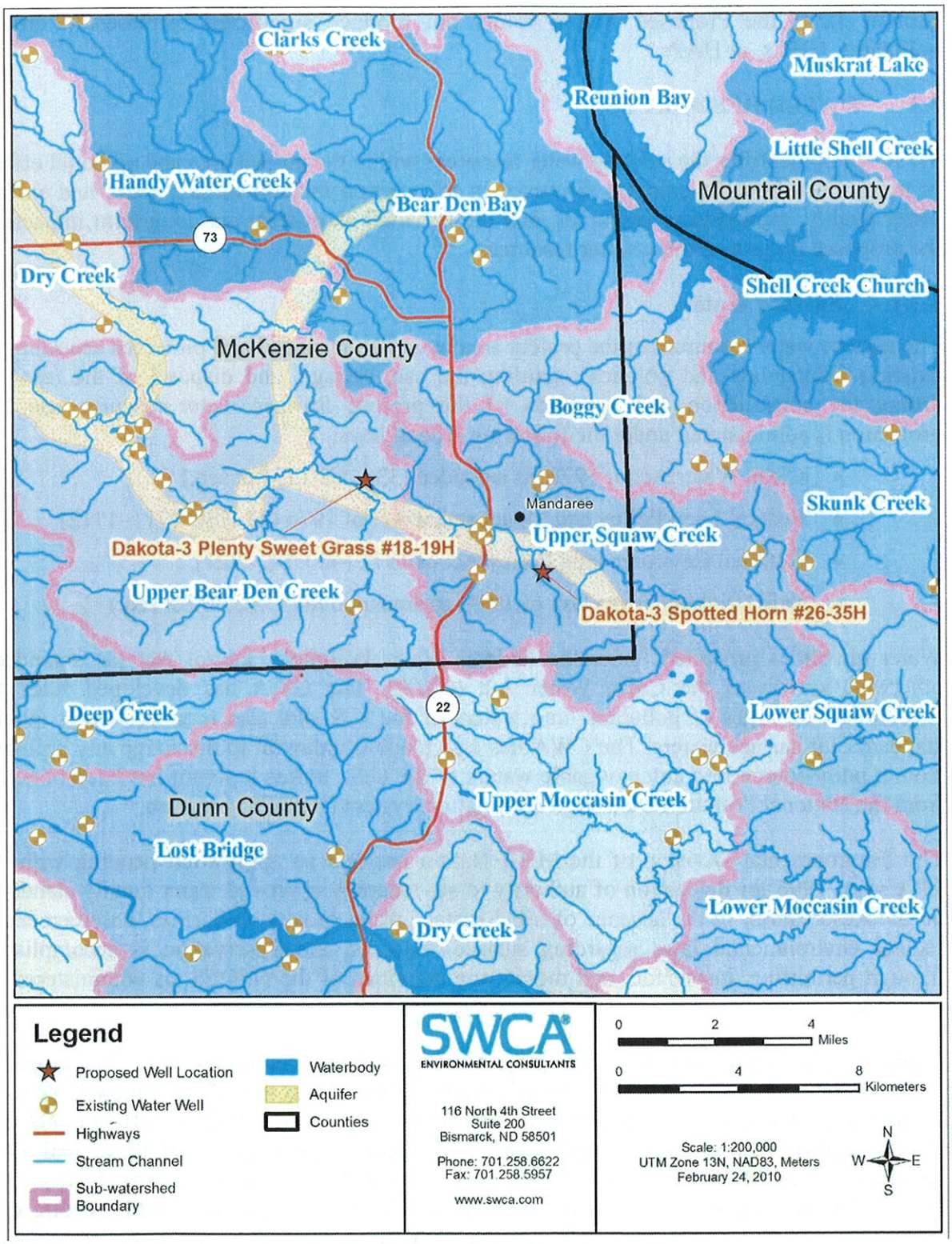


Figure 3-1. Watersheds, existing water wells, and aquifers near the project area.

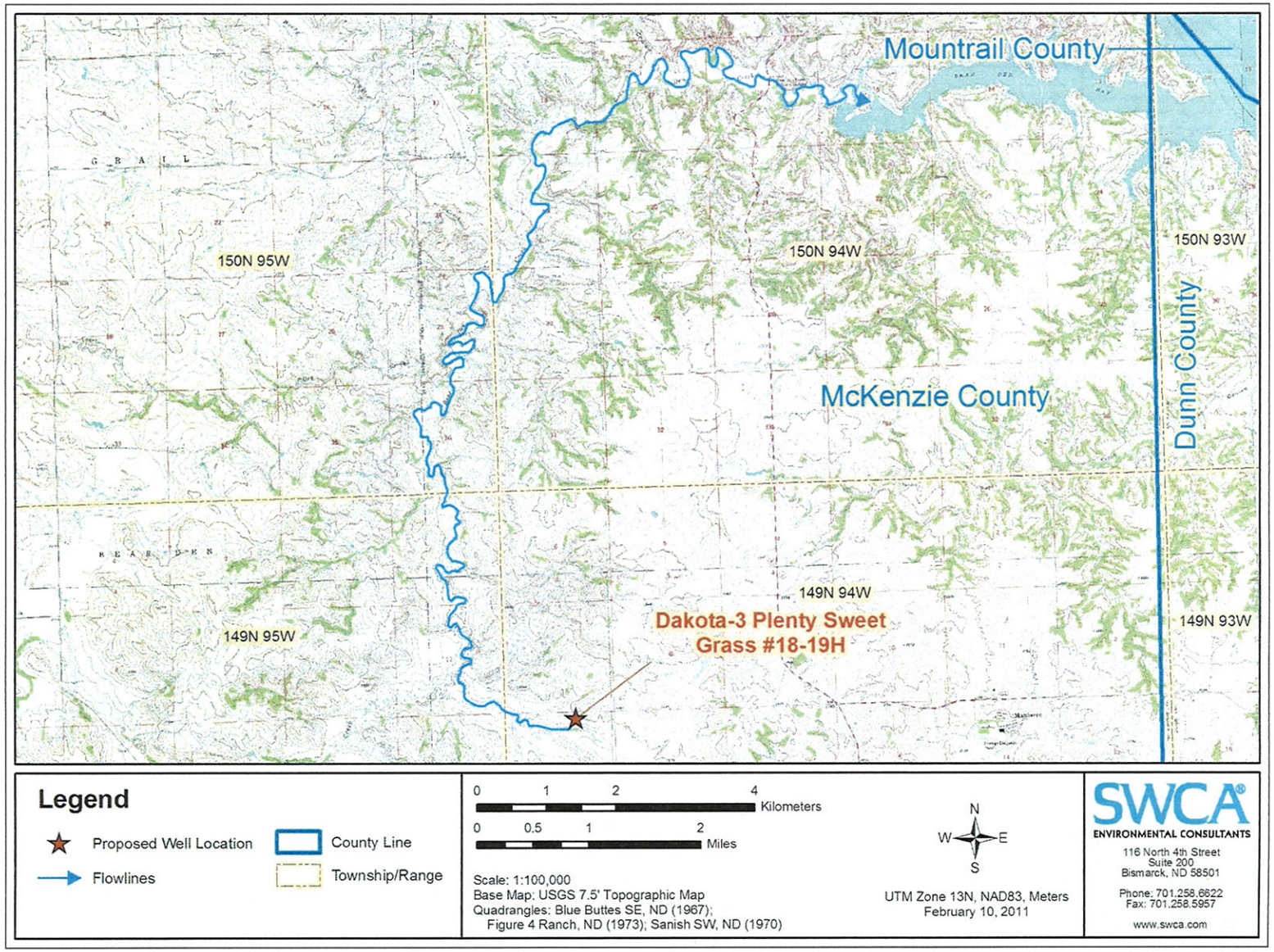


Figure 3-2. Surface runoff direction for the proposed undertaking at Dakota-3 Plenty Sweet Grass #18-19H.

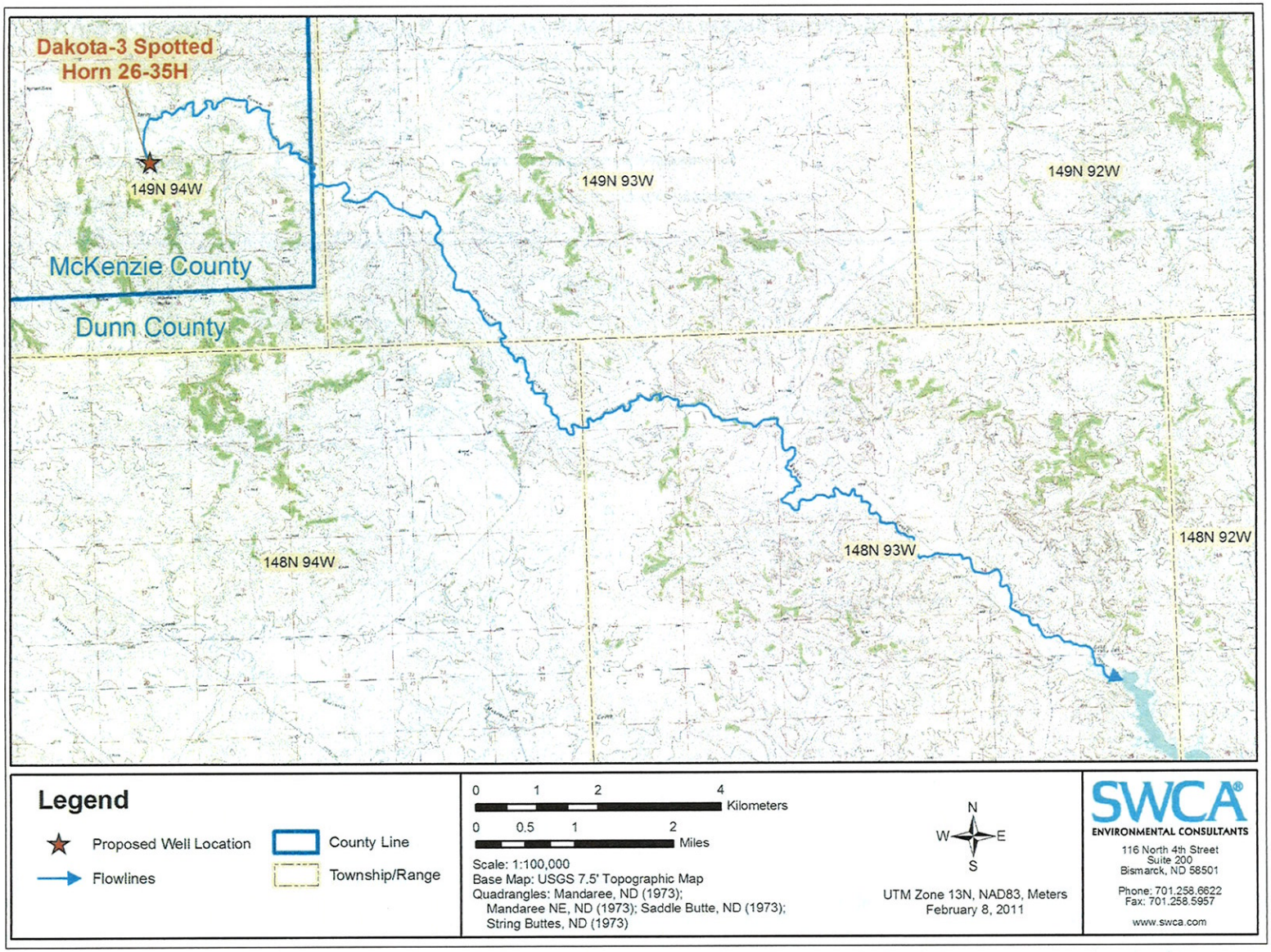


Figure 3-3. Surface runoff direction for the proposed undertaking and Dakota-3 Spotted Horn #26-35H.

As part of the NPDES Construction Permit, the proposed project 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.

3.3.2 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 3-3). Several shallow aquifers related to post-glacial outwash composed of till, silt, sand, and gravel are located in McKenzie County. However, none are within the immediate proposed project areas.

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

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

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

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

Review of electronic records of the North Dakota State Water Commission (2010) revealed 17 existing water wells within 5 miles of any proposed oil wells (Table 3-4). Of the existing water wells within 5 miles of the proposed wells, one is domestic, six are monitoring wells, two are surface water sample sites, two are test holes, and the remaining six wells are of an unknown type. No existing water wells are within 1 mile of the proposed Zenergy oils wells.

Table 3-4. Existing Water Wells within 5 Miles of Proposed Wells.

Water Well Number	Section	Township / Range	Type	Depth (feet)	Aquifer	Miles to Proposed Well Pad
14809406DBD	6	148N 94W	Unknown	Unknown	Sentinel Butte-Tongue River	2.757314
14809414AAB	14	148N 94W	Monitoring	315	Tongue River	4.992281
14809415CAD	15	148N 94W	Surface Water Sample Site	Unknown	Surface Water	4.880936
14809512DCC2	12	148N 95W	Monitoring	52	Sentinel Butte-Tongue River	4.349165
14909305CDC	5	149N 93W	Unknown	Unknown	Sentinel Butte-Tongue River	4.370347
14909308DCC	8	149N 93W	Unknown	Unknown	Sentinel Butte-Tongue River	3.930475
14909414B	14	149N 94W	Unknown	Unknown	Sentinel Butte-Tongue River	1.806257
14909414BA	14	149N 94W	Unknown	1,750	Fox Hills	1.935016
14909421AAD	21	149N 94W	Monitoring - Destroyed	240	Undefined	1.572985
14909422BBB	22	149N 94W	Test Hole	140	No Obs Well Installed	1.549825
14909422BCB	22	149N 94W	Test Hole	80	No Obs Well Installed	1.400724
14909427CB	27	149N 94W	Domestic	36	Undefined	1.252719
14909428AAA1	28	149N 94W	Monitoring	320	Tongue River	1.341522

Water Well Number	Section	Township / Range	Type	Depth (feet)	Aquifer	Miles to Proposed Well Pad
14909428AAA2	28	149N 94W	Monitoring	120	Sentinel Butte-Tongue River	1.341522
14909430CAC	30	149N 94W	Unknown	Unknown	Fort Union	2.631018
15009430B	30	150N 94W	Surface Water Sample Site	Unknown	Surface Water	3.810123
14809414AAB	14	148N 94W	Monitoring	315	Tongue River	4.992281

The majority of the identified groundwater wells may have minimal hydrologic connections due to their respective distances greater than 1 mile from the nearest proposed well. 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).

Since none of the proposed project area lies within the boundaries of the post-glacial outwash aquifers, low porosity bedrock near the project wells would act as confining layers to prevent impacts to groundwater resources. Additionally, well completion methods would prevent cross contamination between aquifers or the introduction of hazardous materials into aquifers.

3.3.2.1 Potential Impacts to Surface Water and Groundwater Resources

The proposed wells would be located 1.25 mile from the nearest water well, and 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. Based on the location, design, and drilling methods, no significant adverse impacts to surface water or groundwater resources are anticipated from the Proposed Action.

3.4 SOILS

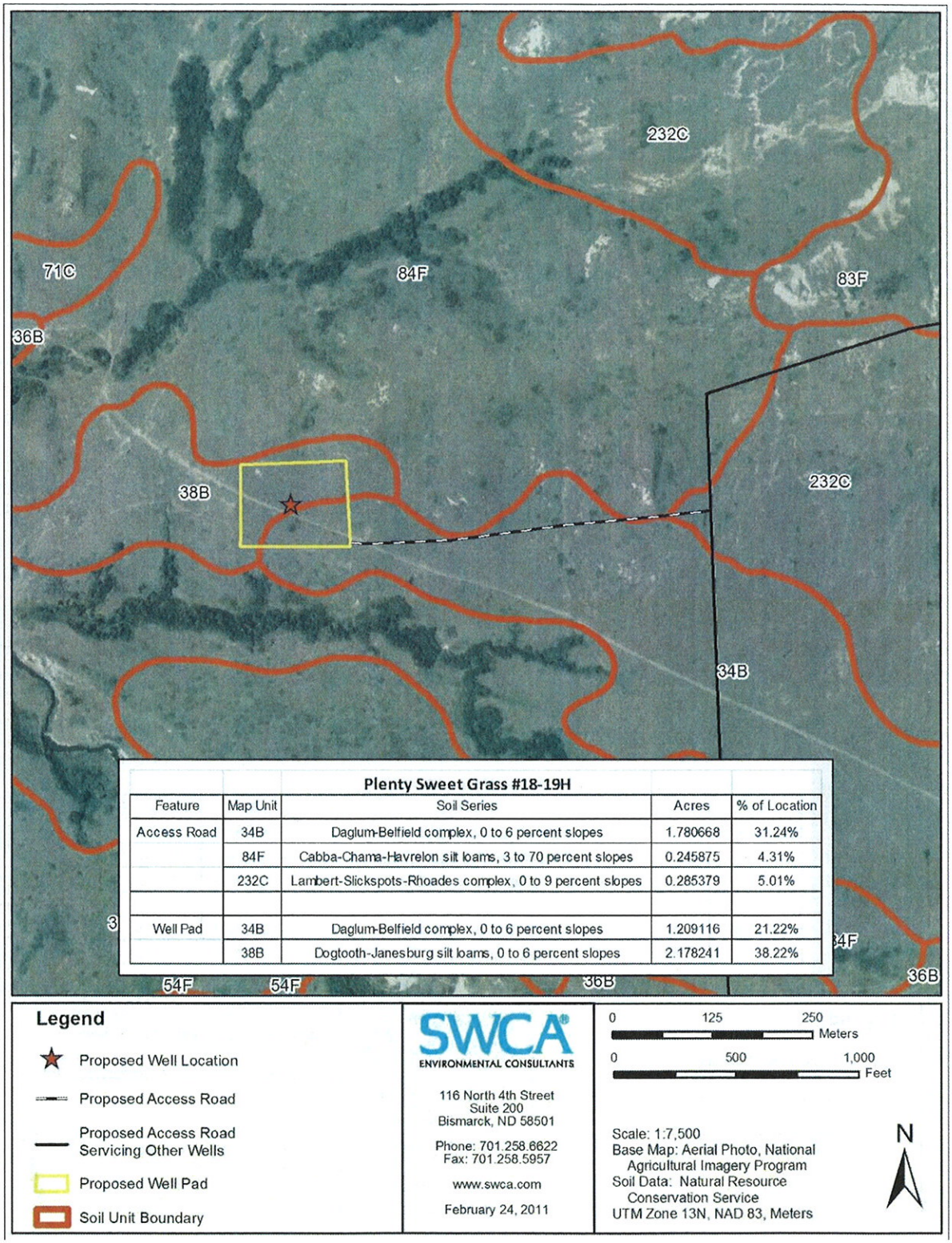
3.4.1 Natural Resources Conservation Service Soil Data

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.

The Natural Resources Conservation Service (NRCS 2011) soil series present on the well pads and access road areas, and their respective acreages, are listed in Table 3-5. The acreage shown in Table 3-5 is based on the spatial extent of soil series combinations derived from NRCS data (Figures 3-4 and 3-5); therefore, the acreage is approximate and used as a best estimate of soil series distribution at each of the proposed project areas.

Table 3-5. Percentage of the Project area Comprised of Specific Soil Types.

Feature	Map Unit	Soil Series	Acres	% of Location
Dakota-3 Plenty Sweet Grass #18-19H				
Access Road	34B	Daglum-Belfield complex, 0 to 6 percent slopes	1.780668	31.24%
	84F	Cabba-Chama-Havrelon silt loams, 3 to 70 percent slopes	0.245875	4.31%
	232C	Lambert-Slickspots-Rhoades complex, 0 to 9 percent slopes	0.285379	5.01%
Well Pad	34B	Daglum-Belfield complex, 0 to 6 percent slopes	1.209116	21.22%
	38B	Dogtooth-Janesburg silt loams, 0 to 6 percent slopes	2.178241	38.22%
Dakota-3 Spotted Horn #26-35H				
Access Road	7	Harriet silt loam, 0 to 2 percent slopes	1.039963	18.26%
	27	Golva silt loam, 0 to 2 percent slopes	0.955967	16.79%
	36B	Rhoades-Daglum complex, 0 to 6 percent slopes	0.422395	7.42%
Well Pad	36B	Rhoades-Daglum complex, 0 to 6 percent slopes	2.941504	51.65%
	145F	Zahl-Cabba-Arikara complex, 9 to 70 percent slopes	0.335171	5.89%



Plenty Sweet Grass #18-19H

Feature	Map Unit	Soil Series	Acres	% of Location
Access Road	34B	Daglum-Belfield complex, 0 to 6 percent slopes	1.780668	31.24%
	84F	Cabba-Chama-Havrelon silt loams, 3 to 70 percent slopes	0.245875	4.31%
	232C	Lambert-Slickspots-Rhoades complex, 0 to 9 percent slopes	0.285379	5.01%
Well Pad	34B	Daglum-Belfield complex, 0 to 6 percent slopes	1.209116	21.22%
	38B	Dogtooth-Janesburg silt loams, 0 to 6 percent slopes	2.178241	38.22%

Figure 3-4. Approximate spatial extent of soil types within and around the Dakota-3 Plenty Sweet Grass #18-19H well pad.

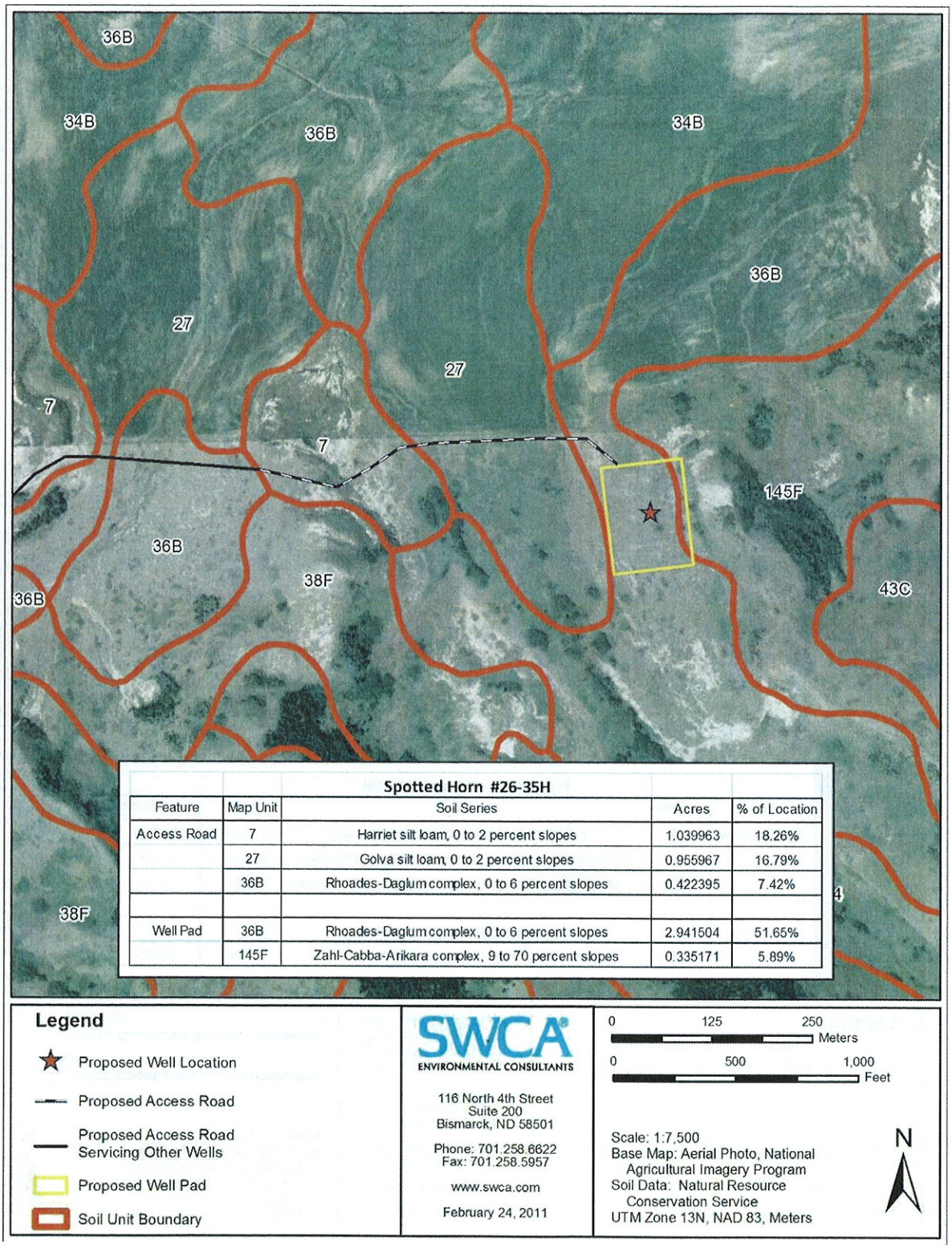


Figure 3-5. Approximate spatial extent of soil types within and around the Dakota-3 Spotted Horn #26-35H well pad.

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 (see Table 3-5).

3.4.1.1 Arikara

The Arikara series consists of very deep, well-drained soils found on wooded slopes. Permeability is moderate with slopes ranging from approximately 9 to 70 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 40°F. This soil type is used most often for woodland grazing. Native vegetation species common to this soil type include bur oak (*Quercus macrocarpa*), green ash (*Fraxinus pennsylvanica*), quaking aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), and Rocky Mountain juniper (*Juniperus scopulorum*) (NRCS 2011).

3.4.1.2 Belfield

The Belfield series consists of deep and very deep, well or moderately well drained, slowly permeable soils formed in alkaline, calcareous residuum, or alluvium on uplands, flats, terraces, and in swales. Slope ranges from 0 to 9 percent. Mean annual air temperature is 43°F, and mean annual precipitation is 15 inches. Most areas are cropped to small grains; some are used for hay or pasture. Native vegetation is mid and short prairie grasses such as western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), and green needlegrass (*Nasella viridula*).

3.4.1.3 Cabba

The Cabba series consists of shallow, well-drained, moderately permeable soils found on hills, escarpments, and sedimentary plains. The soil slopes broadly range between 2 and 70 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is approximately 43°F. The most common vegetation species found on this soil type are little bluestem (*Schizachyrium scoparium*), green needlegrass, and other various herbs, forbs, and shrub species (NRCS 2011).

3.4.1.4 Chama

The Chama series consists of well drained soils formed in materials weathered from soft siltstone, mudstone, and shale on uplands. These soils are moderately deep to soft siltstone, mudstone, or shale, and are moderately or moderately slowly permeable. Slope ranges from 0 to 45 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 15 inches. These soils are cropped to small grains, which are mostly wheat; a significant acreage is in rangeland. The native vegetation is principally western wheatgrass, needle-and-thread (*Hesperostipa comata*), and blue grama.

3.4.1.5 Daglum

The Daglum series consists of deep and very deep, moderately well and well drained soils formed in clayey alluvium or residuum on foot slopes and swales on terraces and uplands. These soils have slow or very slow permeability. Slopes range from 0 to 25 percent. Mean annual air temperature is about 42°F, and the mean annual precipitation is about 16 inches.

These soils are commonly used for range, pasture, and small grains. Native vegetation is western wheatgrass, blue grama, green needlegrass, needleleaf sedge (*Carex duriuscila*), and forbs.

3.4.1.6 Dogtooth

The Dogtooth series consists of moderately deep, well drained, very slowly permeable soils formed in residuum weathered from saline-alkali, calcareous, soft shale, siltstone, or mudstone. These soils are on uplands and have slopes of 0 to 25 percent. Mean annual air temperature is about 42°F, and mean annual precipitation is about 15 inches. Most areas with this soil series is in grass and used for range and pasture. Native vegetation is short- and mid-prairie grasses such as western wheatgrass, blue grama, inland saltgrass (*Distichlis spicata*), sedges, and also some legumes, prickly pear (*Opuntia* sp.), and clubmoss. A few areas are cultivated and used mostly for small grains.

3.4.1.7 Golva

The Golva series consists of very deep and deep, well drained, moderately permeable soils that formed in silty alluvium. These soils are on fans and terraces, and in shallow concave swales. Slope ranges from 0 to 15 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 14 inches. This soil series is used mainly for small grains; some areas are used for row crops, hay, and pasture. Native vegetation is mid and short prairie grasses, such as blue grama, green needlegrass, western wheatgrass, and some forbs.

3.4.1.8 Harriet

The Harriet series consists of very deep, poorly drained, slowly and very slowly permeable soils that formed in calcareous alluvium. These soils are on low-lying flats, terraces, drainageways, and bottom lands. Slope ranges from 0 to 3 percent. Mean annual air temperature is about 42°F, and mean annual precipitation is about 16 inches. Almost all areas of Harriet soils are used for native rangeland or hayland. Native vegetation consists mainly of western wheatgrass, nuttall alkaligrass (*Puccinellia nuttalliana*), and inland saltgrass.

3.4.1.9 Havrelon

The Havrelon series consists of very deep, well and moderately well drained, moderately permeable soils that formed in loamy alluvium. These soils are on floodplains of major streams and tributaries and have slopes of 0 to 6 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 16 inches. Cultivated areas are used for growing small grains, hay, corn, and pasture. Some areas are irrigated and cropped to sugar beets, potatoes, corn, and alfalfa. Native grasses include big bluestem (*Andropogon gerardii*), green needlegrass, and western wheatgrass. Trees, including green ash, cottonwood, boxelder (*Acer negundo*), and chokecherry (*Prunus virginiana*), are along the stream channels.

3.4.1.10 Janesburg

The Janesburg series consists of moderately deep well drained soils formed in residuum weathered from alkaline, soft shale, siltstone, and mudstone. These soils have slow or very slow permeability. They are on upland plains and have slopes of 0 to 25 percent. Mean annual air temperature is about 42°F, and mean annual precipitation is about 15 inches. Most areas of

Janesburg soil are used for range, pasture, and small grains. Native vegetation is western wheatgrass, blue grama, green needlegrass, sedges, and forbs.

3.4.1.11 Lambert

The Lambert soils consist of very deep, well drained soils formed from recent alluvium on uplands, fans, and terraces. These soils are moderately slowly permeable and have slopes of 0 to 65 percent. Mean annual precipitation is about 14 inches and mean annual air temperature is about 42°F. The moderately sloping areas are about equally divided between cropland and native pasture. The steep areas are all range. Uncultivated areas are chiefly in western wheatgrass, blue grama, threadleaf sedge (*Carex filifolia*), and needle-and-thread grass.

3.4.1.12 Rhoades

The Rhoades series consists of deep and very deep, well or moderately well drained, very slowly permeable soils formed in stratified loamy and clayey materials derived from soft shale, siltstone, or mudstone. These soils are in swales on uplands and terraces and have slopes of 0 to 25 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 16 inches. Most areas with Rhoades soil are grasslands used for range and pasture. Native vegetation is short- and mid-prairie grasses such as western wheatgrass, blue grama, sedges, and also some legumes, prickly pear, and clubmoss. Some areas are cultivated mostly to small grains.

3.4.1.13 Zahl

The Zahl series consists of very deep, well drained, moderately slow or slowly permeable soils that formed in calcareous glacial till. These soils are on glacial till plains, moraines, and valley side slopes and have slopes of 1 to 60 percent. Mean annual air temperature is 40°F, and mean annual precipitation is 14 inches. These soils are used mainly for range and pasture; some areas are cropped to small grains. Native vegetation is little bluestem, western wheatgrass, and needle-and-thread grass.

3.4.2 Field-Derived Soil Data

Soil data derived from on-site excavated soil pits, including the matrix value, hue, chroma, and color name, are summarized in Table 3-6. Additionally, redoximorphic features (i.e., reduced/oxidized iron or manganese deposits) and soil texture were noted at each soil pit. A Munsell Soil Color Chart was used to determine the color of moist soil samples.

Table 3-6. Soil Data Obtained through the Excavation of Soil Pits within the Proposed Project area.

Feature	Pit Depth (inches)	Soil Matrix Color (color name)	Redoximorphic Feature Color	Texture
Dakota-3 Plenty Sweet Grass #18-19H Well Pad	0–20	10YR 3/2 (very dark, grayish-brown)	None Observed	Clay Loam
Dakota-3 Spotted Horn #26-35H Well Pad	0–8	10YR 3/2 (very dark, grayish-brown)	None Observed	Silty Clay
	8–16	10YR 4/2 (dark grayish-brown)	None Observed	Silty Clay

3.4.3 Potential Impacts from Soil Erosion

3.4.3.1 Dakota-3 Plenty Sweet Grass #18-19H and Dakota-3 Spotted Horn #26-35H

The well pads are dominated by soils found within 0 to 6 percent slopes. Care will be taken during construction to minimize soil erosion impacts.

1. The soil types found at the well pad locations have variable run-off depending on the slope, which ranges between 0 and 70 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.

3.4.3.2 General

Precautions should 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; 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 reseeded 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.

3.5 WETLANDS

National Wetland Inventory maps maintained by the U.S. Fish and Wildlife Service (USFWS) do not identify any jurisdictional wetlands within the proposed well pads or access roads (USFWS 2009). No wetlands were observed along any access road ROWs or at any of the well sites during surveys conducted in July and August 2010.

According to the USFWS National Wetland Inventory database, proposed Dakota-3 Spotted Horn #26-35H well pad is approximately 0.42 mile from the nearest wetland. No wetlands are located within 0.5 mile of the Dakota-3 Plenty Sweet Grass #18-19H well pad. Due to the location of these wetlands, no impacts are expected as a result of construction, drilling, or production activities associated with the proposed well pads and associated access roads. In order to prevent any downstream impact to Lake Sakakawea, Zenergy would employ standard BMPs to reduce the potential for adverse impact.

3.6 VEGETATION AND NOXIOUS WEEDS

3.6.1 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*).

3.6.1.1 Dakota-3 Plenty Sweet Grass #18-19H Well Pad And Access Road

Herbaceous vegetation noted at the project area includes fringed sage *(Artemisia frigida),* blue grama, green needlegrass, and western snowberry (Figure 3-6).

Figure 3-6. Project area overview of the Dakota-3 Plenty Sweet Grass #18-19H well pad depicting general topography, facing south-southeast.

3.6.1.2 Dakota-3 Spotted Horn #26-35H Well Pad And Access Road

Herbaceous vegetation noted at the project area includes silver sage *(Artemisia cana)*, narrow-leaved purple coneflower *(Echinacea angustifolia)*, green needlegrass, little bluestem, silver buffaloberry, and western snowberry (Figure 3-7).

Figure 3-7. Project area overview of the Dakota-3 Spotted Horn #26-35H well pad depicting general topography, facing northwest.

3.6.2 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. NDCC (Chapter 63-01.1) and the North Dakota Department of Agriculture (NDDA) recognize 11 species as noxious, as shown in Table 3-7 (NDDA 2009). Each county has the authority to add additional species to their list of noxious weeds. McKenzie County has five additional species listed as county noxious weeds. In 2009, seven state noxious weed species were found on 62,222 acres in McKenzie County. In 2009, no county listed species were found in McKenzie County.

Table 3-7. Recognized Noxious Weed Occupied Area in McKenzie County, North Dakota.

Common Name	Scientific Name	McKenzie County (acres)
State Noxious Weeds		
absinth wormwood	*Artemisia absinthium*	15
Canada thistle	*Cirsium arvense*	33,600
diffuse knapweed	*Centaurea diffusa*	1
leafy spurge	*Euphorbia esula*	26,200
musk thistle	*Carduus nutans*	0
purple loosestrife	*Lythrum salicaria*	0
Russian knapweed	*Acroptilon repens*	0
spotted knapweed	*Centaurea stoebe*	5
yellow toadflax	*Linaria vulgaris*	0
dalmatian toadflax	*Linaria dalmatica*	1
salt cedar	*Tamarix ramosissima*	2,400
McKenzie County Listed Noxious Weeds		
black henbane	*Hyoscyamus niger*	0
common burdock	*Arctium minus*	0
houndstongue	*Cynoglossum officinale*	0
halogeton	*Halogeton glomeratus*	0
baby's breath	*Gypsophila muralis*	0

Source: NDDA 2009

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.

3.6.3 Potential Impacts on Vegetation and Noxious Weeds

The Proposed Action would result in minor loss of native grassland vegetation. The potential disturbance associated with the Dakota-3 Plenty Sweet Grass #18-19 H project components would total approximately 7.68 acres. Disturbance associated with the Dakota-3 Spotted Horn #26-35 H project components would total approximately 8.41 acres.

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 pads and associated access roads. 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.

Construction of the proposed well pads and the associated access roads would result in long-term disturbance of approximately 11.24 acres of vegetation, since these facilities would only be partially reclaimed, and would be in continuous use for the life of the project. 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.

3.7 WILDLIFE

3.7.1 Threatened and Endangered Species Occurrence and Habitat

Several wildlife species that may exist in McKenzie 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 McKenzie 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 3-8. SWCA Environmental Consultants (SWCA) biologists did not observe any of these species, although potential suitable habitat of the Dakota skipper, Sprague's pipit, whooping crane, and gray wolf was observed within or near the Project Area.

Descriptions of listed threatened or endangered species known to exist in McKenzie County are provided in Appendix A.

Table 3-8. 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 (*Mustela nigripes*)	Endangered	Species is presumed extirpated from North Dakota.	None	No Effect
Gray Wolf (*Canis lupus*)	Endangered	Nearest known gray wolf populations exist in Minnesota, Canada, Montana, and Wyoming.	None	No Effect
Whooping Crane (*Grus americana*)	Endangered	Birds may occasionally stopover during migration due to the presence of suitable foraging habitat near the project areas.	Drilling or construction activity will cease and the Bureau of Indian Affairs and U.S. Fish and Wildlife Service (USFWS) will be notified if whooping cranes are sighted. In addition, migratory bird protective measures will be implemented, as follows: • Construction will be conducted outside of the migratory bird breeding season (February 1–July 15). If construction is to occur during bird breeding season, vegetation within the construction right-of-way (ROW) will be regularly mowed; or surveys will be conducted for nesting migratory birds within 5 days of construction and finding would be reported to the USFWS. Dry cuttings pits will include avian-safe coverings and be reclaimed immediately after wells are completed.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Piping Plover (*Charadrius melodus*)	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 16.13 to 17.93 river miles from the proposed project area.	See migratory bird protective measures for whooping crane.	May Affect, Is Not Likely to Adversely Affect
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, approximately 16.13 to 17.93 river miles from the proposed project area.	Zenergy will implement all best management practices (BMPs), erosion control measures, and spill prevention practices required by the Clean Water Act. Zenergy will use a semi-closed-loop drilling system and surround each well pad with a 4-foot berm to prevent hazardous runoff or spills.	May Affect, Is Not Likely to Adversely Affect
Interior Least Tern (*Sterna antillarum*)	Endangered	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 16.13 to 17.93 river miles from the proposed project area.	See migratory bird protective measures for whooping crane. See Designated Critical Habitat protective measures for piping plover.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Pallid Sturgeon (*Scaphirhynchus albus*)	Threatened	Lake Sakakawea is approximately 16.13 to 17.93 river miles from the proposed project area.	See Designated Critical Habitat protective measures for piping plover.	May Affect, Is Not Likely to Adversely Affect
Dakota Skipper (*Hesperia dacotae*)	Candidate	Suitable habitat was noted within the project area. However, no adverse impact is anticipated as a result of construction activities.	None.	May Affect, Is Not Likely to Adversely Affect
Sprauge's Pipit (*Anthus spragueii)*	Candidate	Suitable habitat was noted within the project area. However, no adverse impact is anticipated as a result of construction activities.	The proposed well pads will be reclaimed as soon as possible after their lifespan is complete. Impacted areas will be returned to pre-construction contours.	May Affect, Is Not Likely to Adversely Affect
Other Federally Protected Species				
Bald Eagle (*Haliaeetus leucocephalus*)	Bald and Golden Eagle Protection Act (BGEPA)	Raptor habitat survey was conducted. No evidence of bald eagle nesting or foraging habitat occurs in the project area.	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 additional bald eagle surveys will be conducted.	No Adverse Effects Anticipated

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Golden Eagle (*Aquila chrysaetos*)	BGEPA	Raptor habitat survey was conducted. No eagle nests were observed in the project area. Nesting habitat was present and 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 1.4 miles south and west of the Dakota-3 Spotted Horn #26-35H well. No additional golden eagle surveys will be conducted.	No Adverse Effects Anticipated
Migratory Birds	Migratory Bird Treaty Act	Suitable habitat for nesting migratory grassland birds occurs in the project area.	See migratory bird protective measures for whooping crane.	No Adverse Effects Anticipated

3.7.2 General Wildlife Species Occurrence and Habitat

Coyotes (*Canis latrans*) were visually observed by a biologist during the field survey on May 13, 2010, at the Dakota-3 Plenty Sweet Grass #18-19H location. No other wildlife was observed.

3.7.3 Potential Impacts to Wetlands, Habitat, and Wildlife

With the implementation of standard BMPs, no riparian or wetland habitats are anticipated to be directly or indirectly impacted by the proposed access roads or wells.

No impacts to listed species are anticipated because of the low likelihood of their occurrence within the proposed project areas, confirmed by on-site assessments conducted by SWCA biologists. If construction is planned during the critical season, a migratory bird survey would be conducted prior to commencement of construction. Additionally, Zenergy has committed to using a semi-closed-loop drilling system. For additional information on general BMPs and other operator-committed measures, please see Sections 2.2.9, Construction Details, and 3.12, Mitigation and Monitoring.

Minor impacts to unlisted wildlife species and their habitats could result from the construction of the well pads and associated access roads; 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 project 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 (916 USC 703–711). Fragmentation of native prairie habitat can

detrimentally affect grouse species; however, due to the ratio of each project area to the total landscape area, the overall disturbance would be negligible.

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

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

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

3.8 CULTURAL RESOURCES

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

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

Whatever the nature of the cultural resource addressed by a particular statute or tradition, implementing procedures invariably include consultation requirements at various stages of a federal undertaking. The MHA Nation has designated a Tribal Historic Preservation Officer

(THPO) by Tribal Council resolution, whose office and functions are certified by the National Park Service. The THPO operates with the same authority exercised in most of the rest of North Dakota by the State Historic Preservation Officer (SHPO). Thus, BIA consults and corresponds with the THPO regarding cultural resources on all projects proposed within the exterior boundaries of the Fort Berthold Reservation.

Cultural resource inventories of these Dakota-3 well pads and access roads were conducted by personnel of SWCA Environmental Consultants, using an intensive pedestrian methodology. For the Plenty Sweet Grass 18-19H project approximately 16.9 acres were inventoried on May 13, 2010 (Kohler 2011a). No historic properties were located that appear to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.6) for inclusion on the National Register. As the lead federal agency, and as provided for in 36 CFR 800.5, on the basis of the information provided, BIA reached a determination of **no historic properties affected** for this undertaking. This determination was communicated to the THPO on February 3, 2010; however, the THPO did not respond within the allotted 30 day comment period. For the Spotted Horn 26-35H project approximately 20.2 acres were inventoried on November 8, 2010 (Kohler 2011b). No historic properties were located that appear to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.6) for inclusion on the National Register. As the lead federal agency, and as provided for in 36 CFR 800.5, on the basis of the information provided, BIA reached a determination of **no historic properties affected** for this undertaking. This determination was communicated to the THPO on February 24, 2011; however, the THPO did not respond within the allotted 30 day comment period.

3.9 PUBLIC HEALTH AND SAFETY

Health and safety concerns include sour 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.

Hydrogen sulfide (H_2S) is extremely toxic in concentrations above 500 parts per million (ppm), but it has not been found in measurable quantities in the Bakken Formation. Before reaching the Bakken, however, drilling would penetrate the Mission Canyon Formation, which is known to contain varying concentrations of H_2S. 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_2S at dangerous concentration levels is very unlikely, no direct impacts from H_2S are anticipated with implementation of the project.

Tanker trips would depend on production, but Zenergy 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.

A temporary, lined reserve pit would be constructed within the disturbed area of the well pad and constructed so as not to leak, break, or allow discharge and in a way that minimizes the accumulation of precipitation runoff into the pit.

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.

3.9.1 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 new wells. 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 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.

3.10 SOCIOECONOMICS

3.10.1 Socioeconomic Analysis Area

The scope of analysis for social and economic resources includes a discussion of current social and economic data relevant to the Analysis Area and surrounding communities of the Reservation and McKenzie, Dunn, 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.

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.

3.10.2 Population and Demographic Trends

Historic and current population counts for the Analysis Area, compared to the state, are provided below in Table 3-9. The state population showed little change between the last two census counts (1990–2000), but there were notable changes at the local level. Populations in all four counties have steadily declined in the past. McLean and Dunn counties had a higher rate of population decline among the four counties at -10.5% and -7.8%, respectively. These declines can be attributed to more people moving to metropolitan areas, which are perceived as offering more opportunities for growth. However, population on or near the Reservation has increased approximately 13.3% since 2000. While Native Americans are the predominant group on the Reservation, they are considered the minority in all other areas of North Dakota.

As presented in Table 3-9, population growth on the Reservation (13.3%) exceeds the overall growth in the state of North Dakota (-0.1%) and four counties in the Analysis Area. This trend in population growth for the Reservation is expected to continue in the next few years (Fort Berthold Housing Authority 2008).

Table 3-9. Population and Demographics.

County or Reservation	Population in 2008	% of State Population	% Change Between 1990–2000	% Change Between 2000–2008	Predominant Group in 2008 (%)	Predominant Minority in 2008 (Percent of Total Minority Population)
Dunn	3,318	0.5	-10.1	-7.8	Caucasian (84.9%)	American Indian (15.1%)
McKenzie	5,674	0.8	-10.1	-1.1	Caucasian (76.3%)	American Indian (23.7%)
McLean	8,337	1.3	-11.0	-10.5	Caucasian (91.3%)	American Indian (8.7%)
Mountrail	6,511	1.0	-5.6	-1.8	Caucasian (62.8%)	American Indian (37.2%)
On or Near Fort Berthold Indian Reservation[1]	11,897	1.8	178.02	+13.33	American Indian	Caucasian (~27%)
Statewide	641,481	100	0.005	-0.1	Caucasian	American Indian (8.6%)

Source: U.S. Census Bureau 2010a.
[1] Bureau of Indian Affairs 2005. Population shown reflects the Total enrollment in the Tribe in 2005. 2008 data unavailable. All information related to the Fort Berthold Indian 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.

3.10.3 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, 2007 economic data indicates that the major employers in North Dakota include government and government enterprises, which employed 16.6%; health care and social assistance, which employed 11.7%; and retail trade, which employed at 11.3% of the state's labor force (U.S. Bureau of Economic Analysis 2009a). 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.

Table 3-10 provides data on 2009 employment opportunities for the Analysis Area, and changes in unemployment for the period between 2005 and 2009. All counties in the Analysis Area, and the entire state of North Dakota, showed average weekly wages that were lower than the national average in 2009. In 2009, total employment in the state of North Dakota was approximately 354,916, with a statewide unemployment rate of 4.3% of the workforce, one of the lowest in the nation (Bureau of Labor Statistics 2009). While some counties in the

Analysis Area experienced a slight increase in unemployment, others were unchanged or experienced a decreased unemployment.

Table 3-10. 2009 Total Employment, Average Weekly Wages, and Unemployment Rates.

Location	Total Employment (September 2009)	Average Weekly Wage (September 2009)	Unemployment Rate (2009)	Change in Unemployment Rate (2005–2009)
United States	128,088,742	$840	9.8%	
North Dakota	354,916	$680	4.3%	+0.9%
Dunn County	929	647	4.5%	+1.1%
McKenzie County	2,899	839	3.5%	-0.2%
McLean County	3,594	755	5.0%	No change
Mountrail County	3,126	681	4.2%	-1.8%
On or Near Fort Berthold Indian Reservation*	1,287	N/A	71%	N/A

Sources: Bureau of Labor Statistics 2009; U.S. Department of Agriculture 2010; Bureau of Indian Affairs 2005.
* Represents 2005 data only.

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

3.10.4 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 as well as other non-labor income sources like transfer payments, dividends, and rent, it is possible for per capita income to rise even if the average wage per job declines over time.

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

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

With the exception of McLean County, counties that overlap the Reservation tend to have per capita incomes and median household incomes below North Dakota statewide averages. As presented in Table 3-10, unemployment rates in all counties, including the Reservation, were equal to or above the state average of 4.3%. Subsequently, Reservation residents and MHA Nation members tend to have per capita incomes and median household incomes below the averages of the encompassing counties, as well as statewide, and higher unemployment. Per capita income for residents on or near the Reservation is approximately 28% lower than the statewide average (Table 3-11). The median household income reported for the Reservation (i.e., $26,274) is approximately 40% lower than the state median of $43,936. According to the BIA, approximately 55% of tribal members living on or near the Reservation were employed, but living below federal poverty levels (BIA 2005).

Table 3-11. Income and Poverty in Analysis Area, 2007.

Unit of Analysis	Per Capita Income[1]	Median Household Income	Percent of all People in Poverty[2]
Dunn County	26,440	$37,632	13.5%
McKenzie County	32,927	$41,333	13.8%
McLean County	38,108	$44,421	10.4%
Mountrail County	32,324	$35,981	15.9%

Unit of Analysis	Per Capita Income[1]	Median Household Income	Percent of all People in Poverty[2]
Fort Berthold Indian Reservation[3]	10,291	$26,274	N/A
North Dakota	36,082	$43,936	11.8%

[1] U.S. Bureau of Economic Analysis 2009b
[2] United Stated Department of Agriculture (USDA) 2009
[3] North Dakota State Data Center 2009

3.10.5 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 2008 updates (U.S. Census Bureau 2010a). 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 3-12 provides housing unit supply estimates in the Analysis Area, including the Reservation and four overlapping counties.

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

Table 3-12. Housing Development Data for the Reservation and Encompassing Counties.

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

Source: U.S. Census Bureau 2010a.

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 3-13.

Table 3-13. 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 2009a, 2009b.

3.10.6 Potential Impacts to Area Socioeconomics

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

As presented in Table 3-14, implementation of the proposed wells is anticipated to require between 14 and 28 workers per well in the short term. If the wells prove successful, Zenergy 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 Zenergy employees would work in the project area. Therefore, any increase in workers would constitute a minor increase in population in the project area required for short-term operations and would not create a noticeable increase in demand for services or infrastructure on the Reservation or the communities near the project area.

Although the Analysis Area has experienced a recent decline in population between 2000 and 2008 (as shown in Table 3-9), the population on the Reservation itself has increased. This has not led to significant housing shortages. The historic housing vacancy rate (Table 3-12) 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 project. As such, the proposed project would not have measurable impacts on housing availability or community infrastructure in the area. The proposed project also would not result in any identifiable impacts to social conditions and structures within the communities in the project area.

Table 3-14. Duration of Employment during Proposed Project Implementation.

Activity	Duration of Activity (Average Days per Well)	Daily Personnel (Average Number per Well)
Construction (access road and well pad)	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

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

3.11 ENVIRONMENTAL JUSTICE

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

The EPA headed the interagency workgroup established by the 1994 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 3-15 summarizes relevant data regarding minority populations for the Analysis Area.

Table 3-15. Minority Population Breakdown by North Dakota County and Race, 2000–2008[2].

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[1]	27	43	58	93	81	146	87	184	7,786	13,227
Races										
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%	

[1] Hispanic or Latino may be of any race.

[2] U.S. Census Bureau estimates of population demographics were made in July 2008.

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 overall 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 Analysis Area during the same time period. As presented in Table 3-15, 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 Analysis Area during the period from 2000 until 2008 (U.S. Census Bureau 2010a). The four counties of the Analysis Area 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 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 (NDAIC 2010).

Poverty rate data for the counties in the Analysis Area are summarized in Table 3-16. The data show that poverty rates have decreased in the Analysis Area during the period from 2000 to 2008 (U.S. Census Bureau 2010b). 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 $45,995.

Table 3-16. Poverty Rates and Median Household Income for the Analysis Area.

Location	2000	2008	2008 Median Household Income
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.

3.11.1 Potential Impacts to Environmental Justice

The Analysis Area, 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 Analysis Area have already begun to decrease since oil and gas development began after 2000, as shown in Table 3-16. 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 project has not been found to pose a threat for significant impact to any other critical element, including air quality, public health and safety, water quality, wetlands, wildlife, soils, or vegetation within the human environment. Through the avoidance of such impacts, no disproportionate impact is expected to low-income or minority populations. The Proposed Action offers many positive consequences for tribal members, while recognizing EJ concerns. Procedures summarized in this document and in the APD are binding and sufficient. No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required.

3.12 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 during all ground-disturbing activities. Each phase of construction and development through production will 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 will be developed by the BLM and BIA that documents the results of monitoring in order to adapt the projects to eliminate any adverse impact on the environment.

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. Zenergy would implement, to the extent possible, the use of BMPs in an effort to

mitigate environmental concerns in the planning phase 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.

3.12.1 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.

- 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 until reclamation activities commence. At that time, the soil would be redistributed and reseeded 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. Trees near construction areas would be marked clearly to ensure that they are not removed.
- Mowing, instead of 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.
- Recontouring 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.

Zenergy recognizes that there are several BMPs 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. These include:

- following the contour (form and line) of the landscape;
- avoiding locating ROWs on steep slopes;
- sharing common ROWs;
- co-locating multiple lines in the same trench; and
- using natural (topography, vegetation) or artificial (berms) features to help screen facilities such as valves and metering stations.

Zenergy would implement these and/or other BMPs to the extent that they are technically feasible and would add strategic and measurable protection to the project area.

3.12.2 Mitigation and Safety Measures Committed to by Zenergy

3.12.2.1 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.

3.12.2.2 Utility Lines

All utility lines, including electric lines and other lines essential to oil well operations, would be installed underground.

3.12.2.3 Fire Control

Zenergy 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.

3.12.2.4 Traffic

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

3.12.2.5 Semi-Closed-Loop System

Zenergy commits to using a semi-closed-loop system for the well pad locations.

3.12.2.6 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.

3.12.2.6.1 Bald and Golden Eagle and Migratory Bird Protective Measures

- Zenergy will conduct all construction outside of the migratory bird breeding season (between February 1 and July 15); or, if construction occurs during bird breeding season, Zenergy will either:
    - mow and maintain vegetation within the project construction area (access road and well pad) prior to and during the breeding season to deter migratory birds from nesting in the project area until construction is underway; or
    - conduct an ornithological survey of the project area five days before construction begins, and if nests are discovered, notify BIA and USFWS.

3.12.2.6.2 ESA Protective Measures

- Piping Plover and its Designated Critical Habitat, Interior Least Tern, and Pallid Sturgeon: A 4-foot berm will be 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 will be enforced.
- Whooping Crane: If a whooping crane is sighted within 1 mile of the proposed project area, work will be stopped and the BIA and USFWS will 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 Zenergy'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 Section 7 consultation are provided in Appendix B.

3.12.2.7 Cultural Resources

Zenergy will protect significant 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.

3.13 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

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

3.14 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 roads and well pads 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.

3.15 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 cumulative impact analysis area (CIAA) is considered to be all lands within a 20-mile radius of the project area, as shown in Figure 3-8.

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 Formation. Existing oil and gas wells within 1 mile, 5 miles, 10 miles, and 20 miles of the project area are shown in Table 3-17. 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 3-17 and Figure 3-8.

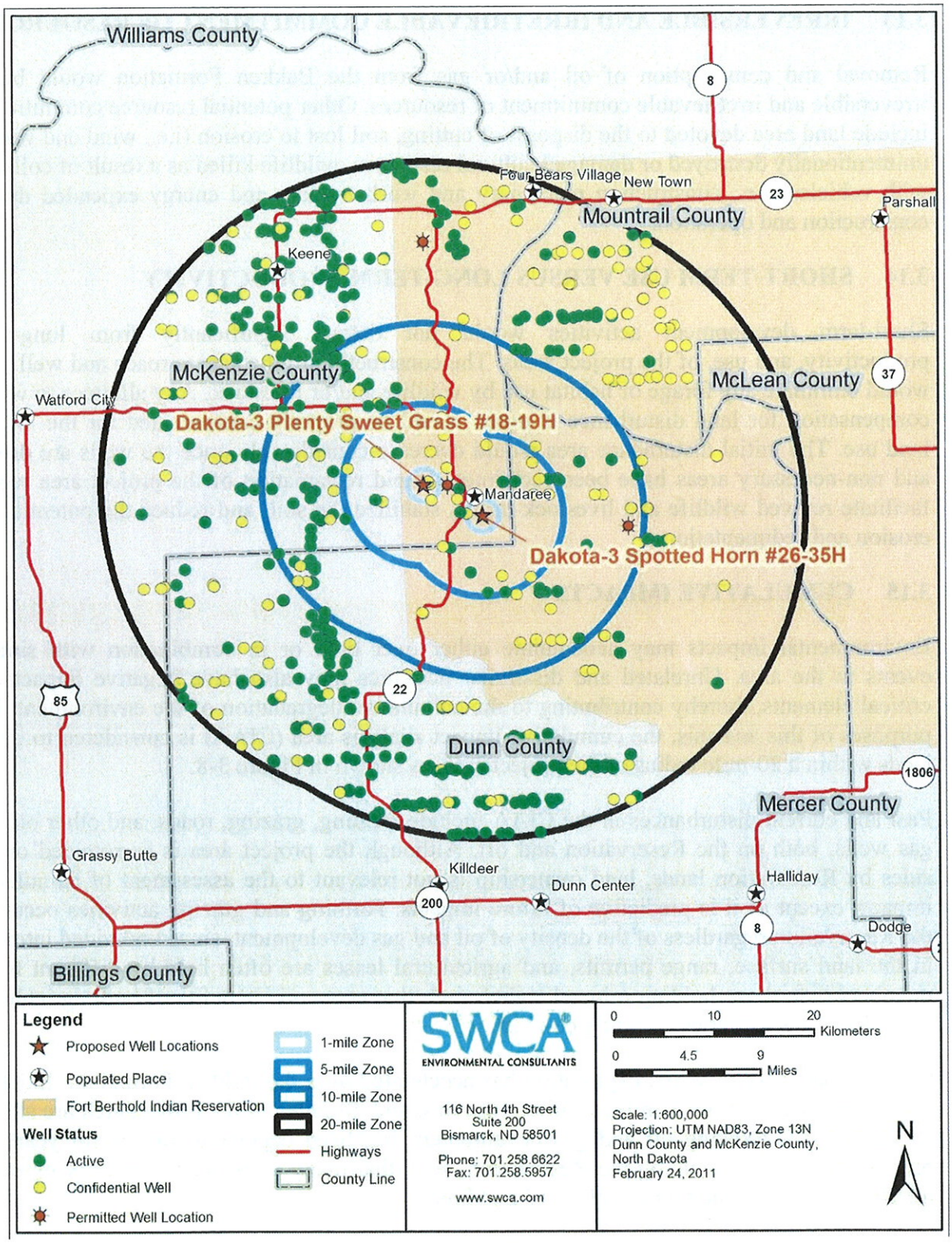


Figure 3-8. Existing and projected future oil and gas development within a 1-, 5-, 10-, and 20-mile radius of the proposed project locations.

Table 3-17. Number of Confidential, Active, and Permitted Wells Surrounding the Project Area.

Well Type	1-mile Radius		5-mile Radius		10-mile Radius		20-mile Radius	
Reservation (On/Off)	On	Off	On	Off	On	Off	On	Off
Confidential Wells	3	0	16	5	18	17	63	96
Active Wells	0	0	10	3	14	62	60	266
Permitted Wells	0	0	1	0	1	0	1	1

Reasonably foreseeable impacts of future developments in the CIAA must also be considered. Should development of the two proposed wells prove productive, it is likely that Zenergy and other operators would pursue additional development in the CIAA. For purposes of cumulative impact analyses, the density of active and permitted oil wells is expected to increase steadily within the CIAA over the next decade. Although it is the dominant activity currently taking place in the area, 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. 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 3.2), and the expected future development would be widely dispersed in time and space, the proposed project 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 livestock grazing, other oil and gas development, and agriculture in the CIAA may 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 Lake Sakakawea and Lower Little Missouri River watersheds. However, any potential increase in degradation would be reduced by Zenergy'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 an additional 0.59 mile of access 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 project, using many of the same main access roads and minimizing the disturbance as much as possible.

Zenergy 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, planting cover crops to stabilize soil following construction and before permanent seeding takes place. Additional information regarding BMPs can be found in Section 3.12, 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 forseeable 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.

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 two new wells, which would be an additional source of revenue for some residents of the Reservation. Increases in employment would be temporary during the construction, drilling, and completion phases of the proposed project. Therefore, little change in employment would be expected over the long term.

Current impacts from oil and gas-related activities are still fairly dispersed, and the required BMPs would limit potential impacts.

No significant negative impacts are expected to affect any critical element of the human and natural environment; impacts would generally be low and mostly temporary.

Concerns regarding the contamination of aquifers commonly used for drinking water by fracturing fluids described in Section 2.2.6 of this document in natural gas formations outside of the Bakken Formation have recently been investigated the EPA (EPA 2010e). Aquifers identified in Table 3-3 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 will achieve depths no shallower than 10,000 feet below ground surface, well below any known aquifer in the project area. Additionally, as laid out in Section 2.2.5 of this document surface casing will 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 Formation.

Zenergy has committed to implementing interim reclamation of the access roads and well pads immediately following construction and completion. Implementation of both interim and permanent reclamation measures would decrease the magnitude of cumulative impacts.

4.0 CONSULTATION AND COORDINATION

The BIA must continue to make efforts to solicit the opinions and concerns of all stakeholders (Table 4-1). 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. 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.

Table 4-1. Scoping Comments.

Name	Organization	Comment	Response to Comment
Bagley, Lonny	BLM	No Comment	
Benson, Barry	MHA Nation	No Comment	
Bercier, Marilyn	BIA	No Comment	
Berg, George	NoDak Electric Cooperative, Inc.	No Comment	
Black, Mike	BIA	No Comment	
Boyd, Bill	Midcontinent Cable Company	No Comment	
Brady, Perry	THPO, Three Affiliated Tribes	No Comment	
Brugh, V. Judy	MHA Nation	No Comment	
Cayko, Richard	McKenzie County	No Comment	
Chevance, Nick	National Parks Service	No Comment	
Christenson, Ray	Southwest Water Authority	No Comment	
Cimarosti, Dan	USACE	Enclosed Section 10 Application in case a permit is required.	Section 10 does not apply at this time.
Crooke, Patsy	USACE	Enclosed Nationwide Permit No. 12 application	Nationwide Permit No. 12 is not applicable to the project at this time
Danks, Marvin	Fort Berthold Rural Water Director	No Comment	
Dhieux, Joyce	EPA	No Comment	
Dixon, Doug	Montana Dakota Utilities	No Comment	
Erickson, Carroll	Ward County Board of Commissioners	No Comment	
Ferris, Kade	Turtle Mountain Band of Chippewa	No Comment	
Fitzpatrick, Barbara	FEMA	No Comment	
Flores, J.R.	U.S. Department of Agriculture	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.	See Sections 2.2.9, Construction Details, and 3.12 Mitigation and Monitoring, for site-specific details and BMPs.
Guzman, Frank	USFS	No Comment	

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) The proposed project is in proximity to the Killdeer Mountain Four Bears Scenic Byway and we recommend development be completed with the least amount of or no visual impact. 3) Three animal species (*Hesperia dacotae, Anthus spragueii, and Falco mexicanus*) of concern are known to occur within one-mile radius of the Dakota-3 Plenty Sweet Grass 18-19H project area. One species (*Anthus spragueii*) is known to occur within one-mile radius of the Dakota-3 Spotted Horn #26-35H project area. Defer further comments to the North Dakota Game and Fish Department and United States Fish and Wildlife Service. 4) Recommend that any impacted areas be revegetated with species native to the project area.	See Sections 2.2.10 Reclamation, 3.5 Wetlands, 3.6 Vegetation and Noxious Weeds, 3.7 Wildlife, and 3.12 Mitigation and Monitoring for more information.
Hauck, Reinhard	Dunn County	No Comment	
Hefferman, Dan	EPA	No Comment	
His Horse Is Thunder, Ron	Chairman, Standing Rock Sioux Tribe	No Comment	
Hoffman, Warren	Killdeer, Weydahl Field	No Comment	
Hovda, Roger	Reservation Telephone Cooperative	No Comment	
Hudson-Schenfisch, Julie	McLean County Board of Commissioners	No Comment	
Hynek, David	Chair, Mountrail Board of County Commissioners	No Comment	
Johnson, Harley	New Town Municipal Airport	No Comment	
Kadrmas, Ray	Dunn County	No Comment	

Name	Organization	Comment	Response to Comment
Kuehn, John	Parshall-Hankins Field Airport	No Comment	
Kulas, Cheryl	Indian Affairs Commission	No Comment	
Kyner, Dave	FEMA	Major concern is whether or not project is located within a mapped Special Flood Hazard Area.	Project area is not in a flood hazard area. Please see Section 3.3 Water Resources.
Latimer, Tom	Red Willow Great Plains, LLC	No Comment	
Laux, Eric	USACE	No Comment	
Lindemann, Larry	Airport Manager, Barnes County Municipal Airport	No Comment	
McKenna, Mike	North Dakota Game and Fish Department	Steve Dyke: Recommend construction be avoided were possible in native prairie, wooded draws, riparian areas, and wetlands. Botanical and raptor surveys suggested.	See Affected Environment Sections 3.5 Wetlands, 3.6 Vegetation and Noxious Weeds, and 3.7 Wildlife. BMPs discussed in APD and will be covered in Conditions of Approval.
McPhillips, Kelly	Bureau of Reclamation	Proposed oil well sites could potentially affect Reclamation facilities in the form of the rural water pipelines of the Fort Berthold Rural Water System. Please review enclosed map for potential adverse effects and proper pipeline crossing, should that be necessary. Coordinate with the FBIR Rural Water director.	Locations of proposed oil well sites will not affect the Fort Berthold Rural Water System at this time
Melhouse, Ronald	Bureau of Reclamation	No Comment	
Nash, Mike	BLM	No Comment	
Nelson, Richard	U.S. Bureau of Reclamation	No Comment	
Nordquist, Don	Petro-Hunt, LLC	No Comment	
Obenauer, Steve	FAA	Patricia Dressler: No Comment	
Olson, Frances	McKenzie County	No Comment	
Paaverud, Merl	State Historical Society	Send copy of reports and forms to keep archives current. Consider putting TCP-related info in separate reports not sent to SHPO.	Reports will be sent to the required agencies. See 3.8 Cultural Resources.
Packineau, Mervin	MHA Nation	No Comment	

Name	Organization	Comment	Response to 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	
Renschler, Jason	USACE	No Comment.	
Rudolph, Reginald	McLean Electric Cooperative, Inc.	No Comment	
Schelkoph, David	West Plains Electric Cooperative, Inc.	No Comment	
Selvage, Michael	Chairman, Sisseton-Wahpeton Sioux Tribe	No Comment	
Shortbull, Marietta	Fort Berthold Agency	No Comment	
Smith, Heather	EOG Resources, Inc.	No Comment	
Sorensen, Charles	USACE	USACE recommends: Closed-loop system, a catch trench be established, sewage collection be a closed system, additional fill should be weed-free, drilling rig and associated equipment should be properly cleaned to prevent the spread of noxious weeds, no surface occupancy allowed within 1/2 mile of known threatened or endangered species critical habitat.	See 2.2.9 Construction Details for information regarding berms. Zenergy will utilize closed loop systems for locations in areas near jurisdictional waters. No additional fill material is required. NSO would be allowed within 0.5 mile of any known T&E habitat.
Svoboda, Larry	EPA	No Comment	
Sweeney, Paul	Natural Resources Conservation Service	Confirms receipt of letter requesting a determination of the project affecting farmland according to FPPA [Farmland Protection Policy Act]. Recommends impacts to wetlands be avoided.	FPPA does not apply to the project. See Section 3.5 Wetlands.

Name	Organization	Comment	Response to Comment
Thompson, Brad	USACE	Acknowledges receipt of letter. Project is not within USACE owned or operated lands so no floodplain or flood risk information is provided.	Thank you for your comment.
Thorson, Gary	McKenzie Electric Cooperative	No Comment	
Towner, Jeffrey	USFWS	See attached letter in Appendix B and recommendations in Appendix A	
Wells, Marcus	Chairman, MHA Nation	No Comment	
Whitcalf, Frank	MHA Nation	No Comment	
Williams, Damon	MHA Nation	No Comment	
Wolf, Malcolm	MHA Nation	No Comment	
Chief Missile Engineer	Minot Air Force Base	No Comment	
Garrison Project Office	USACE	No Comment	
Insurance & Hazard Director	FEMA	No Comment	
Land Department	Northern Border Pipeline Company	No Comment	
Manager	Xcel Energy	No Comment	
NAGRPA Office	Three Affiliated Tribes	No Comment	
Natural Resources Department	Three Affiliated Tribes	No Comment	

5.0 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 Environmental Consultants under the direction of the BIA. Information was compiled from various sources within SWCA Environmental Consultants.

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Prepared the EA.

- Joshua Ruffo, Wildlife Biologist

Conducted natural resource surveys for well pad and access road.

- Judith Cooper

Conducted cultural resource surveys for well pads and access roads

- Mike Cook, Biologist

Conducted natural resource surveys for well pads and access roads

- Nelson Klitzka, Archaeologist/Project Manager

Prepared the EA, conducted cultural resource surveys for the well pads and access roads

- Chandler Herson, Archaeologist

Conducted cultural resource surveys for well pads and access roads.

- Todd Kohler, Archaeologist

Prepared cultural resource reports.

- Trent Reeder, GIS Specialists

Created maps and spatially derived data.

- Rick Wadleigh, NEPA Specialist

Reviewed document for content and adequacy.

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Kohler, Todd

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7.0 ACRONYMS

°F	degrees Fahrenheit
APD	Application for Permit to Drill
APE	Area of Potential Effect
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_4	methane
CIAA	cumulative impact analysis area
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
EA	environmental assessment
EIS	environmental impact statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
H_2S	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_2O	nitrous oxide
NDCC	North Dakota Century Code
NDDA	North Dakota Department of Agriculture
NDDH	North Dakota Department of Health
NDIAC	North Dakota Indian Affairs Commission
NDIC	North Dakota Industrial Commission
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTL	Notice to Lessees
O_3	ozone
PM	particulate matter
ppm	parts per million
PSD	Prevention of Significant Deterioration

ROW	right-of-way
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
THPO	Tribal Historic Preservation Officer
TMD	total measured depth
TRNP	Theodore Roosevelt National Park
TVD	total vertical depth
USC	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

APPENDIX A

Threatened and Endangered Species in McKenzie County, North Dakota

SPECIES ACCOUNTS AND EFFECTS 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 project will 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 Project would have **no effect** on 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. However, project precautionary measures would be implemented if a whooping crane is sighted in or near the project area Zenergy would cease all drilling and construction activities and notify the USFWS of the sighting, should a crane be spotted within 1 mile of the project area. As a result, the proposed project **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 approximately 16.13 to 17.93 river miles from the proposed well pads and access roads. It is unlikely that migrating plovers would visit the project during their migration. Therefore, the proposed project **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 project, along the shoreline of Lake Sakakawea in McKenzie County, North Dakota (USFWS 2002).

It is unlikely that the proposed project would modify, alter, disturb, or affect the shoreline of Lake Sakakawea or any of its tributary streams. Therefore, the proposed project **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 interior population of the 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).

The interior population of least terns breeds 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 least terns in the interior 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).

Suitable shoreline habitat for breeding and nesting plovers does not occur in the project area, and Lake Sakakawea is a minimum of 16.13 to 17.93 river miles away from the proposed wells. It is unlikely that terns would visit the upland habitats present in the project area. Therefore, the proposed project **may affect, 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 approximately 16.13 to 17.93 river miles from the proposed well pads and access roads. 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 are not anticipated to adversely affect water quality and subsequently the pallid sturgeon. Therefore, the proposed project **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. 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 project **may affect, but is not likely to adversely affect** this species. The use of BMPs 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. Sprauge's pipit are not known to occur within the project area; however, suitable habitat does occur. The proposed project **may affect, 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 MBTA and the 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 waterbodies. The project area does not contain old growth trees and is located 16.13 to 17.93 river 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 within 1.4 miles of the proposed project. 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 B

U.S. Fish and Wildlife Service Consultation Letters

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

MAR 9 2011

Mr. Nelson Klitzka, Project Manager
SWCA Environmental Consultants
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501

Re: Zenergy Dakota-3 Plenty Sweet Grass, Dakota-3 Spotted Horn, Dakota-3 Good Bird/Dakota-3 Black Hawk and Dakota-3 Delores Sand Exploratory Oil and Gas Wells, McKenzie County

Dear Mr. Klitzka:

This is in response to your February 18, 2011, scoping letter on the proposed construction of five exploratory oil and gas wells on four well pads, to be completed by Zenergy Operating Company (Zenergy) on the Fort Berthold Reservation, Dunn and McKenzie Counties, North Dakota.

Specific locations for the proposed wells are:

Dakota-3 Good Bird #36-25H/Dakota-3 Black Hawk #1-12H: T. 148 N., R. 93 W., Section 36
Dakota-3 Delores Sand #29-32H: T. 151 N., R. 94 W., Section 29
Dakota-3 Plenty Sweet Grass #18-19H: T. 149 N., R. 94 W., Section 18
Dakota-3 Spotted Horn #26-35H: T. 149 N., R. 94 W., Section 26

We offer the following comments under the authority of and in accordance with 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).

Threatened and Endangered Species

In an e-mail dated October 13, 2009, the Bureau of Indian Affairs (BIA) designated SWCA Environmental Consultants (SWCA) to represent the BIA for informal Section 7

consultation under the ESA. Therefore, the U.S. Fish and Wildlife Service (Service) is responding to you as the designated non-Federal representative for the purposes of ESA, and under our other authorities as the entity preparing the NEPA document for adoption by the BIA.

For the **Dakota-3 Delores Sand #29-32H, Dakota-3 Plenty Sweet Grass #18-19H and Dakota-3 Spotted Horn #26-34H**, the Service concurs with your "may affect, is not likely to adversely affect" determination for piping plover, interior least tern, and pallid sturgeon, and designated critical habitat for piping plover. The proposed location for these three well pads is approximately 5.07, 16.13, and 17.93 stream miles, respectively, from nesting and foraging locations and habitat on Lake Sakakawea for these species and designated critical habitat for the piping plover.

For the **Dakota-3 Goodbird #36-25H/Blackhawk #1-12H**, the Service concurs with your "may affect, is not likely to adversely affect" determination for piping plover, interior least tern, and pallid sturgeon, and designated critical habitat for piping plover. The proposed location for this dual well pad is approximately 0.66 stream miles and approximately 400 meters from nesting and foraging locations and habitat on Lake Sakakawea for these species and designated critical habitat for the piping plover; however, Zenergy has committed to implementing a closed-loop system and constructing and maintaining a perimeter berm for this location.

For all four sites, the Service concurs with your "may affect, is not likely to adversely affect" determination for whooping cranes. This concurrence is predicated on Zenergy's commitment to stop work on the proposed site if a whooping crane is sighted within one mile of the proposed project area and immediately contacting the Service. Work may resume in coordination with the Service once the bird(s) has(ve) left the area.

The Service acknowledges your "no effect" determination for gray wolf and black-footed ferret.

The Dakota skipper and Sprague's pipit are candidate species for listing under the ESA; therefore, an effects determination is not necessary for these species. No legal requirement exists to protect candidate species; however, it is within the spirit of the ESA to consider these species as having significant value and worth protecting. Although not required, Federal action agencies, such as the BIA, have the option of requesting a conference on any proposed action that may affect candidate species such as the Dakota skipper and Sprague's pipit.

Migratory Birds

Zenergy has committed to implementing the following measures:

- Construction will be done outside of the migratory bird nesting season (Feb. 1-July 15);

- Or, conduct a bird/nest survey within five days prior to construction and report any findings to the Service;
- Or, mow grassy areas to reduce nesting potential.

Bald and Golden Eagles

Your letter states that the nearest documented golden eagle nest is located 1.4 miles away and that no eagle nests were observed within 0.5 mile of the project area during line of sight surveys on various dates between March 3 and November 18, 2010.

The Service believes that Zenergy's commitment to implement the aforementioned measures demonstrates that measures have been taken to protect migratory birds and bald and golden eagles to the extent practicable, pursuant to the MBTA and the BGEPA.

Thank you for the opportunity to comment on this project proposal. If you require further information or the project plans change, please contact me or Heidi Riddle of my staff at (701) 250-4481 or at the letterhead address.

Sincerely,

Jeffrey K. Towner

Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

cc: Bureau of Indian Affairs, Aberdeen
(Attn: Marilyn Bercier)
Bureau of Land Management, Dickinson
Director, ND Game & Fish Department, Bismarck

APPENDIX C
MHA THPO Consultation Letters

United States Department of the Interior

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

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
DESCRM
MC-208

FEB 03 2011

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 an oil well pad and access road, and gathering line in McKenzie and Mountrail Counties, North Dakota. Approximately 48.2 acres were intensively inventoried using a pedestrian methodology. Potential surface disturbances are not expected to exceed the areas depicted in the enclosed reports. No historic properties were located that appear to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.4) for inclusion on the National Register of Historic Places. 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-1887/FB/11,** the proposed undertaking, location, and project dimensions are described in the following reports:

Herson, Chandler S.
(2011) A Class I and Class III Cultural Resource Inventory of the Zenergy Mary R. Smith Gathering Line on the Fort Berthold Indian Reservation, Mountrail County, North Dakota. SWCA Environmental Consultants for Zenergy Operating Company, LLC, Tulsa, OK.

Kohler, Todd
(2011) A Class I and Class III Cultural Resource Inventory of the Dakota-3 Plenty Sweet Grass #18-19H Well Pad and Access Road, Fort Berthold Indian Reservation, McKenzie County, North Dakota. SWCA Environmental Consultants for Zenergy Operating Company, LLC, Tulsa, OK.

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

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

Sincerely,

ACTING Regional Director

Enclosures

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

United States Department of the Interior

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

TAKE PRIDE IN AMERICA

FEB 24 2011

IN REPLY REFER TO:
DESCRM
MC-208

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 an oil well pad and access road in McKenzie County, North Dakota. Approximately 20.2 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-1887/FB/11,** the proposed undertaking, location, and project dimensions are described in the following reports:

Kohler, Todd
(2011) A Class I and Class III Cultural Resource Inventory of the Dakota-3 Spotted Horn 26-35H Well Pad and Access Road, Fort Berthold Indian Reservation, McKenzie County, North Dakota. SWCA Environmental Consultants for Zenergy Operating Company, LLC, Tulsa, OK.

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

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

Sincerely,

Regional Director

Enclosure

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

Notice of Availability and Appeal Rights

Zenergy: Dakota-3 Plenty Sweet Grass #18-19H
Dakota-3 Spotted Horn #26-35H

The Bureau of Indian Affairs (BIA) is planning to issue administrative approvals related to installation of two oil and gas wells as shown on the attached map. Construction by Zenergy is expected to begin in 2011.

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

The FONSI is only a finding on environmental impacts – it is not a decision to proceed with an action and *cannot* be appealed. BIA's decision to proceed with administrative actions *can* be appealed until April 27, 2011, by contacting:

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

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

Project locations.