U.S. Department of the Interior Bureau of Land Management

ENVIRONMENTAL ASSESSMENT DOI-BLM-MT-C030-2016-0020-EA

March 28, 2017

The Falkirk Mining Company Federal Coal Lease by Application Serial Number: NDM 107039

Location:	Fifth Principle Meridian, North Dakota
	Township 146 North, Range 82 West
	Section 10, East ¹ ⁄ ₂
	320 acres
	McLean County

Applicant/Address:The Falkirk Mining Company2801 1st Street SWUnderwood, North Dakota 58576

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In cooperation with: The Office of Surface Mining Reclamation and Enforcement Denver, Colorado and North Dakota Public Service Commission Bismarck, North Dakota

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1.1 Introduction

On November 13, 2013, The Falkirk Mining Company (Falkirk) submitted an application to lease the Federal coal resources located in the east ½ of section 10, Township 146 North, Range 82 West. The mine is located in southern McLean County, North Dakota, south of Lake Sakakawea and east of the Missouri River. Please refer to Figure 1, Falkirk Mine Overview.

The east ½ of section 10 (section 10 lease tract) consists of approximately 320 acres of land. Surface ownership of the section 10 lease tract is entirely private. Mineral rights in the tract are undivided and are 50 percent owned by the Federal Government and 50 percent owned by private parties. The Federal mineral estate in the section 10 lease tract is administered by the Bureau of Land Management (BLM) North Dakota Field Office (NDFO). The BLM estimates that the section 10 lease tract contains 4.41 million tons of surface minable Federal and private coal. If the Federal coal lease issued to Falkirk, they anticipate removing topsoil/subsoil from the tract in October 2017, overburden removal in February 2018, and coal removal in August 2019 (Greg Dehne, personal communication, January 25, 2017).

This Environmental Assessment (EA) assists the BLM in project planning to ensure compliance with the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321–4370h). In addition, this EA is an informational document used by both decision-makers and the public that discloses potential environmental and socioeconomic impacts of the Proposed Action and alternatives.

1.2 Background

The Falkirk Mine is located near Underwood, North Dakota. It was first incorporated in 1974, with initial construction starting in 1975, and coal production starting in 1978. Currently, the mine employs 412 full-time employees and 118 temporary employees and produces approximately 8.0 - 8.5 million tons of coal per year. Since 1978, the mine has leased approximately 360 acres of Federal coal from leases NDM-91647 and NDM-85516. These leases are mined-out and have produced approximately 4.5 million tons of coal. Within their current mine permit area, the reserve base is comprised of approximately 3.88 percent Federal coal (Jeremy Eckroth, personal communication, January 12, 2017).

Falkirk is a subsidiary of The North American Coal Corporation (NACC) headquartered in Dallas, Texas. NACC has a long history in North Dakota, dating back to 1957 when they purchased the Indian Head Mine located near Zap, North Dakota. Coal mining at Indian Head Mine has since ceased and the mine has been completely reclaimed. In addition to the Falkirk Mine, NACC currently operates the Freedom Mine located north of Beulah, North Dakota, and the Coyote Creek Mine located south of Beulah. The Coyote Creek Mine became operational in April 2016. NACC also operates surface lignite coal mines in Texas, Mississippi, and Louisiana, as well as several limestone quarries in Florida.



Figure 1, Falkirk Mine Overview

Coal produced at the Falkirk Mine is transported from the pit in bottom-dump haul trucks to the truck dump/crushing facility. From that location, the coal is conveyed on a 5,300-foot-long conveyor to the Great River Energy's Coal Creek Station which is located approximately 6 miles south of Underwood, North Dakota. Coal Creek Station has 235 employees and generates 1,200 megawatts (MW) (2 - 600 Megawatt Units) of power, which is transmitted to 28 power cooperatives that serve approximately two-thirds of rural Minnesota.

Great River Energy also operates the Spiritwood Station located east of Jamestown, North Dakota, approximately 1 mile south of Spiritwood, North Dakota. This combined heat and power plant utilizes dried and refined lignite from the Coal Creek Station to produce up to 99 MW of electricity for regional energy markets and supplies local industry with steam for their production processes. Forty-three individuals are employed at the Spiritwood Station.

The proposed section 10 lease tract is part of the Falkirk Mine's current and extended Mine Plan with the south ½ of the section 10 lease tract already permitted through the North Dakota Public Service Commission (PSC) for mining activities. Leasing and mining coal within the full section 10 lease tract would contribute approximately seven months-worth of average production at the Falkirk Mine.

1.3 Purpose and Need

The purpose of the Proposed Action is for the BLM to respond to the Falkirk Mine's Lease by Application to lease the Federal coal resources contained in the section 10 lease tract. Based on this review, the BLM will determine whether to lease the Federal coal resources located within the section 10 lease tract.

Falkirk's application was submitted consistent with the Mineral Leasing Act of 1920 (MLA) and the Federal Land Policy and Management Act of 1976 (FLMPA). It is the BLM's responsibility to review properly submitted applications to lease Federal coal to determine if they satisfy applicable requirements. As part of that review, the BLM is obligated to evaluate the potential environmental impacts of issuing a Federal coal lease.

1.4 Conformance with BLM Land Use Plan(s)

The Federal Coal Leasing Amendments Act of 1976 requires that lands considered for leasing are managed by a comprehensive land use plan. The NDFO Resource Management Plan/Environmental Impact Statement (RMP/EIS) (approved April 22, 1988, and amended September 21, 2015) identifies tracts of Federal coal available for further consideration for leasing through the application of the following four land use planning screens: (a) identification of coal development potential, (b) application of unsuitability criteria, (c) analysis of multiple-use conflicts, and (d) application of surface-owner consultation requirements. If the Federal coal lands pass the above mentioned land use planning screens, they are available for consideration to be part of a lease application. The lands covered by Falkirk's application pass the land use planning screens.

Under the first land use planning screen, a lease tract must be located within an area known to have coal development potential. The section 10 lease tract was included in the Underwood Coal Study Area of the RMP/EIS which was within the area identified as having coal development potential by the BLM in the screening analysis. In addition, the local area has been mined for coal production for

more than 80 years and the required infrastructure is in-place to enable the development of the coal resources in the tract.

For lands that have been identified as having coal development potential, the BLM conducts the second land use planning screen by reviewing whether these lands are suitable for coal development based on 20 criteria found at 43 Code of Federal Regulations (CFR) Subpart 3461.5, criteria for assessing lands unsuitable for all or certain stipulated methods of coal mining. Criterion 14 states, "Federal lands that are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and USFWS, shall be considered unsuitable." The BLM's unsuitability determination for the section 10 lease tract, in conjunction with the U.S. Fish and Wildlife Service (USFWS), found high priority habitat and appropriate buffer zones for ferruginous hawks and canvasbacks, totaling 657 acres. The Falkirk Mine has committed to, and developed a Fish and Wildlife Management Plan to protect, enhance or reclaim wildlife habitat in the current (and future) North Dakota state mining permit approved by the North Dakota PSC. Please refer to **Section 4.3 General Wildlife** for additional information.

The third land use planning screen is the analysis of multiple-use conflicts. In accordance with 43 CFR 3420.1-4(e)(3), the analysis must be completed to identify and "eliminate additional coal deposits from further consideration for leasing to protect resource values of a locally important or unique nature, not included in the unsuitability criteria." The section 10 lease tract is currently being utilized for agriculture production and would be required to trade-off farming for mining. The trade-off would be for the amount of time required to mine the section 10 lease tract and reclaim it to a point where it could be returned to agricultural production. Please refer to **Section 4.7 Prime and Unique Farmlands** for additional information.

The Falkirk Mine currently holds a lease with the surface owner for the section 10 lease tract. The Falkirk Mine has taken several steps to consider mining effects on local residents and property, including but not limited to, providing written notice to all surface owners within a proposed permit area, requesting surface owner input through a landowner preference statement, publishing a legal notice describing submittal of a permit application and opportunity to comment in various local newspapers, and making copies of permit applications available for public review. The Falkirk Mine also maintains surface owner relations throughout the mining and reclamation process.

1.5 Relationship to Statutes, Regulations, or Other Plans

The proposed lease and mining activities in this EA would be processed in accordance with the regulations found at 43 CFR Subpart 3425 for Lease by Applications, and evaluated under the following Federal authorities:

- Mineral Leasing Act (MLA) of 1920, as amended
- National Environmental Policy Act (NEPA) of 1969
- Federal Land Policy Management Act of 1976
- Federal Coal Leasing Amendments Act (FCLAA) of 1976
- Surface Mining Control and Reclamation Act (SMCRA) of 1977, as amended
- Energy Policy Act (EPAct) of 2005.

The BLM is the lead agency responsible for leasing Federal coal lands under the MLA, as amended by FCLAA, and is responsible for preparation of this EA to evaluate the potential environmental impacts of issuing a coal lease.

The Office of Surface Mining Reclamation and Enforcement (OSMRE) is a cooperating agency on this EA. The SMCRA provides the OSMRE primary responsibility for administering programs that regulate surface coal mining operations in the United States. Pursuant to Section 503 of SMCRA, 30 U.S.C. 1253, the North Dakota PSC developed, and the Secretary of the Interior approved, North Dakota's permanent regulatory program authorizing the PSC to regulate surface coal mining operations on private and state lands within North Dakota. Pursuant to Section 523 of SMCRA, 30 U.S.C. 1273, the North Dakota PSC entered into a cooperative agreement with the Secretary of the Interior authorizing the PSC to regulate surface coal mining operations on Federal lands within the state. Please refer to 30 CFR Part 934.

Pursuant with this cooperative agreement, a Federal coal lease holder must submit a permit application package, which includes the Resource Recovery and Protection Plan and State Mining Permit application, to OSMRE and the North Dakota PSC for any proposed coal mining and reclamation operations on Federal lands located in the state. Federal lands include surface ownership and mineral interests, owned by the Federal Government. If the permit application complies with the relevant laws and plan, the North Dakota PSC issues a permit to the applicant to conduct coal mining operations. The North Dakota PSC has issued one permit associated with the Proposed Action (Permit No. NAFK-8405). The permit covers mining activities in the south ½ of section 10 (roughly half the proposed tract); however, no actual mining of the unleased Federal coal tract can occur until a lease is issued. Therefore, the Falkirk Mine is currently in the process of compiling information for a North Dakota PSC permit application that would include mining activities in the north ½ of section 10, if that tract were to be leased. The permit application is anticipated to be submitted to the North Dakota PSC in 2017. Please refer to *Figure 2, Section 10 Lease Tract*.

Once the State's findings and recommendations are received, OSMRE will prepare a mining plan decision document (MPDD) in support of its recommendation to the Assistant Secretary for Land and Minerals Management (ASLM), who will decide whether or not to approve the mining plan modification and whether or not additional conditions are needed. Pursuant to 30 CFR 746.13, the OSMRE's recommendation shall be based on:

- 1. The permit application, including the Resource Recovery and Protection Plan (R2P2);
- 2. Information prepared in compliance with NEPA, including this EA;
- 3. Documentation assuring compliance with the applicable requirements of Federal laws, regulations, and Executive Orders (EOs) other than NEPA;
- 4. Comments and recommendations or concurrence of other Federal agencies and the public;
- 5. Findings and recommendations from the BLM with respect to the R2P2, Federal lease requirements, and the MLA;
- 6. Findings and recommendations from the North Dakota PSC with respect to the permit application and the state program; and
- 7. Findings and recommendations from the OSMRE with respect to the additional requirements of 30 CFR Chapter VII, Subchapter D.



Figure 2, Section 10 Lease Tract

The OSMRE is required to evaluate the PAP before NACC may conduct mining and reclamation operations to develop the Falkirk Mine Federal Coal Lease. OSMRE is the agency responsible for making a recommendation to the ASLM to approve, disapprove, or approve with conditions the proposed mining plan modification. The ASLM will decide whether the mining plan modification is approved, disapproved or approved with conditions.

In addition to the acts listed above, guidance and regulations for managing and administering public lands are set forth in 40 CFR 1500 (Council on Environmental Quality - Purpose, Policy, and Mandate) and 43 CFR Group 3400 (Coal Management).

1.6 Scoping, Public Involvement, and Issues

Identification of issues specific to the Proposed Action and Alternatives occurred at an initial project kickoff meeting held at the Falkirk Mine office located near Underwood, North Dakota, on March 23, 2015. Agencies that attended the meeting included BLM, OSMRE, North Dakota PSC; and representatives from the Falkirk Mine, NACC, and KLJ (consultant). Areas of concern regarding the proposed project and clearance and approvals that had been received during preparation of the existing mine permit (Permit No. NAFK-8405) were discussed at the meeting. Areas of concern included: threatened and endangered species, greenhouse gas emissions, climate change and air quality, water resources, reclamation, wildlife, cultural resources and economic resources.

Immediately following the project kickoff meeting, a 15-day public review period was held to allow interested parties an opportunity to comment on the proposed project. No comments were received. Internal scoping followed, whereby the BLM and cooperating agencies more clearly defined potential issues and data requirements, for the Proposed Action and Alternatives. Initial internal scoping and coordination has ended with the necessary agencies, and comments are addressed in this EA, where appropriate.

On January 10, 2017, a public hearing was conducted in Underwood, ND by the BLM to receive oral or written comments regarding the Fair Market Value (FMV) and Maximum Economic Recovery (MER) value for the lease tract. No oral comments were made, and no written comments were received at the meeting.

The BLM has the authority to lease Federal coal, but does not authorize subsequent mining of any leased resources. The OSMRE has the authority to approve, approve with conditions, or deny a Federal mine plan application and the North Dakota PSC has the authority to authorize surface mining. Although the Proposed Action only involves the leasing of a Federal coal resource, the mining of the coal (a connected action) will also be discussed and analyzed in this document. OSMRE and North Dakota PSC intend to use this EA to facilitate the completion of their respective mine permitting actions following the BLM coal leasing decision.

2.1 Proposed Action—The Leasing of Federal Coal in Section 10

On November 13, 2013, the Falkirk Mine filed an application to lease 320 acres of Federal coal located in the east ½ of section 10, Township 146 North, Range 82 West in McLean County, North Dakota, under the Lease by Application regulations (43 CFR Subpart 3425). The surface of the section 10 lease tract is privately owned (i.e., split estate), and the Federal Government owns an undivided 50 percent interest in the mineral rights. The other 50 percent of minerals are held by private owners. The Proposed Action is the leasing of the Federal coal in the section 10 lease tract. BLM estimates the section 10 lease tract contains 4.41 million tons of surface minable coal.

Under the existing Falkirk Mine Plan, mining of the section 10 lease tract would commence in 2018. The existing mining facilities have been established to sustain the current mine plan, which includes the mining of section 10. Please refer to *Appendix A, Falkirk Mine Plan*. Implementation of the Proposed Action would comply with currently approved stipulations, mitigation measures, and monitoring programs, as described in existing mine permits and summarized in the following sections of this EA. Additionally, the leasing of the proposed tract would be subject to the BLM special coal lease stipulations and the standard stipulations found on the Federal coal lease form.

Please refer to *Section 2.4 Coal Mining Operations* for a description of the mining of the Federal coal (connected action).

2.2 No Action Alternative

Under the No Action Alternative, the section 10 lease tract would not be leased. The current permitted and approved mining operations would proceed as planned until the section 10 lease tract is reached, then mining operations would bypass the lease tract. Fifty percent of the Federal revenue generated from the lease bonus payment and production royalty payments would not be received by the State of North Dakota. In addition, state tax revenue derived from coal production would not be received. Under the No Action Alternative, the private owners of mineral estate in the section 10 lease tract would not be able to develop their mineral rights and would not receive bonus or royalty payments from leasing their coal interest.

If the section 10 tract is not leased, the coal located immediately adjacent to the lease tract would continue to be mined and reclaimed, as scheduled in the Falkirk Mine Plan. The south ½ of the section 10 lease tract is already permitted and leased for surface disturbance; therefore, a significant

amount of surface disturbance would still occur within the southeast ¼ of the section 10 lease tract (approximately 160 acres). This includes removal of topsoil and subsoil and using the land for other ancillary mining purposes such as stockpile (i.e. topsoil, subsoil, and overburden) locations.

Under the No Action Alternative, the Falkirk Mine would continue to produce approximately 8.0-8.5 million tons of lignite annually and they would simply modify their mine plan to bypass the section 10 lease tract without impacting overall production levels.

2.3 Alternative Considered but Eliminated from Detailed Analysis

Under NEPA, consideration and analysis of reasonable alternatives to the Proposed Action are required. Considering alternatives helps to avoid unnecessary impacts and allows for an analysis of reasonable ways to achieve the stated purpose. To warrant detailed evaluation, a proposed alternative must be reasonable. To be considered reasonable, an alternative must be suitable for decision-making (i.e., any necessary preceding events have taken place), capable of implementation, and satisfactory with respect to meeting the purpose of and need for the action.

The following factors were considered when evaluating alternatives to the Proposed Action:

- Conformance with the existing land use plan, in accordance with the FCLAA Evaluation under the land use planning screens described in Section 1.4 of this EA; and
- Application of unsuitability criteria For lands that have been identified as having coal development potential, the BLM reviews whether these lands are suitable for coal development based on 20 criteria.

Based on these factors, the following alternative was considered, but eliminated from further detailed analysis.

2.3.1 The Leasing of Federal Coal in Section 10 and Section 12

The Leasing of Federal Coal in Section 10 and Section 12 Alternative incorporates (1) the leasing of the Federally and privately owned coal in the east ½ of section 10, Township 146 North, Range 82 West, as described in Section 2.1 of this EA, as well as, (2) the leasing of the Federally- and privately-owned coal in a lease tract consisting of approximately 121 acres of Falkirk Mine-owned surface located in the S½NE¼ and NE¼NE¼ section 12, Township 145 North, Range 84 West. Like the section 10 tract, the coal resources in the section 12 lease tract are undivided and 50 percent owned by the Federal Government and 50 percent owned by private parties. The Falkirk Mine estimates the 121-acre lease tract contains approximately 2.09 million tons of in-place coal. Please refer to *Figure 3, Section 10 and Section 12 Lease Tracts*.

Implementation of this alternative would enable Falkirk to mine approximately 6.50 million tons of surface minable coal contained in approximately 441 acres of land in the section 10 and section 12 lease tracts. Under the existing Falkirk Mine Plan, the section 12 lease tract would be mined in 2025.



Figure 3, Section 10 and Section 12 Lease Tracts

As described in *Section 1.4* of this EA, the FCLAA requires that lands considered for leasing are managed by a comprehensive land use plan. In this case the lands being considered for leasing are managed by the NDFO RMP/EIS, which identified tracts of Federal coal available for further consideration for leasing through the application of land use planning screens. For lands that have been identified as having coal development potential, the BLM reviews whether these lands are suitable for coal development based on 20 criteria. The section 12 lease tract is not included in the current land use plan. In addition, the section 12 lease tract occurs just outside of the 1988 Coal Study Area included in the NDFO RMP/EIS. Therefore, the section 12 lease tract has not been evaluated under the land use planning screens or assessed for suitability based on the 20 criteria. Because the section 12 lease tract is not included in the current land use plan, and the coal screens and unsuitability criteria have not been applied, this alternative is not considered a viable action alternative at this time and was eliminated from further detailed analysis in this EA.

2.4 Coal Mining Operations

2.4.1 Regulations and Permitting

As stated in Section 1.5 of this EA, all surface mining operations in North Dakota are regulated by the North Dakota PSC. The PSC provides permits for, and conducts inspections of, coal mining operations throughout the State of North Dakota. Prior to disturbing lands for mining, the mine is required to apply for, and receive, a state mining permit from the PSC. The mining permit application provides detailed information regarding the proposed mining operations and environmental protection plans. Once the permit is approved by the PSC, the mining operations and environmental protection plans included in the permit application are required to be followed by the operator throughout the mining and reclamation processes.

2.4.2 Exploratory Drilling

To define and characterize the coal resource, the Falkirk Mine conducts coal exploratory drilling by drilling 4.75 to 6-inch bore holes with a mobile rotary drilling rig. The drilling is achieved by air-mist injection or mud circulation depending on the subsurface conditions of the area. A "pilot" hole is drilled before a core hole is drilled. The core hole is drilled as close as possible to the pilot hole. Core holes are drilled on an approximate 1,320-foot grid pattern. In the core hole, rotary drilling is first completed to the top depth of the coal bed, and the coring is then accomplished using a standard split tube core barrel. Once a core sample is removed from the core barrel, it is measured, described, bagged, and sent for laboratory analysis. A proximate analysis (i.e., percent moisture, ash, sulfur, fixed carbon, volatile matter and calorific content) is conducted on all coal core samples, and ultimate analyses are also conducted for ash fusion temperatures, sulfur forms, and mineral ash constituents.

Information obtained from exploratory drilling includes the thickness and depth of the coal bed(s), as well as coal quality. Each drill hole is geophysically logged for natural gamma, high-resolution density, caliper, and resistance. Coal cropline (subcrop) drilling is also conducted by drilling rotary holes on approximate 300-foot traverses with holes spaced about 100 feet apart on each traverse. Following drilling and logging, each bore hole is plugged by backfilling the holes with the drill cuttings. Excess cuttings are loaded and removed to a predetermined location within the mine site. The Falkirk Mine uses flexible plastic hole plugs, which are placed 3 to 6 feet below the surface to plug the drill holes.

Surface reclamation commences approximately two weeks after each hole is drilled. The affected area is then raked and prepared for seeding.

2.4.3 Surface Water Structures

Prior to any surface disturbance, the mine constructs a network of surface water structures (i.e., sedimentation ponds, pit water ponds, sumps, and diversions). The surface water structures will collect and treat surface runoff from disturbed areas, thereby preventing any additional contribution of suspended solids to waters downstream of the disturbed areas.

2.4.4 Topsoil, Subsoil, and Overburden Removal

Once the surface water structures are constructed, vegetation and suitable plant growth material (SPGM), which consists of the topsoil and subsoil, is removed by using tractor-scrapers and truck shovel fleet. The Falkirk Mine's truck/shovel fleet includes end-dump trucks and loading shovels. Removal of SPGM is conducted utilizing two lifts, except in wetland areas. First lift material is topsoil, second lift material is subsoil. Topsoil is removed to depths indicated on the soil survey map or until a color change in the soil is noted, indicating that the subsoil has been encountered. Wetland topsoil is removed down to the zone free of carbonates. The subsoil is then removed by using similar equipment or smaller equipment if conditions are wet. The amount of subsoil removed is dependent upon the volume of topsoil removed. The total volume of topsoil and subsoil removed should be sufficient to respread 24, 36, or 48 inches of material during reclamation, depending on the regraded spoil characteristics. In areas with inadequate volumes of SPGM to meet the respread depth requirements, all available material will be removed and respread uniformly. The SPGM will either be stockpiled in areas designated for topsoil and subsoil stockpiles, or directly respread onto approved regraded areas. Removal of SPGM is conducted approximately 12 to 24 months prior to coal extraction.

As the subsoil removal process is being completed, existing haul roads and pit ramps are extended, or new ones are constructed. Subsoil and other suitable subsoil material will be used to construct haul roads and pit ramps, as described in the Falkirk Mine's state mining permit. Haul road and pit ramp locations are identified to clearly indicate the Falkirk Mine's coal haulage system. Pit ramps will be constructed from the main haul roads at 1,500 to 2,000 foot intervals. Pit ramps run down through the mine spoils until they reach the approximate pit bottom. The current mine plan proposes the construction of two pit ramps in the section 10 lease tract.

Following the removal of the SPGM, the overburden (i.e., material between the SPGM and the first mineable coal bed) is removed. The Falkirk Mine uses two Marion 8750 draglines and two smaller Marion 195-M draglines to remove the overburden. Overburden is spoiled by the dragline using several mining techniques. In most areas where the overburden material is stable, and the overburden thickness is less than 90 feet thick, a simple side casting method is used. In areas where the overburden thickness increases, or where highwall instability occurs, the truck/shovel fleet will establish a pre-bench ahead of the dragline operation.

2.4.5 Mining and Reclamation

Once the overburden has been removed, the coal surface is cleaned with a rubber-tire or track dozer. The coal bed is then ripped to a size that can be effectively loaded into haul trucks using a track dozer, mounted with a 10-foot long shank. After the coal has been ripped, it is loaded by either electric shovels or front-end loaders, into bottom dump haul trucks and transported to the truck dump/crushing facility. At the crushing facility, the coal is crushed to approximately 4 × 0 inches in diameter and conveyed to the Coal Creek Station, where it is burned to produce electricity.

Raw coal stockpiles are maintained at the truck dump facility and can be dozed into the coal hopper push pockets using a rubber-tire or track dozer. The stockpiles are maintained to ensure that a constant flow of coal is delivered to the Coal Creek Station in the event that mining is halted due to inclement weather. In addition, the stockpiles are used to facilitate coal quality blending to ensure that station's quality specifications requirements are maintained.

Depending on where the equipment is operating in the mine sequence, at some point in time, during coal removal from the pit, the box cut for the next pit is initiated. Overburden from this new pit is used to backfill the previous pit, or transferred to the spoil piles. Overburden from the new pit is either backfilled into the empty pit, or transferred to the spoil side of the pit. The reclamation process begins as soon as the overburden is backfilled, followed by subsoil and topsoil placement and revegetation. Spoils are regraded so that no more than four rows of spoil peaks are standing at any one time, except in isolated instances, whereby out of pit spoil must remain to complete the reclamation process. The Falkirk Mine is required to rough grade spoils within 180 days following coal removal. SPGM is replaced using tractor-scrapers and trucks/shovels after the final grade approval has been acquired from the PSC. Global Positioning System (GPS) equipment is used on dozers to ensure the proper respread thicknesses of topsoil and subsoil during reclamation. The Falkirk Mine is required to respread and seed all mined areas within 3 years following coal removal. As soon as topsoil has been respread, farming equipment is used to revegetate and maintain reclaimed areas to the approved post mine land uses, as described in the Falkirk Mine's state mining permit. The mined Federal coal discussed in this EA is sold to the Great River Energy's Coal Creek Station (i.e., electricity generating power plant) and Spiritwood Station (i.e., electricity and steam generating power plant).

Non-coal waste associated with the mining operations such as trees, brush, inert waste from inspected farmsteads, wood materials (e.g., pallets, lumber, lathe, cable spools, and fence posts), brick, concrete block, cured concrete, and plastic materials and pipe are stored in a controlled manner in a designated and approved portion of the mine area. Disposal of the non-coal waste (in the years following the reclamation of a previous waste pit) occurs in approved areas of mining pits within land under the Falkirk Mine ownership.

CHAPTER 3 AFFECTED ENVIRONMENT

This chapter describes the current conditions of the physical, biological, cultural, economic, and social resources that could be affected by the implementation of the Proposed Action and No Action Alternative discussed in *Chapter 2*. In compliance with the requirements of NEPA, and implementing regulations and related guidance, the description of the affected environment focuses on those environmental resources potentially subject to impacts. Please refer to *Table 1, Environmental Assessment Elements*.

Four environmental resources were omitted from further analysis. The basis for such exclusions is provided as follows:

- Areas of Critical Environmental Concern The project area did not meet one or more of the relevance criteria for an Area of Critical Environmental Concern. Many of the areas are also analyzed as an individual environmental resource (e.g., Cultural Resources, Threatened and Endangered Species).
- Floodplains A review of the Federal Emergency Management Agency Flood Hazard Map for the project area verified that there are no mapped floodplains within the project area.
- Wild and Scenic Rivers There are no designated wild and scenic rivers in North Dakota.
- Wilderness A review of the designated wilderness areas in the United States verified there
 was no wilderness within the project area.

MANDATORY ELEMENTS	PRESENT; POTENTIALLY IMPACTED	PRESENT; NOT IMPACTED	NOT APPLICABLE OR NOT PRESENT	CHAPTER 3 SECTION
Air Quality	Х			Air Quality and Climate Resources (Section 3.1)
Areas of Critical Environmental Concern			X	-
Cultural or Historical Values		Х		Cultural Resources (Section 3.2)
Environmental Justice		X		Socioeconomics and Environmental Justice (Section 3.8)
Floodplains			Х	-
Invasive, Nonnative Species	Х			Vegetation (Section 3.12)
Prime or Unique Farmland	Х			Prime and Unique Farmland (Section 3.7)
Threatened and Endangered Species	Х			Threatened, Endangered, Proposed, and Candidate Species (Section 3.10)
Wastes, Hazardous or Solids	Х			Hazardous Materials and Wastes and Solid Wastes (Section 3.5)
Water Resources	Х			Water Resources (Hydrology, Wetlands, Water Quality) (Section 3.14)

Table 1, Environmental Assessment Elements

MANDATORY ELEMENTS	PRESENT; POTENTIALLY IMPACTED	PRESENT; NOT IMPACTED	NOT APPLICABLE OR NOT PRESENT	CHAPTER 3 SECTION
Wetland/Riparian	Х			Water Resources (Hydrology, Wetlands,
				Water Quality) (Section 3.14)
Wild and Scenic Rivers			X	-
Wilderness			Х	
Other Elements				
Climate Change	Х			Air Quality and Climate Resources (Section 3.1)
Economics	х			Socioeconomics and Environmental Justice (Section 3.8)
General Wildlife	Х			General Wildlife (Section 3.3)
Geology and Minerals	Х			Geological, Mineral, and Paleontological Resources (Section 3.4)
Paleontology	Х			Geological, Mineral, and Paleontological Resources (Section 3.4)
Range	Х			Vegetation (Section 3.12)
Social Conditions	Х			Socioeconomics and Environmental Justice (Section 3.8)
Soils	Х			Soils (Section 3.9)
General Vegetation	Х			Vegetation (Section 3.12)
Visual Resources Management	Х			Visual Resources (Section 3.13)
Noise and Vibration	Х			Noise (Section 3.6)
Topography	Х			Geological, Mineral, and Paleontological Resources (Section 3.4)
Transportation or Traffic	Х			Transportation Resources (Section 3.11)

3.1 Air Quality and Climate Resources

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography and the prevailing meteorological conditions.

3.1.1 Existing Air Quality and Climate Conditions

Air quality for any area is generally influenced by the types and quantities of air pollutant emissions released from natural and man-made sources within and upwind of the area. Additionally, the local topography, or terrain (such as mountains and valleys), and weather (such as wind, temperature, air turbulence and pressure, humidity, etc.) will have a direct effect on the how pollutants form, react, disperse, or accumulate. Ambient air quality in the affected area is assessed by conducting air monitoring for ground level air pollutant concentrations and comparing to air quality standards established to protect human health and welfare.

The Environmental Protection Agency (EPA) has primary responsibility for setting ambient air quality standards, including those for six criteria air pollutants subject to National Ambient Air Quality Standards (NAAQS). Pollutants regulated under NAAQS include carbon monoxide (CO), lead, nitrogen dioxide (NO₂), ozone, particulate matter with a diameter less than or equal to 10 microns (PM₁₀), particulate matter with a diameter less than or equal to 2.5 microns (PM_{2.5}), and sulfur dioxide (SO₂). Nitrogen oxides (NOx) and volatile organic compounds (VOCs) contribute to ozone formation in the atmosphere and are regulated through equipment standards and emissions limits. Hazardous air pollutants (HAPs) and greenhouse gases (GHGs) are two other categories of regulated air pollutants due to their impacts on human health and global climate change, respectively. The EPA also sets emission standards for many types of equipment and activities that generate emissions of these air pollutants. EPA has delegated responsibility for many provisions of the Clean Air Act to the State of North Dakota Department of Health (NDDH). NDDH has also promulgated state ambient air quality Standards (SAAQS) for criteria pollutants. In addition, the State of North Dakota has set ambient air quality standards for hydrogen sulfide (H₂S). The NAAQS and NDAAQS for criteria pollutants are summarized in *Table 2, National and State Ambient Air Quality Standards.*

POLLUTANT	AVERAGING TIME	PRIMARY STANDARD FEDERAL	PRIMARY STANDARD STATE	SECONDARY STANDARD
СО	8-hour	9 ppm ^(a)	9 ppm	None
	1-hour	35 ppm ^(a)	35 ppm	None
Pb	Rolling 3-Month Average	0.15 μg/m ^{3 (b)}	0.15 μg/m ³	Same as Primary
NO ₂	Annual Arithmetic Mean	53 ppb ^(c)	0.053 ppm	Same as Primary
	1-hour	100 ppb ^(d)	0.1 ppm	None
PM10	24-hour	150 μg/m ^{3 (e)}	150 μg/m³	Same as Primary
PM2.5	Annual Arithmetic Mean	12 μg/m ^{3 (f)}	12 μg/m³	15 μg/m³
	24-hour	35 μg/m ^{3 (g)}	35 μg/m³	Same as Primary
O 3	8-hour	0.070 ppm ^(h)	0.075 ppm	Same as Primary
SO2	3-hour		0.5 ppm	0.5 ppm
	1-hour	75 ppb ⁽ⁱ⁾	0.075 ppm	None
H₂S	Instantaneous	None	10 ppm	None
	1-Hour	None	0.2 ppm	None
	24-Hour	None	0.1 ppm	None
	3-Month	None	0.02 ppm	None

Table 2, National and State Ambient Air Quality Standards

Sources: EPA 2016a, NDAC 2016

Key: ppm = parts per million; ppb = parts per billion; μ g/m³ = micrograms per cubic meter

Notes: Parenthetical values are approximate equivalent concentrations.

- a. Not to be exceeded more than once per year.
- b. Final rule signed 15 October 2008.
- c. The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of cleaner comparison to the 1-hour standard.
- d. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective 22 January 2010).

- e. Not to be exceeded more than once per year on average over 3 years.
- f. Final rule signed October 1, 2015, and effective December 28, 2015. To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 12 μg/m³.
- g. To attain this standard, the 3-year average of the weighted annual of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 μ g/m³.
- h. Final rule signed October 1, 2015 and effective December 28, 2015. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.070 ppm.
- i. To attain this standard, the 3-year average of the 99th percentile of daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb. Final rule signed 2 June 2010.

NDDH, Air Quality Division operates and maintains a network of Ambient Air Quality Monitoring (AAQM) sites throughout the state. The nearest upwind AAQM sites to the section 10 lease tract are the Beulah North AAQM site, located approximately 30 miles southwest, and Hannover AAQM site, located approximately 20 miles southwest. The nearest downwind AAQM site to the section 10 lease tract is the Fargo NW AAQM site, approximately 205 miles to the southeast. The Beulah North AAQM site measures SO₂, NO₂, O₃, PM_{2.5}, PM₁₀, and NH₃. The Hannover AAQM site measures SO₂, NO₂, O₃, PM_{2.5}, and PM₁₀. The Fargo NW AAQM site measures SO₂, NO₂, O₃, CO, PM_{2.5}, PM₁₀, and total reactive nitrogen oxides (NOx). Table 3 summarizes the monitoring results reported in 2015 for the Beulah North, Hannover, and Fargo NW monitoring sites. Monitoring data indicate that Federal and state ambient air quality standards were met at the Beulah North, Hannover, and Fargo NW AAQM Sites.

CRITERIA POLLUTANT MONITORED	UNITS	BEULAH NORTH AAQM SITE	HANNOVER AAQM SITE	FARGO NW AAQM SITE	NAAQS
CO (1-hour)	ppm	Not Monitored	Not Monitored	0.875	35
CO (8-hour)	ppm	Not Monitored	Not Monitored	0.8	9
SO ₂ (1-hour)	ppb	20	14	3	75
NO₂ (1-hour)	ppb	24	14	34	100
NO₂ (Annual Average)	ppb	2.59	2.18	4.19	53
O₃ (8-hour)	ppm	0.058	0.061	0.058	0.07
PM _{2.5} (24-hour)	µg/m³	20	19	18	35
PM _{2.5} (3-year Average)	µg/m³	5.5	4.9	6.4	12
PM ₁₀ (24-hour)	µg/m³	69	108	93	150
NH₃ (1-hour)	ppm	0.0036	Not Monitored	Not Monitored	Not Monitored

Table 3, 2015 Monitoring Results for Beulah North, Hannover, and Fargo NW AAQM Sites

Based on monitoring data from 2015 and 3-year average data from 2013-2015.

Source: NDDH 2016

Key: ppb = parts per billion; μ g/m³ = micrograms per cubic meter

As required by the EPA under section 313 of the Emergency Planning and Community Right-to-Know Act, Falkirk reported 413,901 pounds of NH₃ released in 2015. The report is based off of the use of anhydrous ammonia and aqueous ammonia applied to the soil as a nitrogen fertilizer during normal farming practices on reclaimed cropland at the Falkirk Mine. Falkirk conducts soil tests on the reclaimed cropland to aid the farmers in making sound management decisions regarding soil fertility and fertilizer applications. This reduces the possibility of over application of fertilizers and pollution to the environment. The use of anhydrous ammonia and aqueous ammonia as a nitrogen fertilizer is a standard farming practice utilized across the United States.

The climate of North Dakota is characterized by large seasonal temperature variations; light to moderate, irregular precipitation; plentiful sunshine; low humidity; and almost continuous wind. The annual average temperature ranges from about 37 degrees Fahrenheit (°F) in the northeastern part of the state to 44°F along most of the southern border. Annual average precipitation ranges from about 14 to 22 inches and winter snowpack averages 9 to 15 inches, depending on the area of the state. In the western portion of the state, prevailing wind directions are west, northwest, and north during most of the year, although this depends somewhat on the season.

The average wind speeds in McLean County are from 9 to 11 miles per hour (mph) (USDA 1979). Bismarck, North Dakota, is the nearest weather station for which a number of years of data are available. Average values of monthly wind speed and direction from the Bismarck weather station are shown in Table 4. Please refer to *Table 4, Average Monthly Wind Speeds and Direction*.

MONTH	WIND SPEED (MPH) PREVAILING WIND DIREC	
January	10.1	Northwest
February	10.1	Northwest
March	11.1	Northwest
April	12.3	West
May	12.0	Northwest
June	10.8	North
July	9.5 West	
August	9.7	South
September	10.2	Northwest
October	10.1	West
November	10.3 Northwest	
December	9.6	Northwest

Table 4, Average Monthly Wind Speeds and Direction

Source: NOAA 1979

3.1.2 Air Resource Regulatory Programs

The Clean Air Act specifies standards and requirements to control air pollution and directs the EPA to develop air quality regulations and programs. EPA may delegate authority to implement air quality programs and regulations to a state that develops and obtains approval of a State Implementation Plan (SIP). SIPs are prepared by states and submitted to the EPA for approval to

meet specific requirements of the CAA, including the requirement to attain and maintain the NAAQS. SIPs describe how the plan, including any rules or other requirements, will comply with these requirements and maintain the NAAQS. The NDDH has an approved SIP and has the authority to regulate and issue air permits to major and minor sources of regulated air pollutants within North Dakota. Because the Falkirk Mine is not a major source of air pollutants, it is not subject to the Federal Prevention of Significant Deterioration (PSD) program or to the Title V Operating Permit Program. However, the NDDH has issued an Air Pollution Control Minor Source Permit to Operate for the Falkirk Mine (Permit Number O79002, April 2016).

The EPA is also responsible for classifying air quality in specified geographic areas. The area may be comprised of one or more counties, a whole state, or a several state region. Depending on the pollutant, air quality for a given geographic area is designated as either attainment, or nonattainment. Attainment areas are those areas where criteria pollutant concentrations in ambient air do not exceed of the NAAQS have been documented, but pollution concentrations no longer exceed NAAQS concentrations, i.e. Attainment/Maintenance areas. As of October 1, 2015, the EPA has classified the entire State of North Dakota as in attainment for all criteria air pollutants (EPA 2015b).

Air sheds are also assigned a priority Class (I, II, or III) which describes how much degradation to the existing air quality is allowed to occur within the area under the Prevention of Significant Deterioration (PSD) regulations. Class I areas are areas of special national or regional natural, scenic, recreational, or historic value, and essentially allow very little degradation in air quality (i.e. National Parks, Wilderness Areas), while Class II areas allow for reasonable economic growth. There are currently no Class III areas defined in North Dakota.

There are four Class I Areas located in North Dakota: Theodore Roosevelt National Park – North Unit (McKenzie County), Theodore Roosevelt National Park – Elkhorn Ranch Unit (Billings County), Theodore Roosevelt National Park – South Unit (Billings County), and Lostwood National Wilderness Area (Burke County). The primary anthropogenic sources of visibility impairment in North Dakota Class I Areas include electric utility steam generating units, energy production and processing sources, agricultural production and processing sources, prescribed burning, and fugitive dust sources (NDDH 2010). The section 10 lease tract is not located within a North Dakota Class I Area. The nearest North Dakota Class I Area to the section 10 lease tract is the Theodore Roosevelt National Park – North Unit (McKenzie County). This Class I Area is located more than 105 miles away, generally upwind of the section 10 lease tract.

3.1.3 Climate Change and Greenhouse Gas Emissions

Greenhouse gases (GHGs) permit incoming (short-wave) radiation from the sun to enter the earth's atmosphere, but block infrared (long-wave) radiation from leaving the earth's atmosphere. This "greenhouse effect" traps radiation from the sun and warms the planet's surface. GHGs include, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone, fluorocarbons, and sulfur hexafluoride gases. Many GHGs are naturally occurring in the environment; however, human activity has contributed to increased concentrations of these gases in the atmosphere. As GHG concentrations increase in our atmosphere they impact the global climate by further decreasing the amount of heat that is allowed to escape back into space. Carbon dioxide is emitted from the combustion of fossil fuels (i.e., 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). Methane results from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills. Methane is also emitted during the production and transport of coal, natural gas, and oil. Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Fluorinated gases, while not abundant in the atmosphere, are powerful GHGs that are emitted from a variety of industrial processes and are often used as substitutes for ozone-depleting substances (e.g., chlorofluorocarbons, hydrochloroflourocarbons, and halons).

In 2014, the Intergovernmental Panel on Climate Change (IPCC) produced the Climate Change Synthesis Report and Summary for Policymakers. The Report states that anthropogenic (i.e., humancaused) GHG emissions have increased since the preindustrial era, driven largely by economic and population growth, and are now higher than they have ever previously recorded. This has led to atmospheric concentrations of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) that are unprecedented in at least the last 800,000 years. These anthropogenic GHG emissions are "extremely likely" to have been the dominant cause of the observed warming since the mid-20th century. According to the IPCC Report, many regions are experiencing climate change impacts that threaten ecosystems, human health, and infrastructure. Increasing temperatures and changing precipitation (including melting snow and ice) are altering hydrological systems and affecting water resources (quantity and quality). Terrestrial, freshwater, and marine species have shifted their geographic ranges, seasonal activities, migration patterns, abundance, and species interactions. Negative impacts on crop yields and forests are more common. In addition, ocean acidification is negatively affecting marine organisms, and sea level rise is threatening ecosystems, human health, and infrastructure (IPCC 2014). Factors that determine a GHG effect on climate change include its concentration, duration, and Global Warming Potential (GWP). The GWP is determined by the length of time a GHG remains in the atmosphere and the strength with which it absorbs energy. In order to aggregate GHG emissions, total GHG emissions are characterized in terms of CO_2 equivalent (CO_2 eq) by adding the product of each GHG multiplied by its GWP. CO2 has a GWP of 1, while CH4 and N2O have GWPs of 25 and 298, respectively, based on 100- year GWPs (40 CFR Part 98, Table A-1).

The EPA collects GHG emissions data in the U.S. by source sector (e.g. industrial, land use, electricity generation), fuel source (e.g. natural gas, coal, geothermal), and economic sector (e.g. industrial, commercial, residential). Considering the diverse sources of GHG emissions nationally, from cattle to vehicles to electric power generation, no single source is likely to represent a significant percentage of national emissions. Total GHG emissions for the U.S. are presented in *Table 5, U.S. GHG Emissions Trends by Gas and Selected Sectors 1990 – 2014* by GHG and for selected source sectors. According to the U.S. Energy Information Administration (EIA), U.S. coal production from surface mines in 2014 was 643,721,158 short tons of which 29,157,193 short tons (approximately 4.5%) were produced from four surface coal mines in North Dakota. Corresponding estimated GHG emissions from surface mining and post mining activities in 2014 were 11.7 MMT CO_{2eq} from all U.S. surface mines, and 0.14 MMTCO_{2eq} from North Dakota surface mines.

GHG SELECTED SECTOR	1990 (ММТ СО250)	2005 (MMT CO250)	2010 (MMT CO250)	2014 (MMT CO2F0)
CO ₂	5,115	6,123	5,689	5,556
Fossil Fuel Combustion	4,741	5,747	5,358	5,208
Electricity Generation	1,821	2,401	2,258	2,039
Transportation	1,494	1,887	1,728	1,738
Industrial	843	828	776	813
Residential	338	358	335	345
Commercial Non-Energy Lise of Eucls	118	130	11/	232
Iron and Stool Droduction 9 Motallurgical	100	67	E6	
Coke Production	100	07	50	55
Natural Gas Systems	38	30	32	42
Cement Production	33	46	31	39
Petrochemical Production	22	27	27	27
CH4	774	717	722	731
Natural Gas Systems	207	177	166	176
Enteric Fermentation	164	169	171	164
Landfills	180	154	142	148
Petroleum Systems	39	49	54	68
Coal Mining	97	64	82	68
Manure Management	37	56	61	61
Wastewater Treatment	16	16	16	15
N ₂ O	406	398	410	404
Agricultural Soil Management	303	297	321	318
Stationary Combustion	12	20	22	23
Manure Management	14	17	17	18
Mobile Combustion	41	34	24	16
HFCs, PFCs, and SF6	47	120	149	167
Substitution of Ozone Depleting Substances	0.3	100	141	161
HCFC-22 Production	46	20	8	5
Electrical Transmission and Distribution	25	11	7	6
Aluminum Production	22	3	2	3
Total Emissions	6,397	7,379	6,986	6,871
Land Use, Land-Use Change, Forestry (sinks)	-738	-699	-766	-763
Net Emissions (Sources and Sinks)	5,659	6,680	6,219	6,108

Table 5, U.S. GHG Emissions Trends by Gas and Selected Sectors 1990 – 2014

Source: EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014 (April 2016).

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Surface mining operations can emit greenhouse gas emissions depending on the coal characteristics and operational methods employed to mine the coal. CO₂ and N₂O may be emitted from mining operations that involve the combustion of fossil fuels such as diesel fired equipment and generators, onsite energy production, or for heating and cooling. Methane (CH₄) is generated in coal beds as a result of the coalification process (coal formation). CH₄ can remain "trapped" in a coal bed if the bed occurs within non-porous strata such as claystone or shale. However, if a coal bed is located near the surface (along a subcrop), or if it is exposed at the surface (along an outcrop), CH₄ may be naturally vented to the atmosphere. During surface mining operations, CH₄ is released into the atmosphere as the overburden is removed and the coal is exposed. Minor amounts of CH₄ may be released when the coal is transported from the pit to the crushing facility, during crushing, temporarily stored in coal stockpiles, or when the coal is conveyed to the power station. In general, emissions from these sources are low because most of the CH₄ is emitted during the mining process.

3.2 Cultural Resources

Federal historic preservation laws provide a mandate and direction for the identification, evaluation, and protection of cultural resources that may be affected by Federal undertakings, which can include private undertakings operating under Federal license or on Federally managed lands. The NEPA requires Federal agencies involved in undertakings to consider the potential effects to the "human environment"—an all-encompassing term that has been interpreted to include historical and archaeological resources. The National Historic Preservation Act (NHPA) requires Federal agencies to consider an undertaking's effects on "historic properties," which are defined as cultural resources included or eligible for inclusion on the NRHP. Section 106 of the NHPA and accompanying implementing regulations specified in 36 CFR 800 ("Protection of Historic Properties") establish a cooperative consultation process and procedures that enable Federal agencies to identify historic properties that may be directly or indirectly affected by a proposed Federal undertaking.

Common types of prehistoric archaeological sites in North Dakota include lithic artifact scatters, earthlodge villages, stone circles, short-term camp sites, stone cairns, rock art, and Knife River Flint tool stone quarries. Also common to a lesser degree are animal bone concentrations resulting from game drives, vision quest stations, eagle-trapping pits, stone alignments, and scatters of artifacts that include ceramics or factory-made trade goods. Well-stratified, multiple-component sites, which are typically significant sites, have been found in remnant alluvial fans, stream terraces, spring deposits, and the terraces lining the Missouri and Little Missouri rivers. Common historic archaeological sites in the state are the remains of homesteads, farmsteads, dumps, schools, churches, roads, railroad grades, trails, trading posts, and military forts.

In 1993, a Class III Cultural Resources Inventory was completed for the southeast ¼ of section 10, Township 146 North, Range 82 West (160 acres).

A Class I literature review of the State Historical Society of North Dakota (SHSND) site and manuscript files was conducted for the entire project area on March 27, 2015. The review revealed 16 previous cultural resource surveys, 32 sites, 15 isolated finds, and two site leads within a 1-mile radius of the project area. There are four isolated finds (32MLx785, 32MLx605, 32MLx606, and 32MLx607), one site lead (32MLx50), and one site (32ML837) within the previously surveyed area (160 acres). The

four isolated finds (32MLx785, 32MLx605, 32MLx606, and 32MLx607), by definition, are considered "not eligible" for the NRHP.

A Class III pedestrian cultural resource inventory was conducted on April 30, 2015 (BLM# 15-MT030-176), for the northeast ¼ of section 10, Township 146 North, Range 82 West (160 acres). The area was surveyed using parallel pedestrian transects spaced no more than approximately 49 feet apart. Site lead 32MLx50 (i.e., single stone circle) could not be located during the 2015 Class III inventory. Site lead 32MLx50 has either been destroyed by agricultural activities or is located outside the mapped location and project area. Site 32ML837 is a historic farmstead and was previously recommended "not eligible" for the NRHP. Only one new cultural resource (i.e., isolated find 32MLx785) was discovered during the 2015 Class III inventory. Isolated find 32MLx785 is a single tertiary flake of Knife River Flint, measuring approximately 1.2 inches long, 0.8 inches wide, and 0.4 inches thick. It was located on a ridge with a large pond to the west in a harvested sunflower field (ground surface visibility at 75 percent). The single flake could not be associated with a nearby previously recorded site and was found out of context; therefore, it was recorded as an isolate and is "not eligible" for the NRHP. Seven rock piles were also recorded and determined by a KLI archaeologist to be modern, showing no signs of being exposed to the elements for an extended period of time.

The Class III survey report (BLM# 15-MT030-176), which covers the surface area not previously archaeologically surveyed, and a cover letter detailing the BLM's findings were submitted to the North Dakota State Historical Preservation Office (SHPO). A concurrence letter from the North Dakota SHPO was received on June 29, 2015, providing a finding of "No Historic Properties Affected" if the project proceeds as currently planned.

In accordance with Section 106 of the National Historic Preservation Act, the BLM sent a letter, and a Class I cultural resource packet was submitted to each Tribal Historic Preservation Officer (THPO) of the following tribes: the Mandan, Hidatsa, and Arikara Nation (MHAN); Lower Sioux Indian Community (LSIC); Fort Peck Tribes (FPT); Northern Cheyenne Tribe (NCT); Spirit Lake Sioux Tribe (SLST); Standing Rock Sioux Tribe (SRST); and Turtle Mountain Band of Chippewa (TMBC). The Class III survey report (BLM# 15-MT030-176) and a cover letter detailing the BLM's findings was also submitted to the THPO of the following tribes: the MHAN, LSIC, FPT, NCT, SLST, SRST, and TMBC. To date, the BLM has not received any comments or concerns regarding the Proposed Action or Class III survey report from the aforementioned tribes or their THPOs.

3.3 General Wildlife

The Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. 703-712) as amended, and EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, require Federal agencies to minimize or avoid impacts on migratory birds listed in 50 CFR 10.13. If design and implementation of a Federal action cannot avoid measureable negative impacts on migratory birds, EO 13186 directs the responsible agency to develop and implement, within 2 years, a Memorandum of Understanding with the USFWS that shall promote the conservation of migratory bird populations. Bald and golden eagles are provided protection under the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668–668c), as amended. A Memorandum of Understanding was entered into by OSMRE and the USFWS,

effective December 7, 2016, to promote and strengthen the conservation and management of migratory birds.

The section 10 lease tract is located within the Central Flyway of North America. The Central Flyway is used as resting grounds for many bird species on their spring and fall migrations and nesting and breeding grounds for many waterfowl species. Wildlife species and habitat surveys were conducted across the southern half of the section 10 lease tract from 1992 to 1993 and 2005 to 2006. For purposes of this analysis, it is assumed that species and habitats observed in the southern half of the section 10 lease tract can also be found in the northern half of the lease tract. The objective of the wildlife species and habitat surveys conducted in the section 10 lease tract was to provide site-specific information regarding the terrestrial and aquatic wildlife resources present within the tract.

A variety of species were observed to be using wetlands, croplands, tame grasslands, and pasture lands in the section 10 lease tract as habitat. Several upland game birds, migratory waterfowl, shorebirds, song birds, and mammals of varying sizes were observed such as the sharp-tailed grouse (*Tympanuchus phasianellus*), Canada geese (*Branta canadensis*), Ferruginous hawk (*Buteo regalis*), Richardson ground squirrel (*Urocitellus richardsonii*), and coyote (*Canis latrans*). No bald or golden eagles were observed during the surveys. A detailed list of wildlife species observed during the surveys of the section 10 lease tract is provided in Section 2-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*.

3.4 Geological, Mineral, and Paleontological Resources

Geological resources consist of surface and subsurface minerals. Within a given physiographic province, these resources typically are described in terms of physiography, topography, geology, and paleontology. Topography and physiography pertain to the general shape and relief of the land surface, including the elevation and orientation of its natural features and human-made alterations. Geology is the study of the Earth's composition and provides information on the structure and configuration of its surface and subsurface features. Paleontological resources (i.e., fossils) are nonrenewable resources that provide evidence of past life on Earth.

Geological Resources

Some of the text contained in this subsection was obtained from Section 2-3 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*. The section 10 lease tract occurs in the portion of the Falkirk Mine's reserve area known as the Underwood Coal Field. The Underwood Coal Field is situated on the Coteau Slope, located southwest of the Missouri Coteau, and northeast of the Missouri Trench. This area is a local physiographic feature within the Northern Great Plains Physiographic Province (Fenneman, 1931). The Coteau slope consists primarily of stream-dissected bedrock covered with a veneer of glacial deposits (Bluemle, 1971). Structurally, the area is situated on the eastern flank of the Williston Basin, which is an intracratonic basin containing a thick sequence of sedimentary rocks. The sedimentary rocks in the Williston Basin represent deposition from every geologic period from the Cambrian period (500 to 600 million years ago) through the Tertiary period (3 to 65 million years ago). The near-surface stratigraphy of the section 10 lease tract is derived from terrestrial sediments and the accumulation and preservation of

peat in regional swamps. The sediments comprising the strata were transported eastward, from western source areas by Early Tertiary fluvial systems.

After the close of the Oligocene Epoch (26 million years ago), erosion was the predominant geologic process affecting the Williston Basin. The area was affected by all four of the major Pleistocene glaciations (10,000 to 900,000 years ago). Each glacial episode modified the previous landscape through erosional and depositional processes. The area was most recently glaciated during the Wisconsinan stage. During early Wisconsinan time (50 thousand years ago), the Napoleon sheet ice advanced across the area depositing drift on a rolling topography that consisted mainly of bedrock with only a thin veneer of pre-Wisconsinan drift deposited in the topographic lows. Most of the pre-Wisconsinan drift had been removed by erosional processes by the time the Napoleon ice sheet advanced across the area. The present topography of the area consists mainly of stream-dissected bedrock covered with a veneer of glacial sediment. A few buried glacial meltwater channels are also present in the area. Post-glacial erosion has been very minor over most of the area. Thin surficial deposits of slopewash (i.e., clays and silts) and eolian (wind) deposits of the Oahe Formation occur over most of the area. The extreme northeastern corner of McLean County is part of the Drift Prairie that covers most of the northeastern portion of North Dakota. Relief in this area, which is generally less than 20 feet per mile, is almost entirely attributed to irregularities on the surface of the glacially deposited ground moraine. The edge of the Drift Prairie is marked by the Missouri Escarpment, a relatively smooth, but stream-dissected slope feature that rises to the Missouri Coteau. Elevations rise from approximately 1,600 feet at the base of the escarpment to more than 2,000 feet at the top, which equates to a change of about 400 feet in a distance of about 5 miles. The Missouri Coteau, which lies at the top of the Missouri Escarpment, is an area of high local relief, averaging approximately 30 to 35 feet between lows and adjacent highs. This hilly area extends from easterncentral South Dakota, northwest to Saskatchewan. The Coteau Slope lies southwest of the Missouri Coteau. Relief is moderate, generally less than 25 feet locally, but greater near some of the deeper valleys. Elevations range between approximately 2,000 feet near the Missouri River, to more than 2,400 feet in the western part of the county (Bluemle 1971).

Mineral Resources

Some of the text contained in this subsection was obtained from Section 2-3 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. The mineable lignite coal in the Underwood Coal Field occurs in the Sentinel Butte Formation (part of the Fort Union Group). The U.S. Geological Survey (USGS) completed an assessment of the undiscovered oil and gas resources in conventional and continuous accumulations of the Williston Basin Province of North Dakota based on geological elements of total petroleum systems. Results of the assessment determined that for continuous (unconventional) gas resources, there is a 95 percent chance of approximately 368 billion cubic feet (ft³), 50 percent chance of approximately 791 billion ft³, and 5 percent chance of approximately 1,701 billion cubic ft³ of gas in the Fort Union coal bed assessment unit. No continuous or conventional oil resources were identified for the Fort Union coal bed assessment unit (USGS 2010). There is no clinker (i.e., scoria) present within the section 10 lease tract.

The near-surface lithostratigraphy of the section 10 lease tract is variable and is mapped as the Bullion Creek, Sentinel Butte, Coleharbor, and Oahe formations. Figure 4 displays the stratigraphic



column representing the lease tract, showing the coal zones occurring in the Fort Union Group and other geologic formations. Please refer to *Figure 4, Falkirk Mine Area Stratigraphic Column.*

The lignite coal bearing Sentinel Butte and Bullion Creek formations occur within the section 10 lease tract. The Sentinel Butte Formation conformably overlies the Bullion Creek Formation. Lithologically, the two formations are very similar: interbedded silts and clays that occur in horizons that range in thickness from 0 to 10 feet make up approximately 60 to 80 percent of the sediment; 15 to 35 percent of the sediment consists of silty, fine-grained to medium-grained sand in horizons that range in thickness from 0.5 to 100 feet; and lignite is a minor constituent that generally comprises less than 5 percent of the formation. The lignite occurs in beds that range in thickness, from less than 0.1 to 15 feet locally.

The Coleharbor Formation unconformably overlies the Sentinel Butte Formation, and includes all of the unconsolidated sediments resulting from deposition during the glacial and interglacial periods. Lithologies are locally variable, including gravel, sand, silt, clay, and till. The Oahe Formation conformably overlies the Coleharbor Formation and occurs over most of the section 10 lease tract, as a thin veneer of eolian, silt-sized sediment that blankets upland surfaces. The Oahe Formation is the uppermost stratigraphic unit over most of the area. Modified glacial channels that delineate Falkirk's mining limits north, east, and south of the section 10 lease tract, are filled with sediments comprising the Coleharbor Formation. The channel fill systems contain a complex of interbedded glaciallyderived fluvial gravels, sands, silts, and clays that are overlain by till. The coarser gravel and sand beds generally occur near the base of the channel fill. The uppermost stratigraphic unit within the Falkirk Mine area is glacial till that generally consists of a pebble loam that ranges in thickness, from 0 to 30 feet, and usually averages 5 feet thick. Underlying this unit, are overburden; a series of lignite coal beds; and interburden, which occurs between successive coal beds. The overburden thickness can range between 10 and 220 feet thick over the mine area. The overburden and interburden materials generally consist of silty sandstone, clayey siltstone, and claystone. Most of the coal beds in the area are fairly continuous and contain claystone partings. In some areas, the partings become thick enough to cause the coal bed to split into two beds or benches. The thickness and areal extent of the partings are extremely variable. The Falkirk Mine staff stated that when a parting attains a thickness of approximately 0.3 feet, it can be removed from the coal bed and discarded.





Source: NDGS 2009

Figure 4, Falkirk Mine Area Stratigraphic Column



The uppermost coal bed occurring in the area is the Kinneman Creek bed. This coal bed contains partings and is not mined due to its limited areal extent and poor quality (i.e., high ash content). Occurring approximately 25 to 70 feet below the Kinneman Creek bed is the Hagel A bed. The Hagel A bed is the uppermost mineable coal bed in the Falkirk Mine area and can contain parting(s). In some areas, the parting thickness increases to where the coal bed splits into two mineable beds that are referred to as the Hagel A-1 (upper bed) and the underlying Hagel A-2 (lower bed). The Hagel A bed averages 5.7 feet thick and ranges from 0.5 to 11.5 feet thick.

The Hagel B bed underlies the Hagel A bed, and in some areas, it nearly coalesces with the overlying Hagel A bed. The interburden thickness between the Hagel A and Hagel B beds is usually less than 10 feet, but can range from approximately 0.1 to 65 feet. The Hagel B bed is mineable and can contain parting(s). In some areas, the Hagel B bed splits into two mineable beds: the Hagel B-1 (upper bed) and the Hagel B-2 (lower bed). The Hagel B lignite bed averages 1.8 feet thick and ranges from 0.5 to 6.3 feet thick. The Hagel A and Hagel B beds are fairly continuous across the Falkirk Mine area. However, in some areas, the beds have been removed by erosion.

Occurring approximately 30 feet below the Hagel B bed is the C bed. Within the Falkirk Mine area, the C bed has a limited areal extent. However, this bed is mined in areas where its thickness and quality are suitable. The C bed is typically less than 2 feet thick. Occurring approximately 65 feet below the C bed is the Tavis Creek bed. The Tavis Creek bed is the thickest and most continuous coal bed across the Falkirk Mine area. The Tavis Creek bed averages 8.2 feet thick and ranges from 0.5 to 12.2 feet thick. Because of its depth, this bed is mined in areas where erosion has removed a significant amount of the overlying stratigraphic units. In some areas, a thin "rider" coal bed occurs several feet above the Tavis Creek bed. The Tavis Creek bed can contain parting(s), and in some areas, the coal bed is split into two mineable beds consisting of the Upper Tavis Creek and Lower Tavis Creek beds.

The lowest mineable coal bed in the Falkirk Mine area is the Coal Lake Coulee bed, which occurs approximately 25 to 50 feet below the Tavis Creek bed. Although thinner than the overlying Tavis Creek bed, the Coal Lake Coulee bed has a similar areal extent. The Coal Lake Coulee bed averages 2.5 feet thick and ranges from 0.5 to 3.8 feet thick. This coal bed also contains parting(s) and in some areas, the bed is split into the Upper Coal Lake Coulee and Lower Coal Lake Coulee beds.

Within the section 10 lease tract (in the Underwood Coal Field), the Hagel A and Hagel B beds are targeted for mining, and based on the BLM geologic model, the tract contains 4.41 million tons of potentially surface mineable coal. Figure 5 shows a depiction of the coal bed layers associated with mining activities in the section 10 lease tract. Please refer to *Figure 5, Falkirk Mine Generalized Coal Bed Stratigraphy.*

Glacial Till	0 to 30 feet thick		
Overburden	10 to 220+ feet thick		
Kinneman Creek Bed	5 feet thick		
Interburden	25 to 70 feet thick		
Hagel A Bed	0.5 to 11.5 feet thick		
Interburden	0.1 to 35 feet thick		
Hagel B Bed	0.5 to 6.3 feet thick		
Interburden	30 feet thick		
C Bed	0 to 2 feet thick		
Interburden	65 feet		
Tavis Creek Bed	0.5 to 12.2 feet thick		
Interburden	25 to 50 feet thick		
Coal Lake Coulee Bed	0.5 to 3.8 feet thick		

Note: Within the lease tract, Falkirk considers all material overlying the Hagel A Bed overburden. *Figure 5, Falkirk Mine Generalized Coal Bed Stratigraphy*¹

¹ All values are approximate.

Paleontological Resources

Surface-disturbing actions have the potential to impact paleontological resources. The BLM uses the Potential Fossil Yield Classification (PFYC) system to classify paleontological resource potential of rock units to assess potential impacts on these resources and determine mitigation requirements for Federal actions involving surface disturbance, land tenure adjustments, or land use planning, where impacts on paleontological resources would be expected. The PFYC system classifies geologic units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher fossil potential. The classification values are as follows:

- Class 1—Very Low. Geologic units are not likely to contain recognizable fossils. Management concern is usually negligible or not applicable.
- Class 2—Low. Sedimentary geologic units are not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils. Management concern is generally low.
- Class 3—Moderate or Unknown. Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence, or sedimentary units of unknown fossil potential. Management concern is moderate or cannot be determined from existing data.
- Class 4—High. Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but might vary in occurrence and predictability. Surface disturbing activities could adversely affect paleontological resources in many cases. Management concern is moderate to high, depending on the project.
- Class 5—Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse effects or natural degradation. Management concern is high to very high.

As part of the Proposed Action, overburden and interburden would be removed exposing the Hagel A and Hagel B coal beds. The overburden is comprised of material mapped as the Oahe, Coleharbor, and Sentinel Butte formations. The coal beds and interburden are also part of the Sentinel Butte Formation. This formation, part of the Fort Union Group in North Dakota, has produced significant flora, clam, insect, fish, bird, and mammal fossils; and is rated as Class 4 (high) under the PFYC system.

The Coleharbor Formation and Oahe Formation names have been applied to the unlithified glacial sediments across North Dakota. The Coleharbor Formation has produced fossil remains of plants, mollusks, insects, amphibians, and mammals (e.g., horses, bison, and giant ground sloth) and is rated Class 3 (moderate) under the PFYC system. The Oahe Formation is thought to be derived from predominately wind-blown sediments, and therefore, has a lower fossil potential and is rated Class 2 (low) under the PFYC system.

3.5 Hazardous Materials and Wastes and Solid Waste

Pursuant to 49 CFR § 171.8 (regulations relating to transportation), the term "hazardous materials" "means a substance or material that the Secretary of Transportation has determined is capable of

posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103)." It includes "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR § 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR § 105–180.

"Hazardous waste" is defined by the Resource Conservation and Recovery Act at 42 U.S.C. § 6903(5), as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273. Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances.

Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs.

The Falkirk Mine is a surface mining operation where there are no mining-related activities that generate hazardous wastes. Non-coal wastes associated with mining operations such as trees, brush, inert waste from inspected farmsteads, wood materials (e.g., pallets, lumber, lathe, cable spools, and fence posts), brick, concrete block, cured concrete, plastic materials, and pipe are stored in a controlled manner in a designated and approved portion of the area permitted for mining. Disposal of the non-coal wastes (in the years following the resumption of mining) occurs in approved mine pits on land under the Falkirk Mine ownership.

3.6 Noise

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

Although human response to noise varies, measurements can be calculated with instruments that record instantaneous sound levels in decibels. A-weighted decibels (dBA) are used to characterize sound levels that can be sensed by the human ear. A soft whisper from 5 feet away is normally 40 dBA and considered to be very quiet, while classroom chatter is considered an intrusive noise at 70 dBA. Noise levels can become annoying at 80 dBA and very annoying at 90 dBA. To the human ear, each 10 dBA increase seems twice as loud (EPA 1981). Please refer to *Figure 6, Typical Sound Levels*.

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration (OSHA) established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed is 115 dBA, and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits (29 CFR § 1910.95).



Source: DOL 2013 Figure 6, Typical Sound Levels

Noise currently generated within, and surrounding the area of, the section 10 lease tract is from local vehicle traffic, agriculture equipment, and nearby operating mining equipment. Noise measurements obtained by OSHA determined that the median noise level for mining is approximately 88.04 dbA (DOL 2013). According to the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations, there are no public buildings or sensitive noise receptors located within 300 feet of a pit operation.

Sensitive noise receptors include a few scattered farm houses, located approximately 1 mile northeast; several residences, located approximately 1.5 miles southwest in the City of Underwood; and two churches and one school, located approximately 1.9 miles southwest of the lease tract.


3.7 Prime and Unique Farmlands

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The soil qualities, growing season, and moisture supply are needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. The land could be cropland, pasture, rangeland, or other land, but not urban built-up land or water. Unique farmland is defined as land that is used for protection of specific high-value food, feed, and forage crops. Farmland of statewide or local importance can be classified as nearly prime, and designated by law or an agency to be important.

Prime farmland, unique farmland, and farmland of statewide or local importance are provided protection by the Farmland Protection Policy Act (FPPA) of 1981 (7 U.S.C. 4201 et seq.). The FPPA applies to projects undertaken by, or with the assistance of, a Federal agency. The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Act also ensures that Federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland. The implementing procedures of the FPPA and Natural Resources Conservation Service (NRCS) require Federal agencies to evaluate the adverse impacts (direct and indirect) of their activities on prime and unique farmland, as well as farmland of statewide and local importance, and to consider alternative actions that could avoid adverse impacts. The NRCS is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act. Determination of whether an area is considered prime or unique farmland and potential impacts associated with a proposed action, is based on preparation of Form AD-1006, Farmland Conversion Impact Rating Form, for areas where prime farmland soils occur and by applying the following criteria established in Section 658.5 of the FPPA (7 CFR Part 658):

- Land Evaluation Criterion Relative Value: This criterion is based on information from several sources including national cooperative soil surveys or other acceptable soil surveys, NRCS field office technical guides, soil potential ratings or soil productivity ratings, land capability classifications, and important farmland determinations. Based on this information, groups of soils within a local government's jurisdiction will be evaluated and assigned a score between 0 and 100, representing the relative value for agricultural production of the farmland to be converted by the project, compared to other farmland in the same local government jurisdiction. This score will be the Relative Value Rating on Form AD-1006.
- Site Assessment Criteria: Federal agencies are to use the following criteria to assess the suitability of each proposed site or design alternative for protection as farmland along with the score from the land evaluation criterion. Each criterion will be given a score on a scale of 0 to the maximum points shown. Conditions suggesting top, intermediate, and bottom scores are indicated for each criterion. The agency would make scoring decisions in the context of each proposed site or alternative action by examining the site, surrounding area, and programs and policies of the state or local unit of government in which the site is located. Where one given location has more than one design alternative, each design should be considered as an alternative site. The site assessment criteria are as follows:

- > How much land is in nonurban use within a radius of 1 mile from where the project is intended?
- > How much of the perimeter of the site borders on land in nonurban use?
- > How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than 5 of the last 10 years?
- > Is the site subject to State or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
- > How close is the site to an urban built-up area?
- > How close is the site to water lines, sewer lines and/or other local facilities and services whose capacities and design would promote nonagricultural use?
- > Is the farm unit(s) containing the site (before the project) as large as the averagesize farming unit in the county?
- > If this site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
- Does the site have available adequate supply of farm support services and markets (i.e., farm suppliers, equipment dealers, processing and storage facilities, and farmer's markets)?
- Does the site have substantial and well-maintained on-farm investments such as barns, other storage buildings, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
- > Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
- > Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?
- Corridor-type Site Assessment Criteria: This criteria is to be used for projects that have a linear or corridor-type site configuration, connecting two distant points and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor-type site or design alternative for protection as farmland along with the land evaluation information described in CFR § 658.4(a).

There are approximately 170 acres of farmland of statewide importance within the section 10 lease tract. Please refer to *Figure 7, Section 10 Lease Tract Farmland*. Of the seven soils mapped in the lease tract, three are considered to be farmland of statewide importance soils (Williams-Zahl loams, Williams-Falkirk loams, and Williams-Bowbells loams). The Williams soil series consists of deep, nearly level to gently rolling, well-drained soils that are formed in loamy glacial till. The Zahl soil series consists of deep, nearly level to steep, well-drained soils that are formed in loamy glacial till. The Falkirk soil series consists of deep, nearly level to gently rolling, well-drained soils that are formed in loamy glacial till. The Falkirk soil series consists of deep, nearly level to gently rolling, well-drained soils that are formed in a loam melt-water mantle, ranging from 20 to 40 inches thick over loamy glacial till. The Bowbells soil series consists of deep, nearly level to gently rolling, moderately well-drained soils that are formed in glacial till (USDA 1979).



Figure 7, Section 10 Lease Tract Farmland

3.8 Socioeconomics and Environmental Justice

Accurately portraying the socioeconomics of the geographic region is essential to understanding the possible impacts of a proposed action. For the purposes of this analysis, three geographic areas will be discussed in greater detail, including McLean, Mercer, and Oliver counties. The mine's physical location implies that McLean County will be the primary geographic region of interest. Because the Falkirk Mine might pull labor from neighboring counties, while contributing to indirect employment and income through proximity, Mercer and Oliver counties will also be discussed. The overall impacts from the Proposed Action and No Action Alternative on socioeconomic resources in the State of North Dakota will also be analyzed.

3.8.1 Demographics

Over the last 15 years, the State of North Dakota has seen an overall population growth. The population in North Dakota increased approximately 4.7 percent between 2000 and 2010, from 642,200 to 672,591. However, between 2000 and 2010, the populations of McLean, Mercer, and Oliver counties declined approximately 3.8, 2.6, and 10.6 percent, respectively (Census Bureau 2000, Census Bureau 2010). Between 2010 and 2014, the population of North Dakota increased approximately 9.9 percent, from 672,591 to 739,482 people. The populations of McLean, Mercer, and Oliver counties also increased between 2010 and 2014, approximately 6.9, 3.8, and 0.2 percent, respectively (Census Bureau 2014). Table 5 summarizes the population estimates in 2000 and between 2010 and 2014 for the State of North Dakota and McLean, Mercer, and Oliver counties. Please refer to **Table 6, Population Estimates (2000, 2010-2014)**.

Housing data for 2015 are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, data from the U.S. Census Bureau 2009-2013 American Community Survey (ACS) 5-Year Estimates (hereafter referred to as the 2009-2013 ACS Survey) are being used. Vacant housing units in the State of North Dakota were estimated at approximately 37,442 or 11.5 percent of all housing units. Vacant housing units in McLean, Mercer, and Oliver counties were estimated at approximately 1,631, 876, and 159, respectively (Census Bureau 2009-2013a). Table 6 summarizes the vacant housing data for the State of North Dakota and McLean, Mercer, and Oliver counties, as estimated in the 2009-2013 ACS Survey. Please refer to **Table 7, Vacant Housing Units**.

LOCATION	2000	2010	2011	2012	2013	2014
State of North Dakota	642,200	672,591	685,242	701,705	723,857	739,482
McLean County	9,311	8,962	9,081	9,371	9,476	9,578
Mercer County	8,644	8,424	8,419	8,486	8,596	8,746
Oliver County	2,065	1,846	1,845	1,832	1,869	1,850

Table 6, Population Estimates (2000, 2010–2014)

Sources: Census Bureau 2000, Census Bureau 2010, Census Bureau 2014

Table 7, Vacant Housing Units

LOCATION*	TOTAL UNITS	VACANT UNITS	PERCENTAGE VACANT
State of North Dakota	324,712	37,442	11.5
McLean County	5,652	1,631	28.9
Mercer County	4,526	876	19.4
Oliver County	912	159	17.4

Source: Census Bureau 2009-2013a

Note: * Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a 90 percent margin of error. In addition to sampling variability, the 2009-2013 ACS Survey estimates are subject to nonsampling error, which is not represented in these tables.

3.8.2 Employment Characteristics

Employment data for 2015 are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, data from the U.S. Department of Commerce, Bureau of Economic Analysis 2014 estimates are being used to summarize the labor force in the State of North Dakota and McLean, Mercer, and Oliver counties.

In 2014, there was an estimated 600,923 jobs in the State of North Dakota. In McLean, Mercer, and Oliver counties there were 5,791, 6,941, and 1,606 jobs, respectively. In the State of North Dakota, the three largest industries were State and Local Government and Government Enterprises, Health Care and Social Assistance, and Construction. In McLean County, the three largest industries were Farming, State and Local Government and Government Enterprises, and Construction. In Mercer County, the three largest industries were Utilities, Construction, and Retail Trade. For Oliver County, there was a tie for the third largest industry; therefore, the four largest industries are reported in this EA. They were Farming; Construction; Real Estate, Rental, and Leasing; and State and Local Government and Government Enterprises (BEA 2014a, BEA 2014b). A summary of employment data for the major industries in the State of North Dakota and McLean, Mercer, and Oliver counties are displayed in Table 7. Please refer to **Table 8, Employment by Major Industries.**

The average annual unemployment data for 2015 are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, the average annual unemployment data for 2014 from the U.S. Department of Labor, Bureau of Labor Statistics are being used in this EA. The average numbers of unemployed individuals in the State of North Dakota and McLean, Mercer, and Oliver counties in 2014 were approximately 11,503, 204, 170, and 57 people, respectively (BLS 2014a, BLS, 2014b, BLS 2014c, BLS 2014d).

Table 8, Employment by Major Industries

OCCUPATION	STATE OF NORTH MCLEAN COUNTY (b)		MERCER COUNTY (c)	OLIVER COUNTY (d)	
	DAKOTA ^(a)				
Accommodation and Food	38,724	261	317	29	
Services	(6.44 percent)	(4.51 percent)	(4.57 percent)	(1.81 percent)	
Administrative and Waste	19,339	N/A (e)	134	N / A (e)	
Management Services	(3.22 percent)		(1.93 percent)	N/A V	
Arts, Entertainment, and	7,768	58	66	34	
Recreation	(1.29 percent)	(1.00 percent)	(0.95 percent)	(2.12 percent)	
Construction	45,213	423	772	105	
	(7.52 percent)	(7.30 percent)	(11.12 percent)	(6.54 percent)	
Education Services	6,342	N/A (e)	N/A (e)	N/A (e)	
	(1.06 percent)	N/A (*)	N/A (*)	N/A (*)	
Farming	33,814	927	425	301	
	(5.63 percent)	(16.01 percent)	(6.12 percent)	(18.74 percent)	
Federal, Civilian Government and	9,104	125	39	N/A (f)	
Government Enterprises	(1.52 percent)	(2.16 percent)	(0.56 percent)	N/A V	
Forestry, Fishing, and Related	4,661	N/A (e)	N/A (e)	N/A (e)	
Activities	(0.78 percent)	N/A (*)	N/A (*)	N/A (*)	
Health Care and Social Assistance	63,257	NL/A (e)	NL/A (e)	NI/A (e)	
	(10.53 percent)	N/A (*)	N/A (°)	N/A ···	
Management of Companies and	5,575	N/A (e)	N/A (f)	N/A (f)	
Enterprises	(0.93 percent)	N/A (*)	IN/A "	N/A ··	
Manufacturing	27,573	84	68	38	
	(4.59 percent)	(1.45 percent)	(0.98 percent)	(2.37 percent)	
Military Government and	11,615	63	58	12	
Government Enterprises	(1.93 percent)	(1.09 percent)	(0.84 percent)	(0.75 percent)	
Mining	34,608	NL/A (e)	NL/A (e)	NI/A (e)	
	(5.76 percent)	N/A (*)	N/A (*)	N/A (*)	
Other Services, Except Public	27,354	N/A (e)	254	N/A (e)	
Administration	(4.55 percent)	N/A (*)	(3.66 percent)	N/A (*)	
Professional, Scientific, and	23,543	N/A (e)	144	N/A (e)	
Technical Services	(3.92 percent)		(2.07 percent)	N/A · /	
Real Estate, Rental, and Leasing	17,610	106	142	103	
	(2.93 percent)	(1.83 percent)	(2.05 percent)	(6.41 percent)	
Retail Trade	Not Reported	400	565	N/A (e)	
	Not Reported	(6.91 percent)	(8.14 percent)	IN/A (°)	
State and Local Government and	66,852	716	545	N/A (f)	
Government Enterprises	(11.12 percent)	(12.36 percent)	(7.85 percent)		
Utilities	3,790 (0.63 percent)	N/A ^(e)	1,324 (19.08 percent)	N/A ^(e)	

Sources: BEA 2014a, BEA 2014b

Notes:

- a. The approximate percentages of jobs within each occupation were calculated from the total jobs in the State of North Dakota (600,923 people).
- b. The approximate percentages of jobs within each occupation were calculated from the total jobs in McLean County (5,791 people).
- c. The approximate percentages of jobs within each occupation were calculated from the total jobs in Mercer County (6,941 people).
- d. The approximate percentages of jobs within each occupation were calculated from the total jobs in Oliver County (1,606 people).
- e. Not Available: Estimates are not shown to avoid disclosure of confidential information; however, the estimates for this industry are included in the total estimated jobs for the county (BEA 2014b).
- f. This industry has less than 10 people employed; however, the estimates for this industry are included in the total estimated jobs for the county (BEA 2014b).

3.8.3 Environmental Justice and Protection of Children

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations..." (Executive Order 12989)." Executive Order 12898 also applies to Federally recognized Indian tribes² and therefore, it is important to determine whether any Indian tribes are present in the area, have treaty or reserved rights for lands and resources in the planning or project area. This requires Federal agencies to determine what, if any, interests Federally recognized Tribes may have in a given planning or project area.

The purpose of EO 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes that may experience common conditions of environmental exposure or effects associated with a plan or project. It is important to note that minority populations, low-income populations, or Tribes may experience common effects from a project even if they do not reside in the immediate study area. EO 12898 requires Federal agencies to ensure opportunities for effective public participation by potentially affected low-income populations, minority populations, or Indian tribes. These populations are considered to be potential "environmental justice populations" of concern that should be addressed throughout the planning effort.

U.S. Census Bureau data is used to determine whether minority populations or low-income populations residing in the study area constitute an "environmental justice population" through meeting any of the following criteria:

- At least one-half of the population is of minority or low-income status; or
- The percentage of population that is of minority or low-income status is at least ten (10) percentage points higher than for the State of North Dakota.

Minority populations, as defined by Council on Environmental Quality (CEQ) guidance under NEPA (40 CFR §§ 1500–1508), include individuals in the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population, or other appropriate unit of geographic analysis. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the previously stated thresholds.

Low-income populations are determined by the U.S. Census Bureau based on poverty thresholds developed each year. Data from the U.S. Census is used to determine whether the populations

² "Indian Tribe" means any Federally recognized Indian or Alaska Native tribes, bands, nations, pueblos, villages or communities that the Secretary of the Interior recognizes to be eligible for special programs and services provided by the United States to Indians because of their status as Indians (25 U.S.C. 479a).

residing in the study area constitute an "environmental justice population" through meeting either: (a) at least one-half of the population is of minority or low-income status, or (b) the percentage of the population that is of minority or low-income status is at least 10 percentage points higher than the entire State of North Dakota.

CEQ guidance does not provide specific criteria for determining low-income populations as it does for minority populations. Therefore, for purposes of this analysis, the criteria for minority populations, which are previously discussed, will be used as the criteria for low-income populations. Low-income and minority population percentages that are "meaningfully greater" are at least 10 percentage points higher than the entire State of North Dakota.

EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, states that each Federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

Race, ethnicity, and poverty characteristics data for 2015³ are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, data from the 2009-2013 ACS Survey are being used. In the State of North Dakota, 89.6 percent of the population was estimated to be White, 5.3 percent was estimated to be American Indian and Alaska Native, 2.3 percent was estimated to be Hispanic, 1.3 percent was estimated to be Black or African American, 1.1 percent was estimated to be Asian, and 0.7 percent was estimated to be some other race. In McLean County, 91.6 percent of the population was estimated to be White, 7.4 percent was estimated to be American Indian and Alaska Native, 1.6 percent was estimated to be Hispanic, and 0.1 percent was estimated to be Asian. In Mercer County, 95.7 percent of the population was estimated to be White, 2.2 percent was estimated to be American Indian and Alaska Native, 1.7 percent was estimated to be Hispanic, 0.9 percent was estimated to be Black or African American, 0.3 percent was estimated to be Asian, and 0.2 percent was estimated to be some other race. In Oliver County, 95.9 percent of the population was estimated to be White, 2.3 percent was estimated to be American Indian and Alaska Native, 2.0 percent was estimated to be Hispanic, 0.6 percent was estimated to be some other race, and 0.1 percent was estimated to be Asian (Census Bureau 2009-2013d). Of the races, the White population had the highest estimated percentages for North Dakota and McLean, Mercer, and Oliver counties. It was estimated that less than 11 percent of the population of North Dakota, 9 percent of McLean County, 5 percent of Mercer County, and 5 percent of Oliver County were within a racial minority (i.e., race other than White alone). In the State of North Dakota, approximately 11.9 percent of the population was estimated to be below the poverty level. In McLean, Mercer, and Oliver counties, approximately 10.9, 7.3, and 7.4 percent, respectively, were estimated to be below the poverty level (Census Bureau 2009-2013c). Please refer to Table 9, Race, Ethnicity, and Poverty Characteristics. The BLM has considered all input from persons or groups regardless of age, income status, race, or other social or economic characteristics. The outreach and public involvement activities taken by the NDFO for this effort, including the consultation of tribes, are described in sections 1.6 Scoping, Public Involvement and Issues, 3.2 Cultural Resources, and 6.1 Consultation and Coordination.

³ 2015 data was not available at the time of EA preparation.

Table 9, Race, Ethnicity, and Poverty Characteristics

RACE AND ETHNICITY ^(a)	STATE OF NORTH DAKOTA	MCLEAN COUNTY	MERCER COUNTY	OLIVER COUNTY
Population	723,857	9,476	8,596	1,869
Percent Under 18 Years of Age	22.3	20.1	21.4	23.4
Percent 65 Years of Age and over	14.4	21.5	16.6	19
Percent White	89.6	91.6	95.7	95.9
Percent Black or African American	1.3	0	0.9	0
Percent American Indian and Alaska Native	5.3	7.4	2.2	2.3
Percent Asian	1.1	0.1	0.3	0.1
Percent Other Race	0.7	0	0.2	0.6
Percent Two or More Races	2.0	0.9	0.8	1.1
Percent Hispanic or Latino ^(b)	2.3	1.6	1.7	2.0
Median Household Income	32,313	33,589	37,990	41,875
Percent of Individuals Living Below Poverty	11.9	10.9	7.3	7.4

Sources: Census Bureau 2009-2013b, Census Bureau 2009-2013c, Census Bureau 2009-2013d

Notes:

a. Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a 90 percent margin of error. In addition to sampling variability, the 2009-2013 ACS Survey estimates are subject to nonsampling error, which is not represented in these tables.

b. A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. The term, "Spanish origin," can be used in addition to "Hispanic or Latino."

Median household income data for 2015 are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, data from the 2009-2013 ACS Survey are being used. The median household incomes for the State of North Dakota and McLean County were estimated at \$32,313 and \$33,589, respectively, which are similar to the median household income estimated in the United States (\$33,419). The median household income for Mercer County was estimated at \$37,990, which was slightly higher than North Dakota and McLean County. Oliver County was estimated to have the highest median household income for the areas studied (\$41,875) (Census Bureau 2009-2013b). The State of North Dakota and McLean, Mercer, and Oliver counties all had lower estimated percentages of individuals living below poverty than the United States (15.4 percent). Of the areas studied, the State of North Dakota had the highest estimated percentage of individuals living below poverty (11.9 percent) and Mercer County had the lowest (estimated at 7.3 percent). The estimated percentage of the total population who were children (i.e., individuals under 18 years of age) living in North Dakota was approximately 22.3 percent. This is similar to the estimated percentage of the total population who were children residing in McLean, Mercer, and Oliver counties (20.1, 21.4, and 23.4 percent, respectively) (Census Bureau 2009-2013c). Please refer to Table 8, Race, Ethnicity, and Poverty Characteristics.



3.9 Soils

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses.

The 1979 U.S. Department of Agriculture (USDA) Soil Survey of McLean County and USDA/NRCS Web Soil Survey identified seven soil types within the section 10 lease tract. Soils within the section 10 lease tract include Williams-Zahl-Zahill (21.8 percent, approximately 72.2 acres), Zahl-Williams loams (18.3 percent, approximately 60.6 acres), Williams-Zahl loams (17.8 percent, approximately 59 acres), Williams-Bowbells loams (17.6 percent, approximately 58.2 acres), Williams-Falkirk loams (16.3 percent, approximately 54.2 acres), Southam silty clay loam (6.1 percent, approximately 20.3 acres), and Parnell silty clay loam (2.2 percent, approximately 7.1 acres) (USDA 1979, USDA/NRCS 2015). Characteristics of these soils are summarized in Table 10. Please refer to **Table 10, Characteristics of Soils in the Section 10 Lease Tract**.

As shown in the table, the identified soils have a moderate susceptibility to sheet and rill erosion and can tolerate higher rates of erosion without loss of productivity. In addition, the soils have a low to moderate infiltration rate and a moderate to high runoff rate.

MAP UNIT SYMBOL	SOIL NAME	PERCENT SLOPE	COMPOSITION SAND (PERCENT)	COMPOSITION SILT (PERCENT)	COMPOSITION CLAY (PERCENT)	EROSION FACTOR ^(a) T	EROSION FACTOR ^(a) KF	HYDROLOGIC SOIL GROUP (b)
C3A	Parnell silty clay loam	0 to 1	12.4	47.9	39.7	5	0.37	C/D
C5A	Southam silty clay loam	0 to 1	10.3	49.4	40.2	5	0.32	C/D
C132B	Williams-Zahl loams	3 to 6	33.6	38.1	28.3	5	0.37	С
C132C	Williams-Zahl-Zahill complex	6 to 9	33.6	38.1	28.3	5	0.37	С
C135D	Zahl-Williams loams	9 to 15	33.2	39.0	27.8	5	0.37	С
C164B	Williams-Falkirk loams	3 to 6	34.8	35.2	30.0	5	0.32	С
C210A	Williams-Bowbells loams	0 to 3	33.6	38.1	28.3	5	0.37	С
C210B	Williams-Bowbells loams	3 to 6	33.6	38.1	28.3	5	0.37	С

Sources: USDA 1979, USDA/NRCS 2015

Key:

T = Factors that estimate maximum average annual rates of erosion by wind and water that will not affect crop productivity. Values range from 1 for shallow soils to 5 for very deep soils. Soils with higher T values can tolerate higher rates of erosion without loss of productivity.

Kf = The erodibility of material less than 2 millimeters in size. Values range from 0.02 to 0.69. Soils with higher Kf values indicate greater susceptibility to erosion.

C = Hydrologic Soil Group with a moderate to low infiltration rate and moderate runoff.

D = Hydrologic Soil Group with a low infiltration rate and high runoff.

Notes:

- a. Erosion factors indicate susceptibility of a soil to sheet and rill erosion by water.
- b. Hydrologic Soil Groups are based on estimates of runoff potential according to the rate of water infiltration under the following conditions: soils are not protected by vegetation, soils are thoroughly wet, and soils receive precipitation from long-duration storms.

3.10 Threatened, Endangered, and Candidate Species

Protected and sensitive biological resources include Federally listed (endangered or threatened), and candidate species designated by the USFWS. An endangered species is one that is in danger of extinction throughout all or a significant portion of its range, while a threatened species is one that is likely to become endangered in the foreseeable future. A candidate species is a plant or animal for which the USFWS has sufficient information on its biological status and threats to propose it as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities. While candidate species are not legally protected under the ESA, it is within the spirit of the ESA to consider said species as having significant value and worth protecting. Federal species of concern are not protected by law; however, these species could become listed, and therefore are given consideration when addressing biological resource impacts of an action.

Sensitive habitats include those areas designated by the USFWS as Critical Habitat protected by the ESA and sensitive ecological areas as designated by state or Federal rulings. Critical Habitat includes specific areas that are occupied by a species at the time of listing or unoccupied areas that are considered essential to the conservation and/or recovery of a species. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats). In accordance with Section 7 of the ESA, each Federal agency is required to ensure the following two criteria: (1) any action funded or carried out by such agency must not be likely to jeopardize the continued existence of any Federally listed endangered or threatened species and (2) no such action can result in the destruction or adverse modification of habitat of such species that is determined to be critical by the Secretary of the Interior.

According to the USFWS Species by County Report for McLean County, there are three endangered species (whooping crane [Grus americana], least tern [Sterna antillarum], and pallid sturgeon [Scaphirhynchus albus]), four threatened species (piping plover [Charadrius melodus], red knot [Calidris canutus rufa], Dakota skipper [Hesperia dacotae], and Northern long-eared bat [Myotis septentrionalis]), and one candidate species (Sprague's pipit [Anthus spraqueii]) (USFWS Undated). As of April 4, 2016, the USFWS determined that the Sprague's pipit no longer meets the definition of a candidate species under the ESA. The USFWS found that the habitat loss from agriculture in the Sprague's pipit's key breeding grounds does not pose a significant risk, historic rates of population decline are expected to stabilize, and the Sprague's pipit is not as affected as once thought by energy development and connecting roads. Studies also show that Sprague's pipits are more mobile, adaptable, and found in more areas than expected in wintering habitat. Therefore, the Sprague's pipit is not discussed in further detail in this EA. The gray wolf (Canis lupus) is an endangered species that was not listed on the USFWS Species by County Report for McLean County, as this species is uncommon in North Dakota. However, individual wolves occasionally pass through the state; therefore, it is discussed further in detail in the following subsections. None of the endangered or threatened species were observed during the fish and wildlife field surveys conducted in 2015 for the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations.

Some of the information in the following substations was obtained from the Falkirk Mine Fish and Wildlife Management Plan, which is in Section 2-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*.

Whooping Crane

The whooping crane breeds, migrates, winters, and forages in a variety of wetland and other habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields. Whooping cranes breed and nest in wetland habitat, where bulrush is the dominant vegetation type; however, cattail, sedge, musk-grass, and other aquatic plants are also common. The whooping crane is a bi-annual migrant that travels from its summer habitat in central Canada across the Great Plains of the United States to its wintering grounds on the Texas coast. During migration, whooping cranes use a variety of habitats; however, wetland mosaics appear to be the most suitable. For feeding, whooping cranes primarily use shallow, seasonally and semi-permanently flooded palustrine wetlands for roosting, and various cropland and emergent wetlands.

Palustrine wetlands include all nontidal wetlands dominated by trees, shrubs, emergent, mosses, or lichens (USFWS 2015b).

It has been well documented that whooping cranes will alter their landing and flight patterns to avoid areas of human disturbance including roadways, buildings, and structures. Studies have shown whooping crane roost sites to have varying mean distances to roadways, ranging from 2,021 to 3,839 feet (Johns et al. 1997, Ward and Anderson 1987). Whooping cranes have also been shown to avoid roosting near human-made structures. Mean documented avoidance distances range from 2,343 feet during the spring migration to 3,402 feet during the fall migration, with respect to structures and buildings (Johns et al. 1997).

Based on these findings, and for the purposes of this analysis, it has been assumed that whooping cranes would avoid using habitat within 2,021 feet of existing roadways and 2,343 feet of existing structures and buildings indicating a potential short-term loss of roosting habitat. The USFWS National Wetlands Inventory mapped 29 palustrine emergent wetlands within the section 10 lease tract that are seasonally flooded. Surface water is present in these wetlands for extended periods (especially early in the growing season) but absent by the end of the growing season in most years (USFWS 2015a). Cropland is located within 1 mile of the section 10 lease tract. In addition, the section 10 lease tract is located in the Central Flyway, where 75 percent of confirmed whooping crane sightings have occurred (USFWS 2010). According to the Falkirk Mine Fish and Wildlife Management Plan, cropland habitat represents the predominant agricultural or human-made habitat present in the area, and the cropland is generally considered to be of only minimal value to the area wildlife, due to such intensive agricultural management practices. In general, the most value of the cropland habitats to wildlife is that of providing a seasonal source of food to animals inhabiting adjacent habitats and to migratory waterfowl and shorebirds.

Least Tern

In North Dakota, the least tern uses sparsely vegetated sandbars on the Missouri River and can be found from the Garrison Dam south to Lake Oahe. Birds nest, raise young, and relax on the barren river sandbars. Approximately 100 pairs breed in North Dakota (USFWS 2013, USFWS 2015c). According to the USACE Missouri River Recovery Least Tern and Piping Plover Data Management System, historical interior least tern sightings have occurred along the shoreline of the Missouri River and Lake Sakakawea. The Missouri River and Lake Sakakawea are approximately 15.3 miles west and 39.2 miles north-northwest of the section 10 lease tract, respectively. No potential habitat for the least tern exists within the section 10 least tract.

Pallid Sturgeon

Pallid sturgeon are a bottom-oriented, large river obligate fish that inhabits the Missouri and Mississippi rivers and some tributaries from Montana to Louisiana. The species is typically found in areas where relative depths (i.e., the depth at the fish location divided by the maximum channel cross section depth expressed as a percent) exceed 75 percent. Spawning occurs between March and July, with lower latitude fish spawning occurring earlier than those in the northern portion of the range. Adult pallid sturgeon can move long distances upstream prior to spawning, and females likely spawn at or near the apex of these movements. Spawning occurs over firm substrates, in deeper water, with relatively fast, turbulent flows, and is driven by several environmental stimuli including flow, water temperature, and day length (USFWS 2015d). The Missouri River is approximately 15.3 miles west of

the section 10 lease tract. Potential habitat for the pallid sturgeon exists in Lake Sakakawea. Lake Sakakawea is approximately 39.2 miles north-northwest of the section 10 lease tract. No potential habitat occurs within the section 10 lease tract.

Piping Plover

In western North Dakota, suitable habitat for the piping plover occurs along the Missouri and Yellowstone rivers in the form of riverine sandbars, gravel beaches, and flat sandy beaches containing sparse vegetation. Suitable habitat also consists of alkali areas of wetlands, which occur throughout North Dakota. According to the USACE Missouri River Recovery Least Tern and Piping Plover Data Management System, historical piping plover sightings have occurred along the shoreline of Lake Sakakawea. Critical Habitat for the Northern Great Plains population of piping plovers has been designated on alkali lakes and wetlands and Yellowstone and Missouri Rivers in North Dakota (USFWS 2015e). The Missouri River and Lake Sakakawea are approximately 15.3 miles west and 39.2 miles north-northwest of the section 10 lease tract, respectively. No suitable or potential habitat or Critical Habitat occurs within the section 10 lease tract.

Red Knot

The red knot migrates during the spring and fall between breeding grounds in northern Canada and wintering grounds in the southeastern United States, northeastern Gulf of Mexico, northern Brazil, and Tierra del Fuego in South America. While a majority of red knots follow migration routes along the east and west coasts of the United States, small numbers of this species follow an inland migration route across the Midwest, along the Great Lakes. Preferred stopover habitat in North America includes sandy or gravely beaches, tidal mudflats, salt marshes, shallow coastal impoundments, and peat banks. Preferred prey found in nonbreeding habitats includes snails, mollusks, and insect larvae (USFWS 2015f). There have been no documented sightings of the red knot within the section 10 lease tract, as habitat is lacking. Potential habitat exists along the Missouri River, Lake Audubon, and Lake Sakakawea; however, no suitable habitat for the red knot occurs within the section 10 lease tract. The Missouri River, Lake Audubon, and Lake Sakakawea are approximately 15.3 miles west, 5.1 miles north, and 39.2 miles north-northwest of the section 10 lease tract, respectively.

Dakota Skipper

The Dakota skipper is presumed to have historically ranged from southern Saskatchewan across North Dakota, South Dakota, and Minnesota, and potentially into Iowa and Illinois. It is now considered extirpated from Iowa and Illinois and occurs in fragmented portions of this range in Minnesota, North Dakota, South Dakota, Manitoba, and Saskatchewan. Preferred habitat includes two grassland types: Iow (wet) grassland dominated by bluestem grasses (*Andropogon* and *Schizachyrium* spp.), wood lily (*Lilium philadephicum*), harebell (*Campanula rotundifolia*), and smooth camas (*Zigadenus elegans*); and upland (dry) grassland on ridges and hillsides dominated by bluestem, needles grasses (*Stipa* spp.), pale purple coneflower (*Echinacea* spp.), upright coneflower (*Ratibida columnifera*), and blanket flower (*Gaillardia* spp.). Dakota skippers remain in the larvae stage throughout most of the year and are most visible during their adult flight stage, which occurs from mid-June to early July. Populations have declined due to widespread conversion of native grassland (USFWS 2015g).

Dakota skipper dispersal is limited due in part to a short adult life span and single annual flight. Maximum dispersal distance for the Dakota skipper is believed to be approximately 0.6 miles; therefore, areas containing suitable habitat are considered to be permanently extirpated unless located near a site actively generating sufficient emigrants. Only a small fraction of the grassland in North Dakota has been surveyed for the Dakota skipper; however, it is thought that a significant portion of the un-surveyed land is not suitable for the Dakota skipper (USFWS 2015g). Critical Habitat for the Dakota skipper has been designated for 12 prairie units in North Dakota. The nearest Critical Habitat to the section 10 lease tract is Unit 5, along North Dakota Highway 14, in McHenry County, ND (USFWS 2015j). Unit 5 is approximately 54 miles northeast of the section 10 lease tract. There is no potential habitat for the Dakota skipper within the section 10 lease tract, as almost all of the land within the section 10 lease tract is devoted to agriculture and cultivated for the production of crops.

Northern Long-eared Bat

The Western population of northern long-eared bats occurs partially in North Dakota, where the bats have been observed during the summer in the Turtle Mountains, Missouri River Valley, and Badlands. No hibernacula (i.e., overwintering sites such as caves, abandoned mines, or similar constructions) are known to exist in North Dakota; however, this may be a function of lack of adequate survey data (78 Federal Register [FR] 191, October 2, 2013). Suitable habitat for summer maternity/nonmaternity activities and spring staging/fall swarming includes forests, woodlots, fence rows, riparian forests, and other wooded corridors. Density and canopy cover is variable within these forested habitats, which could be interspersed with wetlands, agricultural or fallow fields, or pastures. Potential roost sites include live trees or snags that are greater than or equal to 3 inches in diameter at breast height and can include exfoliating bark, cracks, crevices, or cavities. The species is known to switch roost trees about every two days over the course of the summer, and therefore, areas with a large number of trees are preferable (Foster and Kurta 1999). Isolated trees might be potential roost sites if they exhibit the characteristics previously described and are less than 1,000 feet from the nearest roosting site or suitable forested habitat (USFWS 2014, USFWS 2015h). There are no suitable or potential winter habitats within the section 10 lease tract. Sparsely vegetated shelterbelts are located within the section 10 lease tract that could provide suitable summer habitat for the northern long-eared bat.

Gray Wolf

The gray wolf is a keystone species (i.e., species that has a disproportionately large effect on its environment relative to its abundance) capable of surviving in a wide range of habitats including forests, mountains, and grasslands. Gray wolves dispersing through North Dakota west of the Missouri River and United States Highway 83 (US-83) remain classified as endangered. Historically, its preferred habitat includes biomes such as boreal forest, temperate deciduous forest, and temperate grassland (USFWS 2011, USFWS 2015i).

The section 10 lease tract does not contain significantly forested areas; however, tame grassland occurs within the section 10 lease tract. Potential habitat for the gray wolf could exist within these grassland areas; although, it is extremely limited and unlikely to be occupied. According to the Falkirk Mine Fish and Wildlife Management Plan, tame grassland consists of land used for long-term production of predominately adapted, domesticated species of forage plants to be grazed by livestock or occasionally cut and cured for livestock feed. The significance of tame grassland habitat to wildlife varies considerably depending on moisture, vegetation composition, and land management practices of a given area.

3.11 Transportation Resources

Transportation resources include major and minor roadways (including haul roads) located in the project area.

The section 10 lease tract is located approximately 1.2 miles northeast of US-83 and approximately 1mile north of North Dakota Highway 200 (ND-200). County Highway 23 is located approximately 0.7 miles west of the lease tract, and 4th Street NW and 5th Street NW are located approximately 0.3 miles south, and 0.7 miles north of the lease tract, respectively. Several smaller paved and unpaved roads are also located near the lease tract.

Coal is transported from the pit in bottom-dump haul trucks to Falkirk's truck dump/crushing facility. From there, it is conveyed approximately 5,300 feet to the Coal Creek Station. Haul roads, and ancillary roads are located near the lease tract to support mine traffic.

The transportation Facilities Map in Section 3.5.2 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations shows the location of haul roads and the general location of ancillary haul roads. Haul Road Section 1, is the principal haul road located near the section 10 lease tract. It extends north to the landfill access road. Haul Road Section 3 extends from the intersection of Haul Road Section 1 and the landfill access road, north to ND-200, where a bridge (ND-200 Overpass) facilitates east-west highway traffic passing over the haul road. Temporary haul roads are located off Haul Road Section 3, to support mining and reclamation operations along the southern side of ND-200. Several other haul roads (e.g., Island Haul Road Section A, Island Haul Road Section OB1) are also located near the lease tract and supports mine traffic. Please refer to *Appendix B, Permit to Engage in Surface Coal Mining and Reclamation Operations.*

3.12 Vegetation

Field vegetation surveys, including types of vegetation, cover, and production, were conducted as part of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. In addition, land use types were noted during the field survey portion of the project kickoff meeting held on March 23, 2015. Land uses and vegetation characteristics are similar to the surrounding areas where cropland is intermixed with native and tame prairie rangelands. Land uses and vegetation patterns reflect local and regional economic conditions along with climatic, geologic, and soil factors. The section 10 lease tract contains a mixture of cropland, tame grassland, agriculturally developed land, shelterbelts, minor amounts of trees, and several freshwater emergent wetlands (i.e., palustrine emergent wetlands).

According to the 2013 North Dakota Department of Agriculture County and City Listed Noxious Weeds, 11 state noxious weeds are identified for the state. The noxious weed laws are enforced by all cities and counties in North Dakota. Counties and cities have the option to add additional weeds to a list for enforcement only in their jurisdiction. Of the 11 listed state noxious weeds, five are known to occur within McLean County (NDDA 2013).

3.13 Visual Resources

Visual resources are the natural and human-made features that give a particular setting or area its aesthetic qualities. These features define the landscape character of an area and form the overall impression that an observer receives of that area. Evaluating the aesthetic qualities of an area is a subjective process because the value that an observer places on a specific feature varies depending on their perspective. In general, a feature observed within a landscape can be considered as "characteristic" (or character-defining) if it is inherent to the composition and function of the landscape.

The region of influence for visual resources associated with the section 10 lease tract consists of rural development characterized by rolling topography, farmland, rangeland, and homesteads. The section 10 lease tract is in McLean County, North Dakota; therefore, only this county is discussed further in detail.

McLean County is considered rural, with a very low population density of approximately four people per square mile. Water bodies (i.e., lakes, streams, rivers, and creeks) in McLean County include Lake Audubon, Lake Sakakawea, Lake Nettie, Nelson Lake, Mud Lake, Postel Lake, Howells Lake, Minehan Slough, Lake Holmes, Lost Lake, the Missouri River, Buffalo Creek, Deepwater Creek, Wolf Creek, Snake Creek, Turtle Creek, Garrison Creek, the Coal Lake Coulee, Yanktonai Creek, and Charging Creek. Parks and management areas in McLean County include the Lake Susie National Wildlife Refuge, Custer Mine State Game Management Area, Sportsmen's Centennial Park, De Trobriand State Game Management Area, Deepwater Creek Public Use Area, Deepwater Creek State Game Management Area, Douglas Creek Public Use Area, Douglas Creek State Game Management Area, Lost Lake National Wildlife Refuge, and Riverdale State Game Management Area. Of the previously listed resources, Lake Sakakawea, Lake Audubon, Wolf Creek, and the De Trobriand State Game Management Area are nearest to the section 10 lease tract. A small portion of the section 10 lease tract is within the viewshed of Lake Sakakawea; however, Lake Audubon, Wolf Creek, and the De Trobriand State Game Management Area are not likely within the viewshed of the section 10 lease tract.

The Coal Lake Wildlife Management Area, located in eastern McLean County is managed by the North Dakota State Game and Fish Department. The wildlife management area was developed through a program in which The Falkirk Mining Company and Great River Energy donated approximately 729 acres of land to the North Dakota Department of Transportation. The area is open to public access for fishing, hunting, trapping, and other outdoor activities (NDDOT 2014). Portions of the Coal Lake Wildlife Management Area may be within the viewshed of the section 10 lease tract.

The section 10 lease tract is located approximately 1.2 miles northeast of US-83 and approximately 1mile north of North Dakota Highway 200 (ND-200). County Highway 23 is located approximately 0.7 miles west of the lease tract, and 4th Street NW and 5th Street NW are located approximately 0.3 miles south, and 0.7 miles north of the lease tract, respectively. Several smaller paved and unpaved roads are also located near the section 10 lease tract. These highways, streets, and smaller paved and unpaved roadways could be within the viewshed of the section 10 lease tract, depending on how close the viewer was located to the lease tract. An unoccupied farmhouse is located in the southwestern corner of the lease tract. The Falkirk Mine has recently purchased this property.

3.14 Water Resources (Groundwater, Surface Water, Wetlands and Waters of the United States)

Water resources are natural and human-made sources of water that are available for use by, and for the benefit of, humans and the environment. Hydrology entails the distribution of water to water resources through the processes of evapotranspiration, atmospheric transport, precipitation, surface runoff and flow, and subsurface flow. Groundwater is water that exists in the saturated zones beneath the Earth's surface. Surface water resources generally consist of wetlands, lakes, rivers, and streams. Wetlands are defined as areas that are inundated by surface or groundwater with a frequency to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Groundwater quality and quantity are regulated under several different programs. The Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act (CWA), provides the authority to the EPA and U.S. Army Corps of Engineers (USACE) to establish water quality standards, control discharges into surface and ground waters, develop waste treatment management plans and practices, and issue permits for discharges of pollutants (Section 402) and for dredged or fill material in waters of the United States (Section 404). The Safe Drinking Water Act (SDWA) of 1974, as amended, requires many actions to protect drinking water and its sources (i.e., rivers, lakes, reservoirs, springs, and groundwater wells⁴). The Federal Underground Injection Control regulations, authorized under the SDWA, require a permit for the discharge or disposal of fluids into a well. The Federal Sole Source Aquifer regulations, also authorized under the SDWA, protect aquifers that are critical to water supply.

Waters of the United States are defined within the CWA, as amended, and jurisdiction is addressed by the EPA and USACE. These agencies assert jurisdiction over (1) traditional navigable waters; (2) wetlands adjacent to navigable waters; (3) non-navigable tributaries of traditional navigable waters that are relatively permanent, where the tributaries typically flow year-round, or have continuous flow at least seasonally (e.g., typically 3 months); and (4) wetlands that directly abut such tributaries. Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into waters of the United States including wetlands. Encroachment into waters of the United States and wetlands requires a permit from the state and Federal Government.

Some of the information contained in the following subsections was obtained from Sections 2-2, 2-5, and 2-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*.

Groundwater

The Sentinel Butte and Bullion Creek formations are part of the Fort Union Group, which contain lignite coal beds that are aquifers (Schobert 1995). The major hydrostratigraphic units in the area of the section 10 lease tract consist of glacial till and glacially-derived, fluvial sands and gravels

⁴ The SDWA does not regulate private wells that serve fewer than 25 individuals.

associated with the Coleharbor Formation; the Hagel A coal bed, Hagel B coal bed, and the C sand, comprising the Sentinel Butte Formation; and the Tavis Creek coal bed, Coal Lake Coulee coal bed, and the Hensler sand, comprising the Bullion Creek Formation. The Coleharbor Formation is the shallowest aquifer in the area, and water wells in the Coleharbor Formation typically have very low vields and capacity. Stratigraphically, the Hagel A bed (ranging from 0.5 to 11.5 feet thick) is the highest, most significant aquifer in the area. Some areas of the Hagel A bed are confined while other areas are under water table conditions. The Hagel B bed (ranging from 0.5 to 6.3 feet thick) occurs below the Hagel A bed. The interburden thickness between the Hagel A and Hagel B beds is generally less than 10 feet, but can range from approximately 0.1 to 65 feet. In some areas, the Hagel B bed are unsaturated to dry, but this aquifer is generally confined. Recharge of the Hagel B bed is primarily leakage from the overlying Hagel A bed. Occurring approximately 30 feet below the Hagel B bed is the C bed. The C bed (typically less than 2 feet thick) is a confined aquifer that receives recharge primarily through leakage from the Hagel B bed. The general trend of the groundwater flow in the Hagel A, Hagel B, and C beds is from the upland recharge areas, to the Missouri River Valley in the south and west, towards the Weller Slough Trench, in the north, and towards the Coal Lake Coulee Trench, to the east. Occurring approximately 65 feet below the C bed is the Tavis Creek bed (ranging from 0.5 to 12.2 feet thick). Groundwater flow in the Tavis Creek bed occurs under confined conditions from the Weller Slough toward the Missouri River. Recharge of this aquifer is primarily from lateral flow originating from the north, and from the Weller Slough and associated trench-filled drainages.

The Coal Lake Coulee bed is under confined conditions and occurs approximately 25 to 50 feet below the Tavis Creek bed. Flow direction is similar to that of the Tavis Creek bed. Recharge of this aquifer is from the Weller Slough Trench and leakage from the overlying Tavis Creek bed. The Hensler sand is the first aquifer occurring below the Coal Lake Coulee bed. It is part of numerous discontinuous sand units that comprise this aquifer zone. Flow in the Hensler sand takes place under confined conditions from the Weller Slough, toward the Missouri River. Recharge of this aquifer is primarily from lateral flow originating from the north, and from leakage of overlying aquifers. Maps of the groundwater resources in the lease tract area can be found in Sections 2-2 and 2-5 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*. Well certification programs undertaken by the Falkirk Mine have identified 58 water supply wells, 34 of which are not being used, in the area of the section 10 lease tract. All of the wells, including those that were identified as inoperable or abandoned, are certified and water samples have been taken, where possible. There are no water supply wells within the boundary of the section 10 lease tract. Please refer to *Figure 8, Location of Water Wells in the Section 10 Lease Tract Area*.





Figure 8, Location of Water Wells in the Section 10 Lease Tract Area

Surface Water

The section 10 lease tract and adjacent areas consist of a glacially modified upland area of low relief. Ephemeral streams with multi-basinal to parallel drainage patterns drain the area. Drainage density and stream frequency is low. The section 10 lease tract and adjacent areas are within three drainage basins (Basin A – Underwood Coulee and Basins B and C – Coal Lake Coulee), and the area is divided into five major watersheds with the majority draining to Coal Lake. Specifically, the lease tract is located in the Lake Audubon Watershed. Basin A is a poorly drained basin that drains an area of approximately 12.14 square miles. The drainage pattern of Basin A is multi-basinal to parallel. The Underwood Coulee, which is a major ephemeral stream of the basin, only has one main tributary and ultimately discharges into Samuelson's Slough. Water flows in the channel for only a few days each year and occasionally can inundate large areas. Where undisturbed, the channel is a shallow, concave depression and is generally free of vegetation. The bare channel has a very small discharge capacity. Throughout most of the area, the channel has been obliterated by agricultural activity. The Coal Lake Coulee (Basins B and C) is a hydrologically unique area that acts as a drain for the hydrostratigraphic units of the section 10 lease tract area. Most of the drainage is from perimeter areas through ephemeral stream channels to the interior sloughs, including Coal Lake, within the channel fill. Drainage of these interior sloughs is limited to nonexistent. The only external drainage in the valley of the Coal Lake Coulee begins near its southern end, where an approximate 900-acre drainage (Basin B) forms a channel in the meltwater fill valley and drains to the unnamed slough that eventually drains to the Missouri River.. Current stream activity in Basin C is insufficient to form a distinctive channel or provide significant water to areas that could be easily flood irrigated. Water quality is "good" from the side drainages to "marginal" in the valley proper. The watersheds are drained by ephemeral streams. There are no intermittent streams occurring within the section 10 lease tract. Maps of the surface water resources in the area of the section 10 lease tract can be found in Sections 2-5 and 2-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations.

Wetlands and Waters of the United States

Pre-mining land use analysis conducted in December 2006 for the section 10 lease tract and surrounding areas identified seven temporary wetlands (0.9 acres) and 24 seasonal wetlands (68.7 acres) within the section 10 lease tract. The USFWS National Wetlands Inventory mapped 30 wetlands within the section 10 lease tract, 29 of which are freshwater emergent wetlands and one of which is a freshwater pond. All of the freshwater emergent wetlands mapped are palustrine emergent wetlands that are seasonally flooded. Palustrine emergent wetlands include all nontidal wetlands dominated by trees, shrubs, emergent, mosses, or lichens, and are characterized by erect, rooted, and herbaceous hydrophytes. Surface water is present in these wetlands for extended periods (especially early in the growing season) but is absent by the end of the growing season in most years (USFWS 2015a). No waters of the United States were identified within the section 10 lease tract during the pre-mining land use analysis. On May 31, 1994, the Falkirk Mine received approval from the North Dakota State Water Commission regarding their request (application) to drain in the Falkirk Mine's Northeast Permit Area No. 1, which includes the section 10 lease tract.



This chapter summarizes the potential direct and indirect impacts of the Proposed Action and No Action Alternative. It also identifies potential avoidance, minimization, and mitigation measures for adverse impacts.

For purposes of this analysis, direct effects are caused by the action and occur at the same time and place when the action is implemented (40 CFR 1508.8). Indirect effects are also caused by the action, but occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts might include growth-inducing impacts and other impacts related to induced changes in the pattern of land use, population density, or growth rate and related impacts on air and water and other natural systems, including ecosystems. (40 CFR 1508.8).

4.1 Air Quality and Climate Resources

Air quality impacts were assessed by evaluating existing operations at the mine, reviewing local and regional air monitoring data, and estimating the potential magnitude of an increases or decreases in air emissions from the alternatives. Air quality impacts would be considered significant if emissions would (1) increase ambient air pollution concentrations above the NAAQS; (2) contribute to an existing violation of the NAAQS; (3) interfere with, or delay timely attainment of, the NAAQS; (4) impair visibility within Federally mandated PSD Class I areas; or (5) result in the potential for any new stationary sources to be considered major sources of emissions, as defined in 40 CFR § 52.21 and 40 CFR § 51.165 (total emissions of any pollutant subject to regulation under the CAA that are greater than 250 TPY for attainment areas and 100 TPY or less for nonattainment areas, depending on the severity of nonattainment).

Emissions from operations at Falkirk Mine are addressed in the Air Pollution Control Minor Source Permit to Operate (permit no. 079002) issued by the North Dakota Department of Health in April 2016 and expires April 2021. The permit limits annual coal production through emissions generating equipment at the mine and specifies emission limits for particulate matter and opacity and required air pollution control equipment. The air permit conditions limit total emissions from the mine to below major source thresholds and prevent adverse impacts to NAAQS.

Proposed Action

Under the Proposed Action, BLM would be authorizing leasing activities and no direct or indirect impacts on air quality would be expected to occur from this action. However, the intent and purpose of leasing is to develop the coal resources within the proposed lease tract. Therefore, potential direct and indirect air quality impacts from surface mining operations have been evaluated.

Under the proposed action, the primary air pollutant of concern would be PM emissions generated from surface mining operations consisting of land clearing, topsoil, subsoil, and overburden removal, coal extraction, transport, temporary storage, crushing, and conveyance to the Coal Creek Power Station. Because these particulate emissions are not emitted from a single point such as an exhaust vent or smoke stack, they are referred to as fugitive dust emissions. Fugitive dust control measures are specified in the mine's air permit and a fugitive dust control plan is required as part of its mine

permit. In accordance with the Fugitive Dust Control Plan in Section 3-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations, fugitive dust emissions would be reduced by removing topsoil and subsoil in increments, only disturbing areas necessary for operations at any one time. All areas of disturbance would be stabilized as soon as possible using approved revegetation techniques. Fugitive dust from equipment activities and traffic would be reduced by treating road surfaces with approved stabilization agents; using water on roads and problem areas associated with construction, leveling, and other traffic activities; and using dust suppressants during dry periods on haulage and access roads. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations.* The Falkirk Mine would also be required to implement fugitive dust control measures listed in the air permit.

The proposed action is a continuation of current surface mining and would not authorize a change in already permitted actions or in production levels. Since there would be no modification of existing air emission sources and no new sources, mining operations would continue to occur under the current air quality permit. The Proposed Action would not result in a production increase at the mine. Activity levels and equipment use at the mine would remain the same but would move into the project area. Employee levels would remain essentially unchanged. Therefore, emissions would remain at or near current levels as existing mining operations. The Falkirk Mining Company operated a particulate monitoring network at the mine for over two years during which no exceedance of PM NAAQS were measured. NDDH approved Falkirk's request to terminate PM monitoring on Dec. 31, 1992. No NAAQS exceedances or near exceedances are expected to occur. Please refer to *Table 11, Proposed Action Potential Emissions*.

Table 11, Proposed Action Potential Emissions

ACTIVITY	EMISSIONS GENERATING SOURCE	TYPE OF EMISSIONS ¹	POTENTIAL DURATION	POTENTIAL LEVEL OF IMPACT	ESTIMATED INCREASE/DECREASE IN EMISSIONS FROM PROPOSED ACTION	EMISSIONS CONTROLS ^{2,3}
Drilling (Exploratory and Cropline)	rotary drill rig	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (a few days)	negligible - minor	potential minor, temporary increase in emissions of listed pollutants	NDAC 33-15-08-01
	construction dust	РМ	temporary (a few days)	negligible - minor	potential minor, temporary increase in emissions of listed pollutants	Fugitive Dust Control Plan, and NDAC 33-15-17
Surface Water Structures Construction	construction equipment (diesel combustion)	PM, NOx, SOx, CO, CO₂, HAPs	temporary (a few days)	negligible - minor	potential minor, temporary increase in emissions of listed pollutants	NDAC 33-15-08-01
	construction dust	РМ	temporary (a few days)	negligible - minor	potential minor, temporary increase in emissions of listed pollutants	Fugitive Dust Control Plan, and NDAC 33-15-17
Topsoil and Subsoil Removal	construction equipment (diesel combustion)	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (days-months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01
	construction dust	РМ	temporary (days-months)	minor	no increase in emissions over existing operations	Fugitive Dust Control Plan, and NDAC 33-15-17
Haul Road and Pit Ramp Construction	construction equipment (diesel combustion)	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (days-months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01
	construction dust	PM	temporary (days-months)	minor	no increase in emissions over existing operations	Fugitive Dust Control Plan, and NDAC 33-15-17



ΑCTIVITY	EMISSIONS GENERATING SOURCE	TYPE OF EMISSIONS ¹	POTENTIAL DURATION	POTENTIAL LEVEL OF IMPACT	ESTIMATED INCREASE/DECREASE IN EMISSIONS FROM PROPOSED ACTION	EMISSIONS CONTROLS ^{2,3}
Overburden Removal	Electric Draglines	PM-fugitive dust indirect-CO ₂	temporary (months)	minor	no increase in emissions over existing operations	Fugitive Dust Control Plan, and NDAC 33-15-17
	construction equipment (diesel combustion)	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01
Coal Mining, Loading, and Hauling	Dozers, loaders, electric shovels, haul trucks	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01 Fugitive Dust Control Plan, and NDAC 33-15-17
	fugitive dust	PM	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01 Fugitive Dust Control Plan, and NDAC 33-15-17
Coal Processing Primary Crushing	fugitive dust	PM	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-12 Fabric Filter Dust Control System, and PM emission limit = 1.0 lb/hr, and Opacity limit = 20% Production Limit = 20 million tons/year
Coal Processing - Secondary Crushing and Conveying	fugitive dust	PM	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-12 Fabric Filter Dust Control System, and PM emission limit = 1.0 lb/hr, and Opacity limit = 20% Production Limit = 34 million tons/year



ΑCTIVITY	EMISSIONS GENERATING SOURCE	TYPE OF EMISSIONS ¹	POTENTIAL DURATION	POTENTIAL LEVEL OF IMPACT	ESTIMATED INCREASE/DECREASE IN EMISSIONS FROM PROPOSED ACTION	EMISSIONS CONTROLS ^{2,3}
Coal Storage Silo	fugitive dust	РМ	temporary (months)	minor	no increase in emissions over existing operations	Opacity limit = 20%
Coal Transport	Haul Trucks (diesel combustion)	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01 Fugitive Dust Control Plan, and NDAC 33-15-17
	Conveyor system	РМ	currently not in service	currently no emissions	no increase in emissions over existing operations	NDAC 33-15-08-01 Fugitive Dust Control Plan, and NDAC 33-15-17

1 PM=particulate matter, NOx=nitrogen oxides, SOx=sulfur oxides, CO=carbon monoxide, CO₂=carbon dioxide, HAPs= hazardous air pollutants. 2 Emission control requirements from North Dakota Dept. of Health Air Pollution Control Minor Source Permit to Operate #079002, April 2016. 3 NDAC=North Dakota Administrative Code, Chapter 33-15 Air Pollution Control.



Coal mining operations associated with the Proposed Action are not anticipated to cause or contribute to a violation of any NAAQS or NDAAQS, expose sensitive receptors to substantially increased pollutant concentrations, or exceed any emissions limits listed in the Falkirk Mine Permit to Operate (Permit No. O79002). In accordance with the Falkirk Mine Permit to Operate, the owner/operator would record the monthly coal production (tons per month) on the first day of every month and determine the total coal production (tons per year) during the previous 12-month period. Anytime the total coal production exceeded the allowable production limit listed in the Permit (20.0 x 106 TPY for the truck dump, primary crushing station, and conveyor; 34.0 x 106 TPY for the secondary crushing station and conveyor; and 14.0 x 106 TPY for the east dump/primary crusher/cable belt system), the owner/operator would notify the NDDH within 10 working days. In addition, the owner/operator would conduct mining operations at the section 10 lease tract in accordance with 40 CFR Part 60, Subpart Y, Standards of Performance for New Stationary Sources: Coal Preparation Plans, as incorporated by Chapter 33-15-12 of the North Dakota Air Pollution Control Rules (NDDH 2011).

The Proposed Action would contribute to emissions of GHGs during surface mining, coal transport, crushing, and stockpiling at the mine site. Additional (indirect) emissions of GHGs would be generated when the coal is conveyed, temporarily stored, and combusted at the power station.

Methane (CH₄) can be emitted from surface coal mines as the overburden is removed, exposing the coal bed(s). The majority of the CH₄ would likely be emitted from the coal through natural fractures (i.e., cleats) when it is uncovered and exposed along the pit face within the section 10 lease tract. Minor amounts of CH₄ can also be emitted during post-mining activities (i.e., coal transport, crushing, and conveying). Following coal removal and loading into haul trucks, it would be expected that very little CH₄ would remain in the coal.

Under the conservative assumption all of the estimated 4.41 million tons of in place lignite coal would be mined, processed, and combusted in a single year, the estimated GHG emissions would be approximately 6.19 MMTCO2eq. Therefore, estimated GHG emissions due to mining activities under the Proposed Action would represent less than 0.09 percent of total U.S. GHG emissions and approximately 11 percent of GHG emissions in North Dakota and estimated GHG emissions from mining and post mining activities under the Proposed Action would represent less than 0.7 percent of GHG emissions from North Dakota surface mines. Please refer to *Table 12, Estimated Indirect GHG Emissions due to Falkirk Mine* for estimated GHG emissions attributable to the Proposed Action.

According to the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014 (April 2016) the total; GHG emissions reported for the United States in 2014 were 6,870 MMT CO2eq and the total GHG emissions reported for North Dakota were 56.6 MMTCO2eq. Therefore, estimated GHG emission due to mining activities under the proposed action would represent approximately less than 0.07 percent of total U.S. GHG emissions and approximately 8 percent of GHG emissions in North Dakota. Estimated GHG emissions from surface mining and post mining activities for lignite coal mines in North Dakota in 2014 were, and 0.14 MMTCO2eq (excluding combustion). Therefore, estimated GHG emissions from mining and post mining activities under the Proposed Action would represent less than 0.5 percent of GHG emissions from North Dakota surface mines.

COAL ACTIVITY	ANNUAL COAL PRODUCTION RATE (TONS/YEAR)	CO ₂ (MILLION METRIC TONS) MMT	CH₄ (MILLION METRIC TONS) MMT	N ₂ O (MILLION METRIC TONS) MMT	CO _{2EQ} (MILLION METRIC TONS) MMT
Surface Mining					
Emission factor (kg/ton) ¹	4,770,000	_	0.1611	—	0.019
Estimated Emissions	4,770,000	_	7.68E-04	—	0.019
Post Mining					
Emission factor (kg/ton) ¹	4,770,000	_	0.0345	_	0.004
Estimated Emissions	4,770,000	_	1.65E-04	—	0.004
Coal Combustion					
Emission factor (kg/ton) ¹	4,770,000	1,389	0.156	0.023	6.68
Estimated Emissions	4,770,000	6.625	7.44E-04	1.10E-04	6.68
				Total	6.70

Table 12, Estimated Indirect GHG Emissions due to Falkirk Mine

1. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014 ANNEX 3 Methodological Descriptions for Additional Source or Sink Categories, U.S.EPA, April 2016

The potential impacts from GHG emissions are, by nature, global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, the impacts of GHG emissions associated with the Proposed Action are discussed in the context of cumulative impacts in **Section 5** of this EA.

No Action Alternative

Under the No Action, the Federal coal contained in 320 acres of land located in the east ½ of section 10 would not be leased or mined. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres). It is important to note that if the tract is not leased, the existing coal supply contract requirement at the Coal Creek and Spiritwood stations would continue to exist. Without the Federal coal lease, Falkirk would continue to meet their customer's coal supply requirements from another part of its operation. As a result, there would be no change in GHG emissions.

4.2 Cultural Resources

Potential impacts on historic resources are categorized by criteria established by Section 106 of the NHPA and its implementing regulations (36 CFR Part 800). These include "no effect," "no adverse effect," or "adverse effect," which are defined as follows:

- "No effect" is defined as no historic properties present or there are historic properties present but the undertaking would have no effect upon them as defined in 36 CFR § 800.16(i).
- "No adverse effect" is defined as "when the undertaking's effects do not meet the criteria of 36 CFR § 800.5(a)(1) 'adverse effect' or the undertaking is modified or conditions are imposed to avoid adverse effects." A proposed action results in a "no adverse effect" determination when the impacts on a historic property are minimal but do not completely alter the historic characteristics that qualify it for eligibility in the NRHP.
- "Adverse effect" is defined as when the undertaking could alter, directly or indirectly, impact any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that could have been identified subsequent to the original evaluation of the property's eligibility for the NRHP (36 CFR § 800.5(a)).

Proposed Action

Provided that all ground disturbing activity takes place within the inventoried area and previously inventoried areas, the BLM provides a finding of "no effect" on cultural resources for the leasing and mining of the Federal coal resource associated with the Proposed Action. A determination of "no historic properties affected" was also provided by the North Dakota SHPO. If cultural resources are discovered during topsoil/subsoil removal work would immediately be stopped, the site would be secured, and the BLM would be notified. Mining activities would not resume until written authorization to proceed was received from the BLM. All personnel would be prohibited from collecting artifacts or disturbing cultural resources in any area, under any circumstance.

No Action Alternative

If the Federal and private coal lease tract in section 10 is not leased or mined, the land immediately adjacent to the tract in question would continue to be mined and reclaimed as planned. Since the adjacent tract is permitted and leased for surface disturbance, a significant amount of surface disturbance would still occur within the southeast ¼ of section 10, including the stripping of topsoil and subsoil and utilizing the land for other ancillary mining features, such as stockpile locations (i.e. topsoil, subsoil, and overburden).Provided that all construction activity takes place within the inventoried area and previously inventoried areas described in Section 3.2, the BLM gives a finding of "no effect" on cultural resources. If cultural resources are discovered during topsoil/subsoil removal, work would be immediately stopped, the site would be secured, and the BLM would be notified. Work would not resume until written authorization to proceed was received from the BLM. All personnel would be prohibited from collecting artifacts or disturbing cultural resources in any area under any circumstances.

4.3 General Wildlife

The significance of impacts on wildlife is based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to proposed activities, and (4) the duration of ecological effects. A habitat perspective is used to provide a

framework for analysis of general classes of impacts (e.g., noise, human disturbance). Noise associated with a proposed action might be of sufficient magnitude to result in the direct loss of individuals, render habitat unsuitable, or reduce reproductive output within certain ecological settings.

Proposed Action

Under the Proposed Action, no direct or indirect impacts on wildlife would be expected from leasing activities.

Direct and indirect impacts on wildlife would be expected from mining activities associated with the Proposed Action. Short-term, direct impacts on wildlife would be expected from the temporary loss of wildlife habitat in the section 10 lease tract. In accordance with the Falkirk Mine Fish and Wildlife Management Plan, during mining activities, a myriad of sediment-control ponds and SPGM stockpiles would be located throughout the perimeter of the section 10 lease tract, immediately outside the active mining areas. These features and associated areas of disturbance surrounding them would be planted with a grass/forb mixture for erosion stabilization. The vegetation, once established, would become dense nesting cover, which would provide suitable nesting cover for waterfowl and other upland bird species. These cover and water developments would provide an interim enhancement for many wildlife species during mining and initial reclamation operations. Herbicides used to control noxious weeds would be applied with care by licensed and trained contractors to avoid potential impacts on wildlife and associated habitat.

Reclamation plans would include establishing field windbreaks across the post-mine landscape. The windbreaks would be designed using a pattern type arrangement to ensure compatibility with farming operations and use of the windbreaks by wildlife. The addition of the field windbreaks would help protect the post-mine soil resources in the section 10 lease tract, while adding considerable wildlife habitat values to the cropland. The Falkirk Mine would manage the tame grassland areas by using a combination of rotation grazing, burning, and haying. All of the tame grassland acres would be reclaimed upon completion of mining activities. Wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetland acreage, minimize hindrance to farming, and maximize wildlife use. Post-mining temporary and seasonal wetland acreages would be at least equal to the pre-mining wetland acreages. The design of the post-mining wetland would be based on the wetland classification, pre-mining wetland acreage, watershed area, and annual runoff yield.

The Falkirk Mine Fish and Wildlife Management Plan can be found in Section 2-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations.*

Short-term, indirect impacts on wildlife would be expected from mining activities conducted in the section 10 lease tract due to noise. Disturbances (e.g., noise and motion) from mining activities and heavy equipment use could cause wildlife to engage in escape or avoidance behaviors. Most wildlife species in the section 10 lease tract would be expected to quickly recover once the mining activities ceased, or habituate to the disturbances altogether. Noise generated during mining activities could result in temporary disturbance to migratory birds; however, it is anticipated that migratory birds would avoid the pit operation areas and use other areas of the section 10 lease tract and surrounding areas.

The MBTA and EO 13186 require Federal agencies to minimize or avoid impacts on migratory birds listed in 50 CFR 10.13. If design and implementation of a proposed project cannot avoid measurable adverse impacts on migratory birds, EO 13186 requires the responsible agency to consult with the USFWS and obtain a Migratory Bird Depredation Permit. Mining activities would be conducted in a manner to avoid adverse impacts on migratory birds to the extent practicable. While mitigation measures are not required, the following environmental protection measures are going to be implemented for reduction or avoidance of impacts on migratory birds that could occur within the section 10 lease tract:

- Any groundbreaking activities or tree-cutting activities would be performed before migratory birds return to the section 10 lease tract or after all young have fledged to avoid incidental take.
- If mining activities are scheduled to start during the period when migratory birds are present, a site-specific survey for nesting migratory birds would be performed immediately prior to mining activities by a qualified biologist.
- If nesting birds are found in during the survey, buffer areas would be established around nests. Mining activities would be deferred in buffer areas until birds have left the nest. Confirmation that all young have fledged would be made by a qualified biologist.

In accordance with the Falkirk Mine Wildlife Monitoring Plan, wildlife species and habitat types and subtypes would be monitored before, during, and after mining activities to assess the short- and long-term impacts on wildlife species. Monitoring efforts would be centered on wildlife usage of high-value habitats including wetlands, shelterbelts, cropland, and native grassland habitats. Waterfowl breeding and production surveys would be conducted in the spring and early summer on a selected number of wetlands, the use of wetlands in the fall by migratory waterfowl would be documented and recorded, and any small mammals or birds using the wetlands would be closely monitored. Breeding bird census would be conducted on study plots within disturbed and reclaimed areas throughout the active mining areas. Upland gamebird production counts and breeding surveys would be conducted, and sightings of large mammals, furbearers, mid-sized mammals, and raptor nests would be recorded.

Wildlife monitoring under the Falkirk Mine Wildlife Monitoring Plan would continue as an ongoing program throughout the various stages of mining within the section 10 lease tract. As the pre-mining habitats are disturbed and transformed into disturbed area habitat types, monitoring activities on an annual basis would focus on key indicator species. As the mining progressed to the point where reclaimed habitat types began to appear, close monitoring of wildlife usage within these reclaimed habitat types would commence. The Falkirk Mine's environmental personnel would maintain contact with the North Dakota PSC, USFWS, and the North Dakota Game and Fish Department by occasionally requesting field trips in which all parties would have a chance to discuss site-specific techniques that were being used and their success or failure. In addition, a biennial monitoring report would be submitted to all three agencies by March 15 of even numbered years to inform them of the progress of the monitoring program.

No Action Alternative

Under the No Action Alternative, the Federal coal contained in the 320 acres of land in the east $\frac{1}{2}$ of section 10 would not be leased or mined. The south $\frac{1}{2}$ of section 10 is already permitted and leased

for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Short-term, direct impacts on wildlife would be expected from the temporary loss of wildlife habitat in the southeast ¼ of section 10. Reclamation activities for surface disturbance would be similar to those discussed under the Proposed Action. In addition, all native grassland in the southeast ¼ of section 10 would be reclaimed upon completion of surface disturbance by using a combination of rotation, grazing, and haying. All native grassland would be managed to accommodate area wildlife.

4.4 Geological, Mineral, and Paleontological Resources

Proposed Action

Under the Proposed Action, no direct or indirect impacts on geological, mineral, or paleontological resources would be expected from leasing activities.

Long-term, direct and indirect impacts on geological resources would be expected from mining activities associated with the Proposed Action. Direct impacts on physiography would be expected from surface disturbance from mining activities. Except for the removal of the coal beds, the overall nature of the geological and mineral resources of the area is not anticipated to change. There is a 95 percent chance that there is approximately 368 billion ft³ of continuous (unconventional) gas resources contained in the Fort Union Formation coal beds. Therefore, it is likely that there are continuous gas resources in the mining areas of the section 10 lease tract that could be lost from mining activities. Indirect impacts on topography would be expected from subsidence over mined areas. In general, subsidence would be uniform over broad areas. The surface effects of subsidence would depend on characteristics of the overburden, depth of mining below the surface, and thickness of the coal beds removed. The overall effects from subsidence are anticipated to be minor over the short-term and negligible over the long-term.

The Hagel A and Hagel B coal beds will be mined in the section 10 lease tract. The majority of the overburden directly overlying the coal beds would be removed by a dragline, from pits, with widths varying between 90 to 300 feet, depending on the overburden depth and stability. The overburden removed by the dragline would be side-cast into the adjacent mined-out pit.

In areas where the thickness of the overburden exceeds the capability of the dragline, the upper portion of the overburden would be initially removed with a truck/shovel fleet. Because the dragline and truck/shovel fleet would remove both the overburden and interburden material, overburden and interburden mixing of the spoil material would occur.

Initial excavation of the boxcut would be accomplished with 32-yard class tractor-scrapers, and depending upon the overburden thickness, would be completed by the dragline, or the truck/shovel fleet and dragline. Material removed from the boxcut would either be hauled to an 'out of pit spoil area,' or dumped/cast into the adjacent mined-out pit. After all of the overburden has been removed from the boxcut, the surface of the exposed Hagel A coal bed would be cleaned to remove any overburden remnants, and several inches of the top of the coal bed, which contains high ash and sulfur contents.

After the Hagel A has been cleaned, it is mined with electric shovels or front end loaders and loaded into bottom-dump haul trucks. The coal is transported on mine haul roads to the truck dump/crusher facility where the coal is crushed to approximately 3 X 0 inches. Following processing, the coal is then conveyed along a 5,300-foot conveyor to the Coal Creek Power Station. A temporary raw coal stockpile is maintained at the truck dump/crushing facility. This is to ensure a continuous coal feed to the power station in the event that an inclement weather event would temporarily halt coal production.

After the Hagel A bed has been removed, the interburden between the Hagel A and Hagel B beds would be removed by either a dragline or the truck/shovel fleet. The surface of the exposed Hagel B bed would be cleaned, mined, loaded, and transported in the same manner as the Hagel A bed. The Mine Plan, discussed in the Falkirk Permit Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations, considers maximizing the utilization and conservation of the coal being mined in order to minimize future re-disturbance of the land. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*.

The Falkirk Mine is required to rough-grade spoil piles within 180 days following coal removal. Upon completion of coal removal, the overburden would be backfilled and graded to match the postmining topography. Any highwalls remaining following the final mining cut would be graded to comply with existing applicable state and Federal regulations. Sampling of the final graded spoil would be conducted to determine the chemical and physical characteristics of the material, and the data would be submitted to the North Dakota PSC prior to subsoil and topsoil respreading. Any gravel or sand lenses that were present in the topsoil/subsoil material would be removed and either spoiled, or used as haul road fill material.

Subsoil and topsoil are then placed on the graded spoil and respread to the proper thickness and contour with track dozers, mounted with GPS equipment. The Falkirk Mine is required to respread and seed all reclaimed areas within 3 years following coal removal. Following topsoil spreading, farming equipment is used to reestablish reclaimed areas to the approved post-mine land use.

Long-term, direct impacts on paleontological resources could be expected from mining activities associated with the Proposed Action. Overburden and coal removal could disturb paleontological resources of scientific interest (e.g., flora, clam, insect, fish, bird, amphibian, and mammal fossils) potentially contained in the Sentinel Butte and Coleharbor formations. It is unlikely that there are paleontological resources of scientific interest contained in the Oahe Formation.

Prior to any ground disturbance, an assessment of the potential impacts on paleontological resources should be conducted by a professional paleontologist. The assessment would be in accordance with current best management practices and could include a museum and literature search to assess past scientifically important finds in the area, verification and identification of geological formations impacted, and a field survey to determine the presence of paleontological resources and potential salvage value of any discovered resources. The results of the assessment would be the basis for the paleontologist to formulate a mitigation plan and recommendation for proceeding with the proposed mining. At a minimum, the mitigation plan would include an Unanticipated Discovery Plan that outlines the roles and responsibilities of all parties and the steps required for professionally assessing any paleontological finds.

No Action Alternative

Under the No Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Short-term, direct impacts on physiography would be expected from surface disturbance; however, the overall nature of the geological resources of the area is not anticipated to change. Reclamation activities for surface disturbance would be similar to those discussed under the Proposed Action. No direct or indirect impacts on mineral or paleontological resources would be expected, as there would be no removal of overburden or coal under the No Action Alternative.

4.5 Hazardous Materials and Wastes and Solid Waste

Proposed Action

Under the Proposed Action, no direct or indirect impacts would be expected from leasing activities. No hazardous materials would be used, and there would be no generation of hazardous or solid wastes associated with the leasing activities.

No direct or indirect impacts would be expected from mining activities associated with the Proposed Action. No hazardous materials would be used, and there would be no generation of hazardous wastes in the section 10 lease tract. Any non-coal wastes (e.g., trees, brush, wood materials, brick, concrete block, cured concrete, plastic materials, and pipe) generated from mining operations in the section 10 lease tract would be minimal and temporarily stored in a controlled manner in a designated and approved portion of the section 10 lease tract. Disposal of the non-coal wastes would occur in approved mining pits on land under the Falkirk Mine ownership. Any increases in the generation of municipal solid waste (e.g., food scraps, paper, and product packaging) from mining operations in the section 10 lease tract would be minimal and is not anticipated to exceed the capacities of nearby municipal solid waste disposal facilities.

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

No direct or indirect impacts would be expected. No hazardous materials would be used, and there would be no generation of hazardous wastes in the southeast ¼ of section 10. Wastes (e.g., trees, brush, wood materials, brick, concrete block, cured concrete, plastic materials, and pipe) generated from surface disturbance would be minimal and temporarily stored in a controlled manner in a designated and approved location. Disposal of the wastes would occur in approved mining pits on land under the Falkirk Mine ownership. Any increases in the generation of municipal solid waste (e.g., food scraps, paper, and product packaging) from surface disturbance would be minimal and is not anticipated to exceed the capacities of nearby municipal solid waste disposal facilities.

4.6 Noise

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a project. Significance of noise and vibration impacts depends on whether or not a project would increase noise levels above the existing ambient levels by introducing new sources of noise.

Proposed Action

Under the Proposed Action, no direct or indirect impacts on the noise environment would be expected from leasing activities.

No direct impacts on the noise environment would be expected from mining activities associated with the Proposed Action. However, indirect impacts on the noise environment would be expected from mining activities conducted in the section 10 lease tract. Noise from mining activities would vary depending on the type of equipment used, the area that the mining would occur in, and the distance from the noise source. Noise emanating from mining equipment would be localized, short-term, and intermittent during machinery operations. OSHA estimates that the median noise level for mining activities is approximately 88.04 dbA, which is considered to be moderately annoying to sensitive noise receptors. Suitable mufflers on all internal combustion engines and certain compressor components would be used to minimize any increases in noise from mining activities. Since the nearest sensitive noise receptors (a few scattered farm houses) are located approximately 1-mile northeast of the section 10 lease tract, it is not anticipated that they would be directly impacted from the mining activities. Other sensitive noise receptors including several residences, located approximately 1.5 miles southwest in the City of Underwood, and two churches and one school, located approximately 1.9 miles southwest of the section 10 lease tract, would not be directly or indirectly impacted by noise from mining activities, due to their distance from the section 10 lease tract. Noise monitoring associated with mining activities would not be required in the section 10 lease tract.

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

No direct impacts on the noise environment would be expected. However, indirect impacts on the noise environment would be expected from surface disturbance. Noise from surface disturbance would vary depending on the type of equipment used, the area that the surface disturbance would occur in, and the distance from the noise source. Noise emanating from equipment would be localized, short-term, and intermittent during machinery operations. Suitable mufflers on all internal combustion engines and certain compressor components would be used to minimize any increases in noise from surface disturbance. Since the nearest sensitive noise receptors (a few scattered farm houses) are approximately 1 mile northeast of section 10, it is not anticipated that they would be directly impacted from surface disturbance. Other sensitive noise receptors including several residences, approximately 1.5 miles southwest in the City of Underwood and two churches and one school, approximately 1.9 miles southwest of section 10, would not be directly or indirectly impacted

by noise from surface disturbance, due to their distance from section 10. Noise monitoring associated with surface disturbance would not be required in the southeast ¼ of section 10.

4.7 Prime and Unique Farmlands

Proposed Action

Under the Proposed Action, no direct or indirect impacts on prime or unique farmlands or farmland of statewide importance would be expected from leasing activities.

No direct or indirect impacts on prime or unique farmlands would be expected from mining activities associated with the Proposed Action; however, short-term, direct impacts on farmland of statewide importance could be expected from mining activities associated with the Proposed Action. Approximately 170 acres of farmland of statewide importance are located within the section 10 lease tract and could be converted to nonagricultural uses; however, the farmland would be reclaimed following mining activities. Surface mining activities, where reclamation to agricultural use is planned, are not subject to the Farmland Protection Policy Act.

In accordance with the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations, Volumes of topsoil and subsoil in prime soils areas would be removed to ensure that 48 inches of material would be replaced. Topsoil stripped would generally consist of a combination of "A horizon" materials and other available SPGM that would create a final soil having a productive capacity equal to, or greater than, that which existed prior to mining. Reclamation research in North Dakota demonstrating methods for returning full premining yields has been conducted generally using two lifts: (1) topsoil composed of the "A horizon" and the upper "B horizon" and (2) subsoil composed of the lower "B and C horizons." This two-lift method, currently in use for all surface mined lands in North Dakota, has been shown to be effective in reclaiming croplands to their full premining yield potential. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations.*

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

No direct or indirect impacts on prime or unique farmlands would be expected from surface disturbance; however, short-term, direct impacts on farmland of statewide importance could be expected. There are approximately 170 acres of farmland of statewide importance in section 10, some of which, could be converted to nonagricultural uses however, the farmland would be reclaimed following surface disturbing activities.

4.8 Socioeconomics and Environmental Justice

NEPA does not provide specific thresholds of significance for assessment of impacts on socioeconomic resources. Significance varies depending on the context of a proposed project (40 CFR 1508.27[a]).
Proposed Action

Under the Proposed Action, 302 acres of split estate minerals would be leased and developed over a 7-month period. Federally owned minerals, which account for 50 percent of the subsurface minerals in the section 10 lease tract, would be subject to a bonus paid at the time BLM issues the lease, an annual rental payment of \$3.00 per acre or fraction thereof, and royalties⁵ paid on the value of the coal after it has been mined. Federal revenues generated from the leasing and development of Federal coal interests in the section 10 lease tract would be shared equally between the Department of the Interior and the state of North Dakota. In accordance with NDCC 57-62-02, a portion of state revenue from Federal coal is distributed monthly to the county general fund, cities and school districts within coal-producing counties.

Since all subsurface mineral interests proposed for development in the section 10 lease tract are located beneath privately owned lands, and 50 percent of the subsurface minerals are privately owned, Falkirk Mine and the North American Coal Corporation (NACC) will need to negotiate and obtain leases from private mineral estate owners, and reach surface use agreements with land owners whose mineral rights have been severed. Lease terms and compensation will be negotiated between the NACC and individual estate owners..

Although payments associated with the leasing and development of coal interests within the section 10 lease tract would result in additional household income for private surface and subsurface mineral estate owners, and additional public revenues for the surrounding city, county, and local school districts; these activities would not result in long-term reoccurring payments. Although these payments may temporarily increase regional economic activity in sectors that support local governments, public services, and household consumption, they are unlikely to have a long-term effect on regional economic conditions or structure.

In addition to payments associated with the leasing and extraction of coal in the section 10 lease tract, coal mined from these new lease is anticipated to result in approximately seven months-worth of coal production at the Falkirk Mine. During this period, temporary increases in employment and local business volume would be expected to result in increases in payroll taxes, sales receipts, and the indirect purchase of goods and services. Mining activities associated with the Proposed Action would not result in substantial changes to the current economic conditions of the region, displace substantial numbers of people, or substantially reduce the number of available housing units within the project area (i.e., McLean, Mercer, and Oliver counties). According to the 2009-2013 ACS Survey, there was an estimated 2,666 vacant housing units within the study area (Census Bureau 2009-2013a). Any mine workers that may temporarily relocate to the project area during mining the mining activities would not be expected to substantially reduce the number of available housing units or cause a substantial decrease in property values. Falkirk's recent purchase of a farmhouse located in the southwestern corner of the section 10 lease tract did not result in a substantial reduction in the number of available housing units or result in a substantial decrease in property values.

⁵ The royalty for Federal coal has been established by law at 12.5% of the gross value of the coal produced. The 12.5% royalty rate applies to coal severed by surface mining methods. For coal mined by underground methods, the statute provides that the Secretary may establish a lesser royalty rate. By regulation, the BLM requires an 8% royalty for coal severed by underground mining methods (DOI, 2016).



The study area contains lower minority populations in comparison to the State of North Dakota. In addition, the study area has lower percentages of individuals living below the poverty level in comparison to the State of North Dakota. Mining activities would be temporary and concentrated in section 10 lease tract; therefore, minority populations and/ or low-income populations would not be disproportionately affected by mining activities associated with the Proposed Action. Similarly, there are no environmental health and safety risks identified that would disproportionately affect populations of children, as mining activities would occur entirely within section 10 lease tract, which would be fenced and appropriately marked with signs to prevent trespassing. Please refer to sections **1.6 Scoping, Public Involvement and Issues, 3.2 Cultural Resources, 4.2 Cultural Resources** and **6.1 Consultation and Coordination** for discussions related to potential tribal impacts.

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east $\frac{1}{2}$ of section 10 would not be leased or mined for coal. Temporary increases in employment and local business volume associated with leasing and mining activities in the east $\frac{1}{2}$ of the section 10 lease tract would not be realized.

4.9 Soils

Proposed Action

Under the Proposed Action, no direct or indirect impacts on soils would be expected from leasing activities.

Short-term, direct impacts on soils in the section 10 lease tract would be expected from mining activities associated with the Proposed Action. In general, mining activities can impact soils by changing their structure, organic content, fertility, infiltration, and permeability. Soils identified in the section 10 lease tract have a low to moderate susceptibility to sheet and rill erosion, low to moderate infiltration rate, and moderate to high runoff rate; however, the soils can tolerate higher rates of erosion without loss of productivity.

During the initial mining operations conducted in the section 10 lease tract, topsoil and subsoil would be removed with tractor-scrapers or excavators used in conjunction with end-dump trucks using a two-lift removal process. Topsoil would be initially removed, followed by the subsoil. The SPGM would either be stockpiled in areas designated for that material, or directly respread onto pre-approved regraded spoil areas. The total volume of topsoil and subsoil removed would be sufficient to respread 24, 36, or 48 inches of material, depending on projected regraded spoil characteristics. In areas where there would be inadequate volumes of suitable soil material to meet the projected respread depths, all available suitable material would be removed and respread uniformly. Falkirk would submit an SPGM removal plan to the North Dakota PSC prior to each SPGM removal season. The plan would address the volume of SPGM projected to be salvaged during the season and would also include a map showing the proposed SPGM removal area(s).

Overburden would be scarified prior to subsoil respreading. Topsoil and subsoil material would be respread on pre-approved areas with tractor-scrapers or end-dump trucks in conjunction with a track dozer and motor grader. To ensure the proper respread depth, the respread area would either be staked on 100-foot centers, with wood lath marked with the appropriate respread depth, or using a GPS equipped track dozer. Once the SPGM has been spread, it would then be mulched and seeded.

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Short-term, direct impacts on soils in the southeast ¼ of section 10 would be expected from surface disturbance. In general, surface disturbance can impact soils by changing their structure, organic content, fertility, infiltration, and permeability. During surface disturbance, topsoil and subsoil would be removed with tractor-scrapers or dozers and excavators in conjunction with end-dump trucks using two lifts: (1) topsoil would be removed until all black soil is removed and (2) subsoil would be removed after the topsoil is removed. Reclamation activities for surface disturbance would be similar to those discussed under the Proposed Action.

4.10 Threatened, Endangered, and Candidate Species

Under the ESA Section 7(a)(2), each Federal agency is required to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species, or adversely modify or destroy designated Critical Habitat. Under the ESA, "jeopardy" occurs when an action is reasonably expected, directly or indirectly, to diminish a species' numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced. Federal agency action proponents are responsible for making one of the following effects determinations (16 U.S.C. § 1531–1543):

- "No Effect" is the appropriate determination when a proposed action would have no effect on listed species or designated Critical Habitat. For this determination, the effects of a proposed action should be temporally or spatially separated from the listed species. This determination is made by the action agency and does not require further consultation.
- "May Affect, but Not Likely to Adversely Affect" is the appropriate determination when the effects of the action on listed species or designated Critical Habitat would be discountable, insignificant, or wholly beneficial. In order to receive concurrence with this determination, the action agency must initiate informal Section 7 consultation.
- "Likely to Adversely Affect" is the appropriate determination if any adverse effects on listed species or designated Critical Habitat could occur as a direct or indirect result of a proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. Initiation of formal Section 7 consultation would be required and the USFWS would be responsible for completing a biological opinion on the action (and could issue an incidental take statement.

The effects determinations discussed in the following subsections were completed based on information contained in the Falkirk Mine Wildlife Monitoring Plan and Section 2-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B*, *Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*.

Proposed Action

Under the Proposed Action, no effect on threatened or endangered species would be expected from leasing activities.

Table 10 summarizes the effects determinations and preferred and potential habitats in the section 10 lease tract for the threatened and endangered species potentially impacted by mining activities conducted in the section 10 lease tract. Please refer to **Table 13, Summary of Effects Determinations** for Species in the Section 10 Lease Tract.

In accordance with the Falkirk Mine Fish and Wildlife Management Plan, during mining activities, a myriad of sediment-control ponds and SPGM stockpiles would be located throughout the perimeter of the section 10 lease tract, immediately outside the active mining zones. These features and associated areas of disturbance surrounding them would be planted with a grass/forb mixture for erosion stabilization. The vegetation, once established, would become dense nesting cover, which would provide suitable nesting cover. These cover and water developments would provide an interim enhancement for many wildlife species during mining and initial reclamation operations.

No effect on threatened, endangered, or candidate species would be expected from noise or visual disturbances associated with mining activities and heavy equipment use, as these species would be expected to quickly recover once the noise and disturbances from mining activities ceased.

In accordance with the Falkirk Mine Wildlife Monitoring Plan, wildlife species and habitat types and subtypes would be monitored before, during, and after mining activities to assess the short- and long-term impacts on wildlife species. Monitoring efforts would be centered on wildlife usage of high-value habitats including wetlands, shelterbelts, cropland, and native grassland habitats. Waterfowl breeding and production surveys would be conducted in the spring and early summer on a selected number of wetlands, the use of wetlands in the fall by migratory waterfowl would be documented and recorded, and any small mammals or birds using the wetlands would be closely monitored. Breeding bird census would be conducted on study plots within disturbed and reclaimed areas throughout the active mining areas. Habitats capable of supporting threatened, endangered, and candidate species would be searched throughout various stages of mining, and subsequent sightings would be recorded by species, date, location, habitat type, and behavioral activity. The presence of any Federal listed plant or animal, bald or golden eagles, or bald or golden eagles' nests or eggs in the section 10 lease tract would be reported to the North Dakota PSC.

SPECIES	FEDERAL LISTING STATUS	PREFERRED HABITAT ^(a)	POTENTIAL HABITAT ^(b)	EFFECTS DETERMINATION	ADDITIONAL CONSIDERATION
Gray Wolf	Endangered (c)	Forests, Mountains, Grasslands	Tame Grassland	No Effect	The gray wolf is known to tolerate human disturbances.
Whooping Crane	Endangered	Palustrine Wetlands, Cropland	Palustrine Wetlands	May Affect, but Not Likely to Adversely Affect ^(d)	Potential impacts would be temporary due to reclamation and mitigation.
Least Tern	Endangered	Missouri River, Lake Sakakawea	None	No Effect	None
Pallid Sturgeon	Endangered	Missouri River, Lake Sakakawea	None	No Effect	None
Piping Plover	Threatened	Missouri River, Lake Sakakawea, Alkaline Wetlands	None	No Effect	None
Red Knot	Threatened	Missouri River, Lake Audubon, Lake Sakakawea	None	No Effect	None
Dakota Skipper	Threatened	Low (Wet) Native Grassland, Upland (Dry) Native Grassland	None	No Effect	None
Northern Long-Eared Bat	Threatened	Forests, Woodlots, Fence Rows, Riparian Forests, Shelterbelts	Shelterbelts	No Effect	The removal of trees and woody vegetation would occur in the late fall through the winter months. Post- mining reclamation would include the restoration of land use, including shelterbelts.

Table 13, Summary of Effects Determinations for Species in the Section 10 Lease Tract

Notes:

- a. Preferred habitat refers to the species' general preferred habitat.
- b. Potential habitat refers to the potential habitat for the species within the boundaries of the section 10 lease tract.
- c. The gray wolf is considered endangered west of US-83.
- d. All necessary consultation regarding the whooping crane was completed by the Falkirk Mine during the North Dakota PSC application process. Additionally, the BLM received concurrence from the USFWS on 7 July 2015, which stated that the proposed project is not expected to have significant adverse impacts on fish and wildlife.



Wildlife monitoring would continue as an ongoing program throughout the various stages of mining within the section 10 lease tract. As the pre-mining habitats are disturbed and transformed into disturbed area habitat types, monitoring activities on an annual basis would focus on key indicator species. As the mining progressed to the point where reclaimed habitat types began to appear, close monitoring of wildlife usage within these reclaimed habitat types would commence. The Falkirk Mine's environmental personnel would maintain contact with the North Dakota PSC, USFWS, and the North Dakota Game and Fish Department by occasionally requesting field trips in which all parties would have a chance to discuss site-specific techniques that were being used and their success or failure. In addition, a biennial monitoring report would be submitted to all three agencies by March 15 of even numbered years to inform them of the progress of the monitoring program.

Reclamation plans would include establishing shelterbelts/windbreaks across the post-mine landscape. The windbreaks would be designed using a pattern type arrangement to ensure compatibility with farming operations and use of the windbreaks by wildlife. The addition of the field windbreaks would help protect the post-mine soil resources in the section 10 lease tract, while adding considerable wildlife habitat values to the cropland. The Falkirk Mine would manage the tame grassland areas by using a combination of rotation grazing, burning, and haying. All of the tame grassland acres would be reclaimed post-mining. Wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetland acreage, minimize hindrance to farming, and maximize wildlife use. Post-mining temporary and seasonal wetland acreages would be at least equal to the pre-mining wetland acreages. The design of the post-mining wetland would be based on the wetland classification, pre-mining wetland acreage, watershed area, and annual runoff yield.

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Effects determinations for threatened, endangered, and candidate species from surface disturbance would be similar to those described under the Proposed Action. Impacts resulting from noise and motion from surface disturbance would be similar to those described under the Proposed Action. Wildlife monitoring, pre- and post-surface disturbance management, and reclamation activities for the No Action Alternative would be similar to those discussed under the Proposed Action. In addition, all native grassland in the section 10 lease tract would be reclaimed upon completion of surface disturbance by using a combination of rotation, grazing, and haying. All native grassland would be managed to accommodate area wildlife.

4.11 Transportation Resources

Proposed Action

Under the Proposed Action, no direct or indirect impacts on transportation resources would be expected from leasing and mining the lease tract. Haul roads and ancillary haul roads in the lease tract area would be used, or constructed to transport the coal from the pit to the truck dump/crusher facility. Short-term, direct and indirect impacts on transportation resources in the vicinity of the

section 10 lease tract would be expected from mining activities associated with the Proposed Action. Potential temporary increases in traffic volume on US-83, ND-200, County Highway 23, 4th Street NW, and 5th Street NW from trucks transporting coal from the section 10 lease tract to the Coal Creek Station would be minor. Haul roads and ancillary haul roads within the section 10 lease tract would be used and constructed to minimize any potential increases in traffic volume on roadways within the vicinity of the section 10 lease tract.

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Short-term, direct impacts on transportation resources in the vicinity of section 10 would be expected from surface disturbance. Haul roads and ancillary haul roads within section 10 would be used and were constructed to minimize any potential increases in traffic volume on roadways within the vicinity of section 10.

4.12 Vegetation

Proposed Action

Under the Proposed Action, no direct or indirect impacts on vegetation would be expected from leasing activities.

Short-term, direct impacts on vegetation in the section 10 lease tract would be expected from mining activities associated with the Proposed Action. During mining activities, vegetation would be removed with tractor-scrapers and the truck shovel fleet (i.e., loading shovels and end-dump trucks). There are five known noxious weeds in McLean County. Disturbance of vegetation containing noxious weeds could result in the redistribution of invasive species to other areas of the Section 10 lease tract. Therefore, existing areas not dominated by noxious weeds would have the potential to become infested from mining activities. The spread of invasive species could have an adverse effect on several aspects of vegetation including the suitability of sensitive plant habitat and maintenance of native biodiversity to forage production for livestock grazing.

Upon completion of mining activities, revegetation would occur, in accordance with the guidelines outlined in the general revegetation and management plans discussed in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*. Once the topsoil and subsoil are replaced, a suitable seedbed would be prepared. Areas being seeded to the temporary seed mix (i.e., ditches, embankments, and stockpiles) would be seeded as soon as possible after disturbance. For seeding native grassland, the complete mix of warm and cool season grasses would be seeded in mid- to late-June or a split seeding method would be used where the warm-season grasses would be seeded in June and the cool season grasses would be seeded in the late fall. Cropland and tame grassland would be seeded from March to the late fall. The Falkirk Mine would conduct all management and normal husbandry practices necessary (e.g., weed and pest control, litter reduction, interseeding, reseeding, fertilization, remulching) to achieve and maintain an adequate vegetation

cover, which would both stabilize the soil and support the post-mining land uses and achieve revegetation goals. Weed control would be conducted, where necessary, by using post-emergent herbicides (i.e., 2,4-D) and nonselective herbicides (i.e., Glyphosate) and by mowing. All weed control activities would be conducted in coordination with, and following the recommendations of, the local cooperative Extension Service (North Dakota Weed Control Guide) and Soil Conservation District offices in North Dakota.

Maintenance and monitoring of the revegetated areas would continue until (1) the area is consistent with the specifications outlined in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations or (2) the area is consistent with the surrounding undisturbed vegetation and free of noxious weeds. Pre-mining vegetation surveys that were previously conducted to document the types of vegetation, cover, and production would be used as a comparison for success during monitoring. Reclamation success, for most land uses, would be generally based on an assessment of vegetation production and cover. When areas meet an "equal-to-or-better-than" production and cover standard, they may be released from bond. The combination of these maintenance and monitoring activities would reduce or remove the likelihood of adverse effects on vegetation.

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Impacts on vegetation from surface disturbance would be similar to those described under the Proposed Action. Upon completion of surface disturbance, revegetation and vegetation management, maintenance, and monitoring conducted under the No Action Alternative would be the same as described under the Proposed Action.

4.13 Visual Resources

Visual impacts are inherently difficult to characterize because of the subjectivity involved. Visual impacts deal more broadly with the extent that a proposed project contrasts with the existing environment and whether the jurisdictional agency considers this contrast objectionable. The significance of potential impacts on visual resources is based on the level of visual sensitivity in the area. Visual sensitivity is defined as the degree of public interest in a visual resource and concern over adverse changes in the quality of that resource. In general, an impact on a visual resource is adverse if implementation of a proposed project were to result in substantial alteration to an existing sensitive visual setting.

Proposed Action

Under the Proposed Action, no direct or indirect impacts on visual resources would be expected from leasing activities.

Short-term, direct and indirect impacts on visual resources in the lease tract area may be expected during the mining and reclamation operations associated with the Proposed Action. Direct impacts

may occur for persons using highways US-83, ND-200, County Highway 23, 4th Street NW, 5th Street NW, and several smaller paved and unpaved roadways located in the lease tract area. As persons using these roadways approached the lease tract mining area, they would have a better chance to see the mining operations. However, since the land in McLean County is considered rural, with a very low population density (i.e., four persons per square mile), visual impacts for persons driving in the lease tract area would likely be minor, and would only occur during the duration of mining and reclamation operations.

People using recreational areas at Lake Audubon, Wolf Creek, the De Trobriand State Game Management Area, and the Coal Lake Wildlife Management Area would not likely be within the viewshed during the mining and reclamation operations being conducted on the lease tract. However, depending on their location, persons using the recreational areas at Lake Sakakawea might be within the viewshed of a small portion of the lease tract.

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres). Impacts on visual resources from surface disturbance would likely be similar to those described under the Proposed Action.

4.14 Water Resources (Groundwater, Surface Water, Wetlands, and Waters of the United States)

Evaluation criteria for impacts on water resources are based on water availability, quality, and use and associated regulations. A proposed project could have an adverse effect with respect to water resources if it substantially reduced water availability or supply to existing users, caused an overdraft to groundwater basins, exceeded safe annual yield of water supply sources, substantially affected water quality, endangered public health by creating or worsening health hazard conditions, threatened or damaged unique hydrologic characteristics, or violated established laws or regulations adopted to protect water resources.

Determination of the significance of impacts on wetlands is based on (1) the loss of wetland acreage, (2) function and value of the wetland, (3) proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (4) sensitivity of the wetland to proposed activities, and (5) duration of the ecological ramifications. Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected or if wetland acreage were lost.

Proposed Action

Groundwater

Under the Proposed Action, no direct or indirect impacts on groundwater would be expected from leasing activities.

Long-term, direct and indirect impacts on groundwater would be expected from mining activities associated with the Proposed Action. Mining activities conducted in the section 10 lease tract would include the mining of the Hagel A and Hagel B coal beds which are aquifers (Schobert 1995). Removal

of the coal beds would disrupt these aquifers within the section 10 lease tract. Furthermore, overburden removal and subsequent backfilling of the mine pits would completely change the original depositional fabric of the sediments comprising the overburden. The predominately silty claystone and clayey siltstone components of the overburden (Sentinel Butte Formation), were originally sorted and systematically deposited by fluvial processes in orderly layers, resulting in distinct hydraulic, lithologic, and chemical properties. Following coal removal from the lease tract pit, it would be filled with overburden material (spoil) that possesses the same hydraulic, lithologic, and chemical properties. However, since the spoil in the abandoned pit was placed in a chaotic manner, it would lack the hydraulic, lithologic, and chemical continuity that occurred in the overburden prior to mining.

The inflow of groundwater into the reclaimed mine pit creates cones of depression in the pre-mining potentiometric surface (imaginary plane where a given reservoir of fluid will "equalize out to" if allowed to flow) of aquifers occurring in the adjacent unmined overburden sedimentary units and coal beds surrounding the section 10 lease tract. The resultant drawdown of the hydraulic head (liquid surface elevation of the aquifer) in these aquifers would be similar to the cone of depression produced in a water well, immediately following pumping.

As mining progressed on the lease tract, the effects of this drawdown would extend away from the tract into adjacent unmined areas. Due to recharge, the potentiometric surfaces of the adjacent unmined aquifers would return to their pre-mining elevations following tract reclamation. Concurrently, the spoil occupying the reclaimed mine pit would become saturated at its base, and the water level elevation in the unconfined spoil would eventually rise to approximate the potentiometric surface in the adjacent unmined overburden.

Although there are no water wells located on the section 10 lease tract, there are several water wells located within a mile of the tract. Please refer to *Figure 8, Location of Water Wells in the Section 10 Lease Tract Area*. Depending on their location, some of these wells would be impacted by mining operations. However, as stated above, the potentiometric surface of the aquifers in these wells would eventually return to their pre-mining elevations following tract reclamation.

The Hydrologic Reclamation Plan and Surface Water Monitoring Plan are discussed in Section 2-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*. Prior to any surface disturbance of the section 10 lease tract, Falkirk would construct a network of surface water structures (e.g., sedimentation ponds, pit-water ponds, sumps, diversions). These water structures would collect surface runoff from the lease tract, thereby preventing any additional contribution of suspended solids to waters downstream of the disturbed areas. Routine monitoring of the Falkirk Mine monitoring well network would continue post-mining to adequately define water level variations, and when necessary, wells would be periodically monitored for yield rates, water levels, and water quality.

Surface Water

Under the Proposed Action, no direct or indirect impacts on surface water would be expected from leasing activities.

Short-term, indirect impacts on surface water would be expected from mining activities associated with the Proposed Action. Removal of vegetation and excavation of soil during mining activities would result in the transport of sediment and other pollutants into nearby watersheds and water bodies during storm water flow events. Prior to any surface disturbance, the Falkirk Mine would construct a network of surface water structures (e.g., sedimentation ponds, pitwater ponds, sumps, diversions). The surface water structures would collect and treat surface runoff from disturbed areas, thereby preventing any additional contribution of suspended solids to waters downstream of the disturbed areas. The Falkirk Mine would maintain compliance with all applicable effluent standards and conditions listed in their National Pollutant Discharge Elimination (NPDES) Permit and the North Dakota PCS water management rules and regulations.

The Surface Water Management Plan in Section 3-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations addresses the design, construction, operation, and reclamation of surface water structures. There would be two types of temporary sedimentation ponds constructed (i.e., valley ponds and incised valley ponds) that would contain, at a minimum, the runoff resulting from a 10-year/24-hour precipitation event.

Reclamation of the sedimentation ponds would be achieved by removing the pond embankments and backfilling the pond sites following draining. In accordance with the appropriate regulations and policies of the State Health Department and North Dakota PSC, pit-water ponds, consisting of three cells, would be constructed to store groundwater pumped from the mine pits. Groundwater would be pumped into the two outer cells and then discharged into the center cell. Once the water in the center cell met the effluent standards outlined in the Falkirk Mine NPDES Permit, it would be discharged through a nearby natural drainage (e.g., ephemeral stream, drainage ditch). Diversion channels and road ditches would be constructed in overburden, subsoil, and topsoil stockpiles. Diversion channels and road ditches would be reclaimed by backfilling and leveling to the approximate original surface.

Following reclamation of the lease tract, revegetation would occur, in accordance with the guidelines outlined in the general revegetation and management plans discussed in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. This would reduce the volume and velocity of storm water runoff water entering nearby surface water bodies. Please refer to *Appendix B*, *Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*.

The Surface Water Monitoring Plan in Section 2-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations monitors precipitation and surface water runoff along with elevation recordings and water quality sampling at the Coal Lake and Landenberger Slough. In accordance with the Plan, total iron would be sampled annually, pH of total suspended solids would be sampled monthly in water from designated discharge points, and total water discharge and discharge rate from sedimentation ponds would be recorded. Quarterly reports summarizing water discharges would be submitted to the State Health Department and North Dakota PSC.

Wetlands and Waters of the United States

Under the Proposed Action, no direct or indirect impacts on wetlands or waters of the United States would be expected from leasing activities.

No direct or indirect impacts on waters of the United States would be expected from mining activities, as there are no waters of the United States within the section 10 lease tract. Short-term, direct impacts on wetlands would be expected from mining activities associated with the Proposed Action. Wetlands disturbed by mining would be reclaimed, as described in Section 5-2 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*.

Wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetland acreage, minimize hindrance to farming, and maximize wildlife use. Post-mining temporary and seasonal wetland acreages would be at least equal to the pre-mining wetland acreages. The design of the post-mining wetland would be based on the wetland classification, pre-mining wetland acreage, watershed area, and annual runoff yield. Various wildlife enhancement practices (e.g., inclusion of small islands, maintenance of bare shorelines, convolution of shorelines, establishment of blocks of vegetation in open water zones) would be evaluated at the time of wetland reclamation operations. Infestations of noxious weed species would likely be controlled by applications of non-selective herbicides (i.e., Glyphosphate). Monotypic stands of cattails that threaten to take over the wetland vegetation would be controlled through a combination of management practices (e.g., burning, drowning out, mowing, and root system disruption). North Dakota regulations require that reclaimed mine lands are returned to a productivity level equal to or greater than its pre-mine productivity.

No Action Alternative

Under the No Action Alternative, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres). No direct or indirect impacts on groundwater or waters of the United States would be expected from surface disturbance.

Short-term, indirect impacts on surface water would be expected from surface disturbance. The removal of vegetation and excavation of soil would result in the transport of sediment and other pollutants into nearby watersheds and water bodies during storm water flow events. The construction and reclamation of surface water structures for No Action Alternative would be the same as described under the Proposed Action. The Falkirk Mine would maintain compliance with all applicable effluent standards and conditions listed in their NPDES Permit and the North Dakota PCS water management rules and regulations. Revegetation and implementation of the Falkirk Mine Surface Water Management Plan and Surface Water Monitoring Plan for the No Action Alternative would be the same as described under the Proposed Action. Short-term, direct impacts on wetlands would be expected from surface disturbance. The reclamation activities and replacement of wetlands for the No Action Alternative would be the same as described under the same as described under the Proposed Action.

Federal regulations implementing NEPA (CEQ 40 CFR § 1500–1508) require that the cumulative effects of a proposed action be assessed. CEQ regulations implementing the procedural provisions of NEPA define "cumulative impact" as follows (40 CFR § 1508.7):

[T]he impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

A cumulative effect could be additive (i.e., the net adverse cumulative effects are strengthened by the sum of individual effects), countervailing (i.e., the net adverse cumulative effect is less as a result of the interaction between beneficial and adverse individual effects), or synergistic (i.e., the net adverse cumulative effect is greater than the sum of the individual effects). Cumulative effects could result from individually minor, but collectively significant actions that take place over time. Accordingly, a cumulative effects analysis identifies and defines the scope of other actions and their interrelationship with the alternatives if there is an overlap in space and time. Cumulative effects are most likely to occur when there is an overlapping geographic location and a coincidental or sequential timing of events. Because the environmental analysis required under NEPA is forward-looking, the aggregate effect of past actions is analyzed to the extent relevant and useful in analyzing whether the reasonably foreseeable effects of a proposed action could have a continuing, additive, and significant relationship to those effects.

For the purposes of this analysis, the temporal span of the Proposed Action represents the time during which the section 10 lease tract would be mined (i.e., 7 months). The geographic area of consideration for potential cumulative effects varies by resource. The spatial area of consideration for some resources might only include the immediate Falkirk Mine area, such as geological resources. The geographic area of consideration for potential cumulative effects for other resources, such as water or biological resources may include a much larger area. For air (quality) resources, the geographic area could encompass the North Dakota intrastate AQCR. Therefore, given the large geographical area that could be considered for analyzing the Proposed Action's potential effects, this cumulative effects analysis focuses on the surface coal mines that are operating near the lease tract. Other, large-scale industrial operations are not present in this geographic area.

5.1 Surface Coal Mines Considered for Potential Cumulative Impacts

Historically, lignite coal mining in North Dakota began in 1873, and by 1900, approximately 73 mines were operational. By the 1920s, there were approximately 250 mines operating in North Dakota. Western North Dakota contains an estimated 351 billion tons of coal (NDGS Undated). North Dakota also contains an estimated 25 billion tons of economically mineable coal, which is enough to last more than 850 years at the current annual production rate of approximately 29 million tons per year (NDGS Undated). The mineable coal occurs in western and central North Dakota in the upper Fort Union Group (Paleocene age). Currently, there are five operating surface coal mines in North Dakota

(i.e., Beulah Mine, Center Mine, Coyote Creek, Falkirk Mine, and Freedom Mine) that produced approximately 29.18 million tons of coal in 2016. Coal production from these mines feed "mine-mouth" electricity generating stations that are located adjacent to the mines (NDGS Undated). Operations are located in McLean, Mercer, and Oliver counties, near the section 10 lease tract, and are addressed in this cumulative effects analysis. *Table 14* summarizes North Dakota's coal production in 2016.

Table 14, Summary of 2016 Lignite Production in North Dakota

SURFACE MINE (a)	ANNUAL PRODUCTION	PERCENT OF TOTAL ANNUAL PRODUCTION
Beulah Mine	2.5 million tons	8.6
Center Mine	3.83 million tons ^(b)	13.1
Coyote Creek Mine	1.49 million tons ^(c)	5.1
Falkirk Mine	7.24 million tons	24.8
Freedom Mine	14.12 million tons	48.4
Total	29.18 million tons	-

Sources: North Dakota Mine operators, 2017.

Notes:

- a. The Stony Creek Mine produces leonardite (i.e., oxidized coal used as a soil additive and in drilling muds) and is not included in this table because it is located outside of the cumulative impact study area.
- b. In April 2016, one of the two coal supply contracts at the Beulah Mine ended. In 2017, its annual production will be approximately 0.50 million tons.
- c. The Coyote Creek Mine initiated production in April 2016. Starting in 2017, its annual production will be approximately 2.5 million tons.

Beulah Mine

The Beulah Mine is located west of North Dakota Highway-49 (ND-49), approximately 3 miles south of Beulah, in Mercer and Oliver counties, ND. The mine, established in 1963, expanded to its present size in the late 1970s. The mine was formerly owned and operated by the Knife River Corporation, until it was sold to Dakota Westmoreland Corporation in 2001. Prior to 2017, the mine produced approximately 3.0 million tons of coal annually. In April 2016, the coal supply contract (2.5 million tons/year) with the adjacent Coyote Power Station ended, and for 2016, 0.88 million tons. This coal is shipped by rail and supplied to the Heskett Power Station which is operated by Montana-Dakota Utilities Company, located in Mandan, North Dakota. The Beulah Mine also sells oil-treated stoker coal to smaller retail customers (NDPSC 2015, BLM 2013). The Beulah Mine is currently pursuing other coal supply contracts.

Center Mine

The Center Mine is located south of ND-25, approximately 4 miles southeast of Center, in Oliver County, ND. The mine was established in 1970 and is owned and operated by BNI Coal, Ltd., which is a subsidiary of ALLETE (formerly Minnesota Power and Light). There are approximately 18,000 acres that comprise the Center Mine mining permit area and approximately 200 acres are mined and reclaimed annually. Approximately 4 million tons of coal per year are produced at the Center Mine. In

2016, approximately 3.83 million tons of coal was produced at the mine. Coal is supplied to the Milton R. Young Power Station which is operated by Minnkota Power and Square Butte Electric Generating Cooperatives, and Center Coal Company, which are both located adjacent to the mine. Center Coal Company crushes the coal it receives from the mine and resells oil treated stoker and lump coal to smaller retail customers (NDPSC 2015, BNI Coal 2015).

Coyote Creek Mine

The Coyote Creek Mine is located off of ND-49, approximately 6 miles southwest of Beulah, in Mercer County, ND. The mine, owned and operated by the Coyote Creek Mining Company, a subsidiary of NACC, initiated production in April 2016 and produced approximately 1.49 million tons during 2016. The Coyote Creek Mine supplies coal to the Coyote Power Station, which is owned by Otter Tail Power Company, Northern Municipal Power Agency, Montana-Dakota Utilities Company, and NorthWestern Corporation. Approximately 2.5 million tons of coal will be delivered annually to the Coyote Station (Jeremy Eckroth, personal communication, 2017).

Falkirk Mine

The Falkirk Mine is located east and west of ND-83, approximately 3.5 miles south of Underwood, in McLean County, ND. The mine was established in 19**77** and is owned and operated by The Falkirk Mining Company, a subsidiary of NACC. In 2016, Falkirk produced approximately 7.24 million tons of coal. Coal is supplied to the Great River Energy's Coal Creek Power Station, which is located adjacent to the mine (NDPSC 2015). The Falkirk Mine also supplies coal to the Spiritwood Station, located near Jamestown, North Dakota. The 320-acre Federal coal lease tract is located within and adjacent to the Falkirk Mine permit area.

Freedom Mine

The Freedom Mine is located north of ND-200, approximately 6 miles north of Beulah and approximately 10 miles northwest of Hazen, in Mercer County, ND. The mine was established in 1978 and is owned and operated by The Coteau Properties Company, which is a subsidiary of NACC. Approximately 13.5 million tons of coal per year are produced at the Freedom Mine, with the maximum production rate at 16 million tons per year. In 2016, Freedom produced approximately 14.12 million tons of coal. Coal is supplied to Dakota Gasification Company's Great Plains Synfuels Plant, which is located adjacent to the mine; Basin Electric Power Cooperative's Antelope Valley Power Station, which is also located adjacent to the mine; and Basin Electric Power Cooperative's Leland Olds Power Station, which is located in Stanton, ND, where coal is delivered by rail (NDPSC 2015, DOI 2015).

The Dakota Gasification Company, a subsidiary of Basin Electric Power Cooperative, owns and operates the Great Plains Synfuels Plant. Dakota Gasification is a leader in technologies that capture, compress, and transport carbon dioxide (CO₂) emissions generated from the coal gasification process. The Great Plains Synfuels Plant captures approximately 3 million tons of CO₂ annually. The CO₂ is transferred via a 205-mile-long pipeline through western North Dakota to southern Saskatchewan where the CO₂ is used to enhance oil recovery in oil fields, resulting in the permanent geologic sequestration of the CO₂.

On April 1, 2011, The Coteau Properties Company received Federal mining plan approval from the Assistant Secretary of Lands and Mineral Management to mine portions of the Federal coal tract

NDM-91535 at the Freedom Mine. On October 28, 2014, the North Dakota PSC notified the OSMRE that they had received Permit Revision No. 18 for The Coteau Properties Company Surface Coal Mining Permit NACT-0201. The total amount of Federal coal authorized for removal within the currently approved Federal mining plan is approximately 45.1 million tons; approximately 39.1 million tons still remain to be mined. No Federal surface acres would be added to the approved permit area; however, the Freedom Mine proposes to add approximately 960 Federal coal acres and 25.6 million tons of Federal coal to the approved Federal mining plan. The Permit Revision No. 18 proposed by the Freedom Mine would not change the average production rate or the maximum production rate for the life of the mining operation (i.e., until 2045). The mining plan modification would not extend the life of the mine (DOI 2015).

5.2 Cumulative Impact on Resource Areas

The following analysis examines the impact on the environment that would result from the incremental impact of the Proposed Action in addition to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. This analysis assesses the potential for an overlap of impacts with respect to project schedules or affected areas. This section presents a qualitative analysis of the cumulative effects, based on significant activities anticipated for the Proposed Action (e.g., ground-disturbing activities). The Proposed Action has been evaluated in conjunction with other past, present, and reasonably foreseeable future actions to determine whether cumulative effects on the human environment would occur. No significant, adverse, cumulative effects were identified in the cumulative effects analysis. The Proposed Action would have no effects on cultural resources and thus would not contribute to cumulative effects on cultural resources are not included in this cumulative effects analysis.

5.2.1 Air Quality and Climate Resources

According to the Annual Report for the North Dakota Ambient Air Quality Monitoring Program completed in 2015 by the NDDH, the Coal Creek Station and coal-fired power plants in the vicinity of the section 10 lease tract are considered to be major stationary point sources (i.e., more than 100 TPY) for some of the Federally listed criteria pollutants (NDDH 2015). A summary of the coal-fired power plants located in the area and considered to be major stationary point sources for CO, NO_x, VOCs, PM₁₀, and SO₂ is presented in *Table 15, Summary of Major Stationary Point Sources*.

Table 15, Summary of Major Stationary Point Sources

POLLUTANTS	GREAT RIVER ENERGY: SPIRITWOOD STATION	GREAT RIVER ENERGY: COAL CREEK STATION	GREAT RIVER ENERGY: STANTON STATION	BASIN ELECTRIC POWER COOPERATIVE: ANTELOPE VALLEY	BASIN ELECTRIC POWER COOPERATIVE: LELAND OLDS	MINNKOTA POWER COOPERATIVE: MILTON R. YOUNG STATION	OTTER TAIL POWER COMPANY: COYOTE STATION	MONTANA- DAKOTA UTILITIES COMPANY: HESKETT STATION
				STATION	STATION			
СО	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NOx	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VOCs	No	Yes	No	No	Yes	Yes	No	No
PM10	No	Yes	Yes	Yes	Yes	Yes	Yes	No
SO ₂	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: NDDH 2015

The State of North Dakota has been classified by the EPA as in attainment for NAAQS and SAAQS. The 2015 Annual Report stated that neither the Federal nor state standards for CO (i.e., 35,000 ppb [1-hour] and 9,000 ppb [8-hour]) were exceeded. The maximum concentrations of CO were 569 ppb (1-hour) and 300 ppb (8-hour). Neither the Federal nor state standards for NO₂ (i.e., 100 ppb [1-hour] and 53 ppb [annual]) were exceeded. The maximum concentrations for NO₂ were 35 ppb (3-year average of the 98th percentile 1-hour average concentrations) and 5.52 ppb (annual). The Federal and state standards for O₃ (i.e., 75 ppb) were not exceeded. The maximum fourth highest 8-hour concentration of O₃ was 60 ppb. Neither the Federal nor state standards for PM₁₀ (i.e., 150 μ g/m³ [24-hour]) or PM_{2.5} (i.e., 35 μ g/m³ [24-hour] and 12 μ g/m³ [annual]) were exceeded. The maximum concentrations for PM₁₀ so 108.0 μ g/m³ (24-hour) and 7.9 μ g/m³ (annual). The Federal and state standards for PM₁₀ was 108.0 μ g/m³, and the maximum concentrations for PM_{2.5} were 19 μ g/m³ (24-hour) and 7.9 μ g/m³ (annual). The Federal and state standards for SO₂ (i.e., 75 ppb [1-hour], 140 ppb [24-hour], and 30 ppb [annual]) were not exceeded. The maximum concentrations for SO₂ were 26 ppb (3-year average 1-hour 99th percentile), 6.5 ppb (24-hour), and 1.07 ppb (annual). There is no ambient air quality standard for NH₃; however, the mean 1-hour concentration reported was 4.8 ppb. There was no lead, H₂S, or hazardous air pollutant (HAP) monitoring conducted (NDDH 2015).

In addition to the Coal Creek Station and other coal fired power plants, four surface coal mines were considered in the cumulative assessment of impacts to air quality. The Beulah, Center, Coal Creek, and Freedom mines are within the vicinity of the proposed action. Coal mining and processing at active surface mines in conjunction with coal processing associated with the Proposed Action would collectively result in emissions of criteria pollutants, primarily PM₁₀. Emission rates from the Proposed Action would remain similar to current emission rates from the Falkirk Mine and would not contribute to increase in cumulative emissions. Cumulative emissions from mining operations would present a temporary, minor impact on air quality in the area. As reported in the NDDH 2015 Annual Report, emissions resulting from coal processing at existing mines have not resulted in any exceedances of any Federal or state standards for criteria pollutants. Continued rates of emissions from coal processing under the Proposed Action would represent a small percentage of overall air emissions in North Dakota and are not anticipated to result in any exceedances of NAAQS or SAAQS when combined with the emissions from existing coal processing occurring at other active mines. Therefore, cumulative effects are not expected to result in adverse impacts to air quality. As noted above, the proposed leasing action, if approved, would not increase overall production levels at the mine.

SURFACE MINE ^(a)	ANNUAL PRODUCTION	ESTIMATED ANNUAL CO ₂ EMISSIONS ^(b)	PERCENT OF TOTAL U.S. CO2 EMISSIONS ^(c)
Beulah Mine	3 million tons (2.72 million metric tons)	7.05 million metric tons	0.13
Center Mine	4 million tons (3.63 million metric tons)	9.40 million metric tons	0.17
Coyote Creek Mine	2.5 million tons ^(d) (2.27 million metric tons)	5.87 million metric tons	-
Falkirk Mine ^(e)	7 million tons (6.35 million metric tons)	16.45 million metric tons	0.30
Freedom Mine	13.5 million tons (12.25 million metric tons)	31.72 million metric tons	0.59
Total	27.5 million tons (24.95 million metric tons)	64.61 million metric tons	1.19

Table 16, Summary of Estimated CO2 Emissions from Coal Combustion in North Dakota

Sources: NDPSC 2015, SEC 2014, NDGS Undated

Notes:

- a. The Stony Creek Mine produces leonardite (i.e., oxidized coal used as a soil additive and used in drilling muds) and is not included in this table.
- b. The estimated annual CO2 emissions assume that all of the coal mined in North Dakota and supplied to the generating stations would undergo complete combustion.
- c. The percentage value for total CO2 emissions in the US resulting from coal combustion is approximate, which is related to the total annual coal production value. The CO2 emission contribution from each ND surface mines' coal delivered to electric generating stations is compared to the total CO2 emissions in the US reported in 2013, which was 5,396 million metric tons of CO2 (EIA 2014).
- Production began at the Coyote Creek Mine in 2016. Starting in 2017, its annual production will be approximately 2.5 million tons. CO2 emission calculations for the Coyote Creek Mine are estimated based on their 2017 annual production rate.
- e. The Falkirk Mine includes the section 10 lease tract.

As shown in Table 16, the total estimated CO₂ emissions from coal combustion associated with the Falkirk Mine (includes Proposed Action) and the other operating mines located near the lease tract, would represent approximately 1.19 percent of the total 2013 reported CO₂ emissions from coal combustion associated with surface coal mines operating in the United States. Therefore, cumulative effects from coal combustion emissions are not anticipated to be significant for purposes of this NEPA analysis.

As for the coal produced by the mine, it is assumed that all of it will be combusted given current operations at the mine. For purposes of this cumulative effects analysis, it is assumed that a surface coal mining operation would release approximately 1.91 grams of CH₄ per kilogram of mined coal (Spath et al. 1999). Table 17 summarizes the estimated CH₄ emissions (excluding combustion) from the Falkirk Mine (includes Proposed Action) and the other operating surface mines located near the lease tract. Please refer to *Table 17, Summary of Estimated CH₄ Emissions from Surface Coal Mines in North Dakot*a.

SURFACE MINE ^(a)	ANNUAL PRODUCTION	ESTIMATED ANNUAL CH₄ EMISSIONS	PERCENT OF TOTAL U.S. CH4 EMISSIONS ^(b)
Beulah Mine	3 million tons (2,721 million kilograms)	5,198 metric tons	0.05
Center Mine	4 million tons (3,628 million kilograms)	6,931 metric tons	0.07
Coyote Creek Mine	2.5 million tons ^(c) (2,267 million kilograms)	4,332 metric tons	-
Falkirk Mine ^(d)	7 million tons (6,350 million kilograms)	12,129 metric tons	0.13
Freedom Mine	13.5 million tons (12,246 million kilograms)	23,392 metric tons	0.24
Total	27.5 million tons (24,947 million kilograms)	47,650 metric tons	0.49

Table 17, Summary of Estimated CH4 Emissions from Surface Coal Mines in North Dakota

Sources: NDPSC 2015, SEC 2014, NDGS Undated

Notes:

- a. The Stony Creek Mine produces leonardite (i.e., oxidized coal used as a soil additive and used in drilling muds) and is not included in this table.
- b. The percentage value for total CH₄ emissions in the U.S., resulting from coal surface mining operations is approximate, and is based on the estimated CH₄ emitted which is related to the total annual surface coal production value (kg). The CH₄ emissions from each ND surface mine is compared to the total CH₄ emissions in the U.S. reported in 2013, which was 9.7 million metric tons (EPA 2015c).
- c. Production began at the Coyote Creek Mine in 2016. Starting in 2017, its annual production will be approximately 2.5 million tons. CO2 emission calculations for the Coyote Creek Mine are estimated based on their 2017 annual production rate.
- d. The Falkirk Mine includes the section 10 lease tract.

As shown in Table 17, the total estimated CH_4 emissions from the Falkirk Mine (includes Proposed Action) and the other operating surface mines located near the lease tract, represents approximately 0.49 percent of the total 2013 reported CH_4 emissions from surface coal mines operating in the United States. Therefore, cumulative effects from surface mining emissions associated with total production at the Falkirk Mine in conjunction with other active surface mines in the vicinity of the proposed action are not anticipated to be adverse.

On October 23, 2015, the EPA issued the final rule for the Clean Power Plan (CPP), which is expected to achieve (by calendar year 2030) a 32 percent reduction of United States power plant CO₂e emissions from 2005 levels. On February 9, 2016, the Supreme Court stayed implementation of the CPP pending a judicial review. On September 27, 2016, the U.S. Court of Appeals for the D.C. Circuit heard oral arguments for the legal challenge of the CPP. A decision has not been issued. The plan creates a partnership between the EPA, states, tribes, and United States territories. The EPA has set emissions goals, and the states, tribes, and United States territories will choose how they will meet the goals. The EPA is currently establishing interim and final CO₂ emission performance rates for two subcategories of fossil fuel-fired electric generating units including (1) fossil fuel-fired electric steam generating units (e.g., coal- and oil-fired power plants) and (2) natural gas-fired combined cycle

generating units. To maximize the range of choices available to states in implementing the standards and to utilities in meeting them, the EPA is establishing interim and final statewide goals in three forms: (1) a rate-based state goal measured in pounds per megawatt hour, (2) mass-based state goal measured in total short tons of CO₂, and (3) mass-based state goal with a new source complement measured in total short tons of CO₂. Based on this, states will develop and implement plans that ensure that the power plants in their state (either individually, together, or in combination with other measures) achieve the interim CO₂ emissions performance rates over the period of 2022 to 2029 and the final CO₂ emissions performance rates, rate-based goals, or mass-based goals by 2030 (EPA 2015d). On February 9, 2016, the U.S. Supreme Court granted a stay on further implementation of the rule. The stay will remain in place while the Washington, D.C. Circuit resolves the merits, and until the Supreme Court resolves any appeals.

5.2.2 General Wildlife

No cumulative effects on wildlife would be expected from leasing activities associated with the Proposed Action. Implementation of mining activities associated with the Proposed Action combined with present and reasonably foreseeable future mining actions at other mine operations would result in short-term, cumulative effects on wildlife due to temporary habitat loss and fragmentation. During mining activities under the Proposed Action, the Falkirk Mine would maintain sediment-control ponds and SPGM stockpiles throughout the mining areas. These areas would be planted with a grass/forb mixture for erosion stabilization and would become dense, suitable nesting cover for waterfowl and upland species. Reclamation plans under the Proposed Action would include reclaiming tame grassland and establishing field windbreaks, which would add considerable wildlife habitat values to the cropland. In addition, all of the wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetlands and maximize wildlife use. Therefore, cumulative effects on wildlife are not anticipated to be significant.

Noise from mining activities associated with the Proposed Action combined with noise from local vehicle traffic, agriculture equipment, and nearby mining equipment would result in short-term, cumulative effects on wildlife. Disturbance from mining activities associated with the Proposed Action combined with local vehicle traffic, agriculture equipment, and mining activities at other active mines could cause wildlife to engage in escape or avoidance behaviors. Most wildlife species in the area would be expected to quickly recover once the mining activities ceased, or habituate to the disturbances altogether. Noise from mining activities in the area could result in temporary disturbance to migratory birds; however, it is likely that migratory birds would avoid pit operation areas and use other areas not disturbed by mining activities. Under the Proposed Action, mining activities would be conducted in a manner to avoid adverse impacts on migratory birds to the extent practicable and environmental protection measures could be implemented to reduce or avoid impacts on migratory birds, as necessary. In addition, wildlife species and habitat types and subtypes would be conducted under the Proposed Action. Therefore, cumulative effects on wildlife are not anticipated to be significant.

5.2.3 Geological, Mineral, and Paleontological Resources

No cumulative effects on geological, mineral, or paleontological resources would be expected from leasing activities associated with the Proposed Action. Implementation of the Proposed Action

combined with present and reasonably foreseeable future mining actions occurring at the other operating mines located near the lease tract, would result in long-term, cumulative effects on geological, mineral, and paleontological resources. Table 18 summarizes the 2016 coal production in North Dakota compared to the total North Dakota in-place coal reserve base. Table 19 compares the in-place coal reserve value for the section 10 lease tract to the total North Dakota in-place coal reserve base. Please refer to *Table 18, 2016 North Dakota Coal Production Compared to the Estimated North Dakota in-place Coal Reserve Base* and *Table 19, Section 10 Lease Tract in-place Coal Reserve Compared to the Estimated North Dakota in-place Coal Reserve Base*.

 Table 18, 2016 North Dakota Coal Production Compared to the Estimated North Dakota in-place Coal Reserve

 Base

SURFACE MINE ^(a)	2016 COAL PRODUCTION	PERCENT OF TOTAL ND COAL PRODUCTION	PERCENT OF ESTIMATED ND IN-PLACE COAL RESERVE BASE ^(b)
Beulah Mine	2.5 million tons	8.6	0.010
Center Mine	3.83 million tons	13.1	0.015
Coyote Creek Mine	1.49 million tons ^(c)	5.1	0.006
Falkirk Mine ^(d)	7.24 million tons	24.8	0.029
Freedom Mine	14.12 million tons	48.4	0.056
Total	29.18 million tons	-	0.117

Sources: NDPSC 2015, SEC 2014, NDGS Undated, North Dakota Coal Operators, 2017

Notes:

- a. The Stony Creek Mine produces leonardite (i.e., oxidized coal used to treat soils and is an additive for drilling mud) and is not included in this table.
- b. The North Dakota mineable coal reserve base is estimated at 25 billion tons.
- c. The Coyote Creek Mine began production in April 2016.
- d. The Falkirk Mine includes the section 10 lease tract.

Table 19, Section 10 Lease Tract in-place Coal Reserve Compared Reserve Compared to the Estimated North Dakota in-place Coal Reserve Base

LEASE TRACT	IN-PLACE RESERVES ^(a)	PERCENT OF 2016 NORTH DAKOTA COAL PRODUCTION ^(b)	PERCENT OF ESTIMATED NORTH DAKOTA IN-PLACE COAL RESERVE ^(C) ACT MINERABLE RESERVES PERCENT OF TOTAL
Section 10	4.41 million tons	15.1	0.018

Note:

- a. Based upon BLM Falkirk Geologic Model.
- b. North Dakota coal production was 29.18 million tons in 2016.
- c. Estimated North Dakota in-place coal reserve base is estimated at 25 billion tons.

The 7.24 million tons of coal produced in 2016 at the Falkirk Mine represents approximately 24.8 percent of the 2016 coal production in North Dakota and approximately 0.029 percent of the estimated North Dakota in-place coal reserve base. The 4.41-million-ton reserve value for the section 10 lease tract represents approximately 15.1 percent of the 2016 coal production in North Dakota and approximately 0.018 percent of the estimated North Dakota in-place coal reserve base. Therefore, the cumulative effects on mineral resources are not anticipated to be significant. Cumulative effects on topography from ground disturbing activities (e.g., top soil, sub soil, overburden, interburden, and coal removal) associated with the Proposed Action, when combined with the ground disturbing activities associated with all of the existing North Dakota lignite mines, would be minor. Except for the removal of the coal beds, the overall nature of the geological and mineral resources of the area are not anticipated to change. It is likely that there are continuous (unconventional) gas resources in the mining areas associated with the Proposed Action; therefore, implementation of the Proposed Action could contribute to the overall loss of continuous gas resources in the area. It is unlikely that there are oil resources in the mining areas associated with the Proposed Action; therefore, implementation of the Proposed Action is not anticipated to contribute to the overall loss of oil resources in the area.

Mining-related subsidence impacts occurring at other active mines in conjunction with subsidence impacts associated with the Proposed Action would collectively result in short-term, temporary, cumulative effects. The surface effects of subsidence associated with the Proposed Action would depend on the characteristics of the overburden, depth of mining, and thickness of the coal bed(s) removed. The overall effects from subsidence from mining associated with Proposed Action and mining at the Falkirk Mine are anticipated to be minor over the short-term and negligible over the long-term. All areas reclaimed under the Proposed Action would conform and be consistent with the adjacent topography of unmined land. Any highwalls remaining from the final cut would be graded to comply with existing applicable state and Federal regulations. Upon completion of final grading, surface drainage patters would be reestablished to approximate the general basins that existed prior to mining.

Cumulative effects on paleontological resources from mining operations associated with the Proposed Action, when combined with the mining operations being conducted at all other North Dakota coal mines, would be minor depending on the paleontological resources occurring at each of the mines. It is likely that there are paleontological resources occurring in the Sentinel Butte and Coleharbor formations, associated with the Proposed Action; therefore, implementation of the Proposed Action could contribute to the overall loss of paleontological resources of scientific interest (e.g., flora, clam, insect, fish, bird, amphibian, and mammal fossils) occurring in the lease tract.

Under the Proposed Action, potential impacts on paleontological resources would be assessed by a professional paleontologist in accordance with best management practices. The results of the assessment would be the basis for development of a mitigation plan and recommendation for proceeding with the mining.

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5.2.4 Hazardous and Solid Waste

No cumulative effects would be expected from leasing activities associated with the Proposed Action. No hazardous materials would be used, and there would be no generation of hazardous or solid wastes associated with the leasing activities.

Mining activities associated with the Proposed Action would not include the use of hazardous materials or generation of hazardous wastes. However, mining activities would generate non-coal wastes (e.g., trees, brush, wood materials, brick) and municipal solid waste (e.g., food scraps, paper, product packaging). Disposal of non-coal wastes associated with the Proposed Action would occur in approved mining pits surrounded by land owned by the Falkirk Mine, and therefore, would not affect the capacities of the non-coal waste disposal areas at other active mines. The quantity of municipal solid waste generated from mining activities associated with the Proposed Action, when added to the municipal solid waste generated at other active mines, is not anticipated to exceed the capacities of municipal solid waste disposal facilities in the area.

5.2.5 Noise

No cumulative effects on the noise environment would be expected from leasing activities associated with the Proposed Action. Noise from mining activities associated with the Proposed Action combined with noise from local vehicle traffic, agriculture equipment, and nearby mining equipment would result in short-term, cumulative effects on the noise environment. Overall, mining activities associated with the Proposed Action would collectively increase noise levels in the area temporarily, but variations in the timing of cumulative mining activities would moderate impacts over space and time. Equipment noise from other active mines and agricultural activities combined with equipment noise from mining activities associated with the Proposed Action 10 lease tract. Therefore, increased noise from the Proposed Action would not be expected to result in significant, cumulative effects on the noise environment in the area.

5.2.6 Prime and Unique Farmland

No cumulative effects on prime or unique farmland or farmland of statewide importance would be expected from leasing activities associated with the Proposed Action.

Cumulative effects on farmland of statewide importance from mining activities associated with the Proposed Action, when combined with the mining activities occurring at other active mines, would be minor depending on the amount of prime and unique farmlands and farmland of statewide importance in each of the coal mines. Reclamation conducted at all surface coal mines in North Dakota includes a twolift method: (1) topsoil composed of the A horizon and the upper B horizon and (2) subsoil composed of the lower B and C horizons. This two-lift method has been shown effective in reclaiming croplands to their full premining yield potential. The Falkirk Mine would conduct reclamation activities that would create a final soil that would have a productive capacity equal to, or greater than, that which existed prior to mining.

5.2.7 Socioeconomics and Environmental Justice

Private ownership of the mineral estate for the areas to be mined in the section 10 lease tract and existing mining operations would receive lease bonus payments and production royalty payments for

leasing and mining their coal interest. This would increase their incomes and temporarily stimulate the economy and increase business volume in the area during the lease terms. The leasing activities associated with the Proposed Action, when combined with leasing activities occurring at other active mines, would not result in substantial changes to the current economic conditions of the region, displace substantial numbers of people, substantially reduce the number of available housing units, cause a substantial decrease in property values, disproportionately affect minority or low-income populations, or cause any environmental health and safety risks that would disproportionately affect populations of children.

Mining activities associated with the Proposed Action in conjunction with mining activities occurring at other active mines would result in increases in employment and business volume in the area during the time in which mining would occur due to increases in payroll taxes, sales receipts, and the indirect purchase of goods and services. Mining activities in the section 10 lease tract are expected to provide four months-worth of production. The mining activities associated with the Proposed Action, when combined with mining activities occurring at other active mines, would not result in substantial changes to the current economic conditions of the region, displace substantial numbers of people, reduce the number of available housing units, or cause a substantial decrease in property values.

McLean, Mercer, and Oliver counties contain lower minority populations and lower percentages of individuals living below the poverty level in comparison to the State of North Dakota. Therefore, no minority or low-income populations would be cumulatively or disproportionately affected by mining activities associated with the Proposed Action. In addition, there are no environmental health and safety risks identified that would disproportionately affect populations of children, as the areas to be mined would be fenced and appropriately marked with signs to prevent trespassing.

5.2.8 Soils

No cumulative effects on soils would be expected from leasing activities associated with the Proposed Action. With respect to mining-related soil impacts, surface mining at other active mines in conjunction with surface mining associated with the Proposed Action would collectively result in short-term, cumulative effects.

In general, mining activities in the area impact soils by changing their structure, organic content, fertility, infiltration, and permeability. Reclamation of surface mines minimizes erosion and sedimentation once mining activities have ceased. During mining activities associated with the Proposed Action, SPGM would either be stockpiled in the areas designated for topsoil and subsoil stockpiles or directly respreads onto approved regraded areas to minimize erosion and sedimentation. Under the Proposed Action, reclamation activities would include scarifying overburden prior to subsoil replacement, respreading topsoil and subsoil material on approved areas, and mulching and seeding the area. In addition, the Falkirk Mine would submit an SPGM removal plan prior to each SPGM removal season to the North Dakota PSC. The plan would address the volume of SPGM projected to be salvaged during the season and would include a map depicting the SPGM removal operations. Therefore, cumulative effects on soils from potential increases in erosion and sedimentation from mining activities would not occur.

5.2.9 Threatened, Endangered, Proposed, and Candidate Species

No cumulative effects on threatened or endangered species would be expected from leasing activities associated with the Proposed Action. Mining activities associated with the Proposed Action combined with mining activities occurring at other active mines could result in short-term, cumulative effects on populations of whooping cranes in the area depending on the amount and availability of habitat in nearby coal mines. All habitats altered will be short term in nature regardless of which mine they occur at. On a population scale, the impacts are negligible and short term in nature.

Under the Proposed Action, temporary habitat loss and fragmentation and increased noise would be expected from mining activities, which could temporarily displace populations of whooping cranes. However, most of the species in the area would be expected to quickly recover from noise disturbances once mining activities ceased, or habituate to the disturbances altogether. In addition, reclamation plans under the Proposed Action would include reclaiming tame grassland and establishing field windbreaks, which would add considerable wildlife habitat values to the cropland, and all of the wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetlands and maximize wildlife use. As part of the Proposed Action, wildlife species and habitat types and subtypes would be monitored before, during, and after mining activities, and waterfowl and breeding bird surveys would also be conducted. Therefore, cumulative effects are not anticipated to be significant.

5.2.10 Transportation Resources

No cumulative effects on transportation would be expected from leasing activities associated with the Proposed Action. Haul roads and ancillary haul roads within the coal mining areas would be used and or constructed to transport the coal from the pit to the truck dump/crusher facility.

5.2.11 Vegetation

No cumulative effects on vegetation would be expected from leasing activities associated with the Proposed Action. Mining activities associated with the Proposed Action combined with mining activities occurring at other active mines would result in short-term, cumulative effects on vegetation.

During mining activities associated with the Proposed Action, vegetation would be removed; however, upon completion of mining activities revegetation would occur. The Falkirk Mine would conduct all management and normal husbandry practices necessary (e.g., weed and pest control, litter reduction, interseeding, reseeding, fertilization, remulching) to achieve and maintain an adequate vegetation cover, which would both stabilize the soil and support the post-mining land uses and achieve revegetated areas until (1) the area is consistent with the specifications outlined in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations or (2) the area is consistent with the surrounding undisturbed vegetation and free of noxious weeds. Therefore, the Proposed Action would not contribute to an overall long-term, cumulative loss of vegetation in the area.

5.2.12 Visual Resources

No cumulative effects on visual resources would be expected from leasing activities associated with the Proposed Action. Mining activities associated with the Proposed Action combined with mining activities occurring at other active mines could result in short-term, cumulative effects on visual resources.

The overall area of McLean, Mercer, and Oliver counties is primarily rural (Mercer County is 35 percent urban). The population densities in McLean, Mercer, and Oliver counties range from very low to low (3 to 8 people per square mile). People using ND-200 in the vicinity of the section 10 lease tract and Falkirk Mine would likely be able to see mining activities the closer they got to the mining area. However, since the land in McLean and Mercer counties is considered primarily rural, with very low to low population densities, cumulative visual impacts for people driving on ND-200 in the vicinity of the mining areas would be minor and only occur during the duration of the mining activities. People using recreational areas at the Coal Lake Wildlife Management area would not likely be within the viewshed of mining activities associated with the Proposed Action. Since no other active coal mines are within the viewshed (i.e., approximately 3 miles) of the Coal Lake Wildlife Management area, cumulative effects would not be expected.

5.2.13 Water Resources (Groundwater, Surface Water, Wetlands, and Waters of the United States)

No cumulative effects on groundwater, surface water, or wetlands would be expected from leasing activities associated with the Proposed Action. No cumulative effects on waters of the United States would be expected from leasing or mining activities associated with the Proposed Action, as there are no waters of the United States within the section 10 lease tract. Mining operations associated with the Proposed Action, combined with mining operations occurring at the other mines, would result in long term, cumulative effects on groundwater, and short-term, cumulative effects on surface water and wetlands.

Most of the coal mined in North Dakota occurs in the Sentinel Butte and Bullion Creek formations of the Fort Union Group. These coal beds frequently serve as aquifers. Mining operations associated with the Proposed Action would include the recovery of the Hagel A and Hagel B coal beds. Within Mercer and Oliver counties, the Hagel, Beulah Zap, Twin Buttes, Schoolhouse, and Kinneman Creek coal beds are being recovered at other mining operations (Schobert 1995).

The predominately silty claystone and clayey siltstone components of the overburden (Sentinel Butte Formation) were originally sorted and systematically deposited by fluvial processes in orderly layers, resulting in distinct hydraulic, lithologic, and chemical properties. Following coal removal from the lease tract pit, it would be filled with overburden material (spoil) that possesses the same hydraulic, lithologic, and chemical properties. However, since the spoil in the abandoned pit was placed in a chaotic manner, it would lack the hydraulic, lithologic, and chemical continuity that occurred in the overburden prior to mining.

After the pit has been fully reclaimed, the spoil occupying the reclaimed mine pit would eventually become saturated at its base due to recharge. Ultimately, the water level elevation in the unconfined spoil would rise to approximate the pre-mining potentiometric surface occurring in the overburden.

Therefore, long-term, cumulative effects on groundwater in the Sentinel Butte and Bullion Creek formations would not be considered significant.

Mining operations associated with the Proposed Action would include vegetation and soil removal, which would add to the overall transport of sediment and other pollutants in the area to nearby watersheds and water bodies during storm water flow events. The Falkirk Mine would construct surface water structures prior to surface disturbance and maintain compliance with all applicable effluent standards and conditions listed in their NPDES permit and North Dakota PCS water management rules and regulations. Upon completion of mining activities, the Falkirk Mine would revegetate mined areas, which would reduce water volume and velocity of storm water runoff entering nearby water bodies. Therefore, short-term, cumulative effects, from sediment and pollutant transport from mine operations conducted in the area, would not be significant.

Mining operations conducted in the section 10 lease tract combined with operations occurring at other the other mines, would collectively result in minor, cumulative effects on wetlands located in the area, depending on the amount of wetland acreage disturbed at each mine. Wetlands in the section 10 lease tract disturbed by mining operations would be replaced to ensure no net loss of wetland acreage, minimize the hindrance to farming, and maximize wildlife use. Post-mining temporary and seasonal wetland acreage would be at least equivalent to the pre-mining wetland acreage. Therefore, cumulative effects from wetland disturbance would be temporary.

In 2011, the North Dakota PSC completed a Cumulative Hydrologic Impact Assessment (CHIA) of The Falkirk Mining Company that included an assessment of the probable cumulative hydrologic impacts of all of the anticipated mining in the area of the Falkirk Mine, as required by NDCC 38-14.1-21-(3)(c) (NDPSC 2011). The following paragraphs provide summaries of the probable cumulative hydrologic impacts on groundwater, surface water, and wetlands, as discussed in the CHIA.

All groundwater wells within the assessment area that have been, or would be, destroyed by mining or affected by temporary head loss during mining are listed and discussed in Section 2.2.5 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. The probable hydrologic consequences assessment of the Falkirk mining permits indicate that several operating wells within the permit boundaries of the coalfield have been, or would be, destroyed by mining. In all instances, suitable replacement sources have been identified in the permit narrative and include deeper aquifers, as well as piped rural water that would provide similar or better water quality and quantity than what was available prior to mining. Several other wells in the general area have experienced, or may experience, drawdown effects from mining activities. If any adverse impacts were to occur, the Falkirk Mine would be required by regulations to replace lost supplies with water of equal or better quantity and quality at no significant increase in operating or maintenance costs to the owner. Adequate replacement sources exist and are discussed in the permit (NDPSC 2011). Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations*.

According to the CHIA, seasonal low water levels of the Saylers, Weller, Samuelson, and slough systems are probably augmented by mine production of groundwater. However, during the dry conditions of 1988-1992, water levels of these slough systems were not significantly altered by the mine contribution. During wet periods, the natural and mine-discharged groundwater contribution to

Coal Lake can be a factor in wetland habitat suitability, and the Falkirk Mine works with the USFWS to maintain optimal water levels in the lake. Evapotranspiration typically exceeds precipitation in North Dakota, and the magnitude of evaporative losses in the mine surface water management system and in the surrounding wetlands has not been determined. The dewatering of shallow aquifers at active pits is likely balanced somewhat by increased natural recharge of glacial aquifers within the wetlands drainage systems, which receive mine NDPDES discharges. The Falkirk Mine operations maintain cleaner surface water discharges than are typical for McLean County. Positive dilution effects on surface water quality downstream from permit areas are insignificant because the quantities discharged through the mine NDPDES system, though large, are relatively small compared to the volumes of water contributed by natural groundwater discharge systems and surface runoff outside permitted areas. Additionally, due to recharge, the potentiometric surfaces of the adjacent unmined aquifers would return to their pre-mining elevations following tract reclamation.

Potential effects on wetlands in the permit area and adjacent areas are addressed, and plans for wetland replacement are detailed, in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Impacts on springs, wells, or stock dams are not anticipated, other than those in or adjacent to the permit area, as discussed in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to *Appendix B, Falkirk Mine Permit to Engage in Surface in Surface Coal Mining and Reclamation Operations*.

5.3 Relationship between Short-Term Uses of the Human Environment and Maintenance and Enhancement of Long-Term Productivity

NEPA requires consideration of the relationship between short-term use of the environment and the impacts that such use could have on the maintenance and enhancement of long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Such impacts include the possibility that choosing one alternative could reduce future flexibility to pursue other alternatives, or that choosing a certain use could eliminate the possibility of other uses at the site. Short-term uses of the biophysical components of the human environment include direct impacts, usually related to construction activities, which occur over a period of less than 5 years. Long-term uses of the human environment include those impacts that occur over a period of more than 5 years, including permanent resource loss. Since mining activities in the section 10 lease tract would occur for 7 months, the Proposed Action would be expected to result in minor, cumulative effects; however, these cumulative effects would not be considered significant.

5.4 Irreversible and Irretrievable Commitment of Resources

NEPA (42 U.S.C. 4332 Section 102(2)(C)(v) as implemented by CEQ regulation 40 CFR 1502.16) requires an analysis of significant, irreversible effects resulting from implementation of a proposed action. An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered, even after an activity has ended. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources such as metal, wood, fuel, paper, and other natural resources) also are

considered irretrievable. Human labor is also considered an irretrievable resource. All such resources are irretrievable in that they are used for a project and thus, become unavailable for other purposes.

An impact that falls under the category of the irreversible or irretrievable commitment of resources is the destruction of natural resources that could limit the range of potential uses of that resource. Implementation of the Proposed Action would result in an irreversible commitment of vehicles and equipment used during mining activities and human labor and other resources. Energy, water, fuel consumption, and demand for services would not increase significantly as a result of implementation of the Proposed Action because the overall production rate at the mine is not expected to increase as a result of the Proposed Action. Similarly, the Proposed Action is not expected to result in changes to the operations at the Great River Energy's Coal Creek Station. As a result, the overall consumption of energy resources would not place a significant demand on their availability in the region. The commitment of these resources is undertaken in a regular and authorized manner and does not represent a significant impact.

6.1 Consultation and Coordination

Project specific consultation and coordination occurred at an initial project kickoff meeting held on March 23, 2015, at the Falkirk Mine. Agencies that attended the meeting included BLM; OSMRE; North Dakota PSC; and representatives from the Falkirk Mine, NACC, and KLJ. Discussions at the kickoff meeting included the areas of concern on the proposed project and necessary clearance and approvals received during preparation of the existing mine permits. In addition, BLM conducted internal scoping with pertinent agencies to determine resources potentially affected.

In accordance with the requirements of Section 106 of the NHPA, letter detailing the proposed project, map of the project location, and Class I cultural resources packet was submitted to the THPO of the MHAN, LSIC, FPT, NCT, SLST, SRST, and TMBC. In addition, the Class III Cultural Resources Inventory conducted in 2015 was also submitted to the THPO of those Tribes. To date, the BLM has not received any comments or concerns regarding the proposed project or Class III pedestrian cultural resources inventory from any of the aforementioned Tribes.

Coordination with the North Dakota SHPO was conducted for the proposed project. On June 29, 2015, a concurrence letter from the North Dakota SHPO was received that provided a finding of "no historic properties affected" for the proposed sale of the section 10 lease tract, provided the project proceeds as currently planned. In December 2016, BLM reached out to several tribes that have traditional connections to central North Dakota. These tribes include the Cheyenne River Sioux Tribe, Crow Tribe, Crow Creek Sioux Tribe, Flandreau Santee Sioux Tribe, Fort Belknap Gros Ventre and Assiniboine Tribes, Fort Peck Assiniboine and Sioux Tribes, Lower Brule Sioux Tribe, Lower Sioux Tribe, Northern Cheyenne Tribe, Oglala Sioux Tribe, Rosebud Sioux Tribe, Santee Sioux Tribe, Sisseton-Wahpeton Oyate, Spirit Lake, Standing Rock Sioux Tribe, Three Affiliated Tribes: Mandan, Hidatsa, and Arikara, Turtle Mountain Band of Chippewa, and Yankton Sioux Tribe. BLM invited these tribes to bring up concerns relating to the environmental analyses and provided a copy of the draft EA for review and comment. To date, no comments on the draft EA have been received.

6.2 Preparers and Contributors

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CHAPTER 7 REFERENCES, ABBREVIATIONS, AND ACRONYMS

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ABBREVIATIONS AND ACRONYMS

µg/m³	micrograms per cubic meter	НАР	hazardous air pollutant
AAQM	Ambient Air Quality Monitoring	IPCC	Intergovernmental Panel on Climate Change
ACS	American Community Survey	LSIC	Lower Sioux Indian Community
ASLM	Assistant Secretary for Land and Minerals Management	MBTA	Migratory Bird Treaty Act
BLM	Bureau of Land Management	mg/m³	milligrams per cubic meter
CAA	Clean Air Act	MHAN	Mandan, Hidatsa, and Arikara Nation
CEQ	Council on Environmental Quality	MLA	Mineral Leasing Act
CFR	Code of Federal Regulations	mph	miles per hour
CH_4	methane	MW	megawatts
CHIA	Cumulative Hydrologic Impact	N ₂ O	nitrous oxide
	Assessment	NAAQS	National Ambient Air Quality Standards
CO	carbon monoxide	NACC	North American Coal Corporation
CO ₂	carbon dioxide	NCT	Northern Cheyenne Tribe
CO₂e	carbon dioxide equivalent	NDDH	North Dakota Department of Health
CWA	Clean Water Act	NDFO	North Dakota Field Office
dBA	A-weighted decibels	NEPA	National Environmental Policy Act
EA	Environmental Assessment	NH_3	ammonia
EIS	Environmental Impact Statement	NHPA	National Historic Preservation Act
EO	Executive Order	NO ₂	nitrogen dioxide
EPAct	Energy Policy Act	NO _x	nitrogen oxides
ESA	Endangered Species Act	NOy	total reactive oxides
FCLAA	Federal Coal Leasing Amendments Act	NRCS	Natural Resources Conservation Service
FPPA	Farmland Protection Policy Act	NRHP	National Register of Historic Places
FPT	Fort Peck Tribes	O ₃	ozone
FR	Federal Register	OSHA	Occupational Safety and Health Administration
ft³	cubic feet	OSMRE	Office of Surface Mining Reclamation
GHG	greenhouse gas		and Enforcement
GPS	Global Positioning System	Pb	lead
GWP	Global Warming Potential	PFYC	Potential Fossil Yield Classification
H_2S	hydrogen sulfide	PM _{2.5}	particulate matter equal to or less than 2.5 microns in diameter

PM ₁₀	particulate matter equal to or less than 10 microns in diameter	SO ₂	sulfur dioxide
ppb	parts per billion	SPGM	suitable plant growth material
ppm	parts per million	SRST	Standing Rock Sioux Tribe
PSC	Public Service Commission	THPO	Tribal Historic Preservation Officer
PSD	Prevention of Significant Deterioration	тмвс	Turtle Mountain Band of Chippewa
R2P2	Resource Recovery and Protection Plan	ТРҮ	tons per year
RMP	Resource Management Plan	USACE	U.S. Army Corps of Engineers
SAAQS	State Ambient Air Quality Standards	U.S.C.	United States Code
SDWA	Safe Drinking Water Act	USDA	U.S. Department of Agriculture
SHPO	State Historical Preservation Office	EPA	U.S. Environmental Protection Agency
SHSND	State Historical Society of North Dakota	USFWS	U.S. Fish and Wildlife Service
SIP	State Implementation Plan	USGS	U.S. Geological Survey
SLST	Spirit Lake Sioux	VOC	volatile organic compound
SMCRA	Surface Mining Control and Reclamation Act		





Falkirk Mine Plan





Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations



Coal Lease

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

FORM APPROVED OMB NO. 1004-0073 Expires: June 30, 2016

Serial Number

COAL LEASE

PART 1. LEASE RIGHTS GRANTED

This lease, entered into by and between the UNITED STATES OF AMERICA, hereinafter called lessor, through the Bureau of Land Management (BLM), and (*Name and Address*)

hereinafter called lessee, is effective (*date*) / / , for a period of 20 years and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of the 20th lease year and each 10-year period thereafter.

Sec. 1. This lease is issued pursuant and subject to the terms and provisions of the:

□ The Mineral Leasing Act of 1920, as amended, 30 U.S.C. 181 - 287; or

□ The Mineral Leasing Act for Acquired Lands, 30 U.S.C. 351 - 359;

and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessor, in consideration of any bonuses, rents, and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants and leases to lessee the exclusive right and privilege to drill for, mine, extract, remove, or otherwise process and dispose of the coal deposits in, upon, or under the following described lands:

containing acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and the right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE - Lessee must pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of \$ for each lease year.

(b) RENTAL CREDITS - Rental will not be credited against either production or advance royalties for any year.

Sec. 2. (a) PRODUCTION ROYALTIES - The royalty will be percent of the value of the coal as set forth in the regulations. Royalties are due to lessor the final day of the month succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES - Upon request by the lessee, the BLM may accept, for a total of not more than 20 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty will be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS - Lessee must maintain in the proper office a lease bond in the amount of \$. The BLM may require an increase in this amount when additional coverage is determined appropriate.

Sec. 4. DILIGENCE - This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused

when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years will terminate the lease. Lessee must submit an operation and reclamation plan for the BLM's approval pursuant to 30 U.S.C. 207(c) prior to conducting any development or mining operations or taking any other action on a leasehold which might cause a significant disturbance of the environment.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

5. LOGICAL MINING UNIT (LMU) - Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease will become an LMU or part of an LMU, subject to the provisions set forth in the regulations.

The stipulations established in an LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease will then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION - At such times and in such form as lessor may prescribe, lessee must furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee must keep open at all reasonable times for the inspection by BLM the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee must allow lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section will be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS -Lessee must comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee must not conduct exploration operations, other than casual use, without an approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area must be submitted to the BLM.

Lessee must carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation to any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee must take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but are not limited to, modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits not covered hereunder and approving easements or rights-of-way. Lessor must condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8. PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTU-NITY - Lessee must: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any one day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years should be employed in any mine below the surface. To the extent that laws of the State in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor. Neither lessee nor lessee's subcontractors should maintain segregated facilities.

Sec. 15. SPECIAL STIPULATIONS -

Sec. 9. (a) TRANSFERS -

This lease may be transferred in whole or in part to any person, association or corporation qualified to hold such lease interest.

This lease may be transferred in whole or in part to another public body or to a person who will mine coal on behalf of, and for the use of, the public body or to a person who for the limited purpose of creating a security interest in favor of a lender agrees to be obligated to mine the coal on behalf of the public body.

This lease may only be transferred in whole or in part to another small business qualified under 13 CFR 121.

Transfers of record title, working or royalty interest must be approved in accordance with the regulations.

(b) RELINQUISHMENT - The lessee may relinquish in writing at any time all rights under this lease or any portion thereof as provided in the regulations. Upon lessor's acceptance of the relinquishment, lessee will be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. DELIVERY OF PREMISES, REMOVAL OF MACHINERY,

EQUIPMENT, ETC. - At such time as all portions of this lease are returned to lessor, lessee must deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all workings in condition for suspension or abandonment. Within 180 days thereof, lessee must remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the BLM. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, will become the property of the lessor, but lessee may either remove any or all such property or continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface is owned by third parties, lessor will waive the requirement for removal, provided the third parties do not object to such waiver. Lessee must, prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulations, reclaim all lands the surface of which has been disturbed, dispose of all debris or solid waste, repair the offsite and onsite damage caused by lessee's activity or activities incidental thereto, and reclaim access roads or trails

Sec. 11. PROCEEDINGS IN CASE OF DEFAULT - If lessee fails to comply with applicable laws, existing regulations, or the terms, conditions and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease will be subject to cancellation by the lessor only by judicial proceedings. This provision will not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver will not prevent later cancellation for the same default occurring at any other time.

Sec. 12. HEIRS AND SUCCESSORS-IN-INTEREST - Each obligation of this lease will extend to and be binding upon, and every benefit hereof will inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. INDEMNIFICATION - Lessee must indemnify and hold harmless the United States from any and all claims arising out of the lessee's activities and operations under this lease.

Sec. 14. SPECIAL STATUTES - This lease is subject to the Clean Water Act (33 U.S.C. 1252 et seq.), the Clean Air Act (42 U.S.C. 4274 et seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.).

Sec. 15. SPECIAL STIPULATIONS (Cont'd.) -

THE UNITED STATES OF AMERICA

(Company or Lessee Name)	by
(Signature of Lessee)	(BLM)
(Title)	(Title)
(Date)	(Date)

NOTICES

The Privacy Act and 43 CFR 2.48(d) require that you be furnished with the following information in connection with the information requested by this form.

AUTHORITY: 30 U.S.C. 181 - 287 and 30 U.S.C. 351 - 359 permit collection of the information requested by this form. PRINCIPAL PURPOSE: The BLM will use the information you provide to process your application and determine if you are eligible to hold a coal lease on public lands.

ROUTINE USES: The BLM will only disclose this information in accordance with the provisions at 43 CFR 2.56(b) and (c). EFFECT OF NOT PROVIDING INFORMATION: Submission of the requested information is necessary to obtain or retain a benefit. Failure to submit all of the requested information or to complete this form may result in delay or preclude the BLM's acceptance of your application for a coal lease.

The Paperwork Reduction Act requires us to inform you that:

The BLM collects this information to evaluate and authorize proposed exploration and mining operations on public lands.

Submission of the requested information is necessary to obtain or retain a benefit.

You do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: The public reporting burden for this form is estimated to average 25 hours per response when the form is used under the authority of 43 subpart 3422 (Lease Sales), or 800 hours per response when the form is used under the authority of 43 subpart 3430 (Preference Right Leases). The estimated burdens include the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. You may submit comments regarding the burden estimate or any other aspect of this form to: U.S. Department of the Interior, Bureau of Land Management (1004-0073), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, Mail Stop 401 LS, Washington, DC 20240.

(Form 3400-12, page 4)

SPECIAL COAL LEASE STIPULATIONS

In addition to observing the general obligations and standards of performance set out in the current regulations, the lessee shall comply with and be bound by the following stipulations. These stipulations are also imposed upon the lessee's agents and employees. The failure or refusal of any of these persons to comply with these stipulations shall be deemed a failure of the lessee to comply with the terms of the lease. The lessee shall require his agents, contractors and subcontractors involved in activities concerning this lease to include these stipulations in the contract between and among them. These stipulations may be revised or amended, in writing, by the mutual consent of the lessor and the lessee at any time to adjust to changed conditions or to correct an oversight.

CULTURAL RESOURCES

(1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the Authorized Officer of the BLM (hereinafter referred to as the Authorized Officer) on portions of the mine plan area, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. Cultural resources are defined as a broad, general term meaning any cultural property or any property of religious or cultural importance to tribes as defined below:

Cultural resources: a definite location of past human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structure, or places with important public and scientific uses, and may include traditional cultural or religious importance to specified social and/or cultural groups. Cultural resources are concrete, material places, and things that are classified, ranked, and managed through the system of inventory, evaluation, planning, protection, and utilization.

The cultural resources inventory shall be conducted by a qualified professional cultural resource specialist; i.e., archaeologist, anthropologist, historian, or historical architect, as appropriate and necessary, and approved by the Authorized Officer (BLM if the surface is privately owned). A report of the inventory and recommendations for protection of any cultural resources identified shall be submitted to the Assistant Director of the Western Support Center of the Office of Surface Mining (hereinafter referred to as the Assistant Director) by the Authorized Officer. Prior to any on-the-ground cultural resource inventory, the selected professional cultural resource specialist shall consult with the BLM, The purpose of this consultation will be to guide the work to be performed and to identify properties with religious or cultural importance to tribes within the immediate and surrounding mine plan area. The lessee shall undertake measures, in accordance with instructions from the Assistant Director to protect cultural resources on the leased lands. The lessee shall not commence the surface-disturbing activities until permission to proceed is given by the Assistant Director in consultation with the Authorized Officer.

(2) The Lessee shall protect all cultural resource properties within the lease area from lease related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

(3) The cost of carrying out the approved site mitigation measures shall be borne by the lessee.

(4) If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Assistant Director, or the Authorized Officer if the Assistant Director is not available. The lessee shall not disturb such resources except as maybe subsequently authorized by the Assistant Director. Within two (2) working days of notification, the Assistant Director will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the Authorized Officer.

(5) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

PALEONTOLOGICAL RESOURCES

If a paleontological resource, either large and conspicuous, and/or of significant scientific value is discovered during construction, the find will be reported to the authorized officer immediately. Construction will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five (5) working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological value. Operations within 250 feet of such discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The lessee will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant interest discovered during the operation.

PUBLIC LAND SURVEY PROTECTION

The lessee will protect all survey monuments, witness comers, reference monuments, and bearing trees against destruction, obliteration, or damage during operations on the lease areas. If any monuments, comers or accessories are destroyed, obliterated or damaged by this operation, the lessee will hire an appropriate county surveyor or registered land surveyor to reestablish or restore the monuments, corners, or accessories at the same locations, using surveying procedures in accordance with the "Manual of Surveying Instructions for the Survey of Public Lands of the United States." The survey will be recorded in the appropriate county records, with a copy sent to the authorized officer.

RESOURCE RECOVERY AND PROTECTION PLAN (R2P2)

Notwithstanding the approval of a resource recovery and protection plan (R2P2) by the BLM, lessor reserves the right to seek damages against the operator/lessee in the event (i)

the operator/lessee fails to achieve maximum economic recovery (MER) [as defined at 43 CFR3480.0-5.2(21)] of the recoverable coal reserves or (ii) the operator/lessee is determined to have caused a wasting of recoverable coal reserves. Damages shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal. The parties recognize that under an approved R2P2, conditions may require a modification by the operator/lessee of that plan. In the event a coal bed or portion thereof is not to be mined or is rendered unmineable by the operation, the operator shall submit appropriate justification to obtain approval by the authorized officer to leave such reserves unmined. Upon approval by the authorized officer, such coal beds or portions thereof shall not be subject to damages as described above. Further, nothing in this section shall prevent the operator/lessee from exercising its right to relinquish all or a portion of the lease as authorized by statute and regulation. In the event the authorized officer determines that the R2P2 as approved will not attain MER as the result of changed conditions, the authorized officer will give proper notice to the operator/lessee as required under applicable regulations. The authorized officer will order a modification if necessary, identifying additional reserves to be mined in order to attain MER. Upon a final administrative or judicial ruling upholding such an ordered modification, any reserves left unmined (wasted) under that plan will be subject to damages as described in the first paragraph under this section. Subject to the right to appeal hereinafter set forth, payment of the value of the royalty on such unmined recoverable coal reserves shall become due and payable upon determination by the authorized officer that the coal reserves have been rendered unmineable or at such time that the lessee has demonstrated an unwillingness to extract the coal. The BLM may enforce this provision either by issuing a written decision requiring payment of the MMS demand for such royalties, or by issuing a notice of non-compliance. A decision or notice of non-compliance issued by the lessor that payment is due under this stipulation is appealable as allowed by law.

MULTIPLE MINERAL DEVELOPMENT

Operations will not be approved which, in the opinion of the authorized officer, would unreasonable interfere with the orderly development and/or production from a valid existing mineral lease issued prior to this one for the same lands.

The BLM realizes that coal mining operations conducted on Federal Coal Leases issued within producing oil and gas fields may interfere with the economic recovery of oil and gas; just as Federal oil and gas leases issued within a Federal coal lease area may inhibit coal recovery. BLM retains authority to alter and/or modify the R2P2 for coal operations on those lands covered by Federal mineral leases so as to obtain maximum resource recovery.