Environmental Assessment
EA-2247

University of North Dakota- Rare Earth Element Demonstration Facilities

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Environmental Assessment

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Abbreviations

AADT	annual average daily traffic
AAQM	Ambient Air Quality Monitoring
AirToxScreen	Air Toxics Screening Assessment tool
AML	abandoned mine land
AOI	Areas of Interest
APE	Area of Potential Effects
Barr	Barr Engineering Co.
BGEPA	Bald and Golden Eagle Protection Act
BGEPA	Bald and Golden Eagle Protection Act
BIL	Bipartisan Infrastructure Law
BMP	best management practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
Cheyenne	Tséstho'e
CMM	critical minerals and materials
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
DKey	Determination Key
DO	dissolved oxygen
DOE	Department of Energy
EA	Environmental Assessment
eGRID	Emissions & Generation Resource Integrated Database
EGU	Electric Generating Units
EIS	Environmental Impact Statement
EJ	environment justice
EO 11988	Floodplain Management
EO 11990	Protection of Wetlands
EO	Executive Order
EO12898	Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESA	Endangered Species Act
FECM	Fossil Energy and Carbon Management
FEED	Front-End Engineering Design
FFPA	Farmland Protection Policy Act
FLIGHT	Facility Level Information on Greenhouse Gases Tool
FOA	Funding Opportunity Announcement
FONSI	Finding of No Significant Impact
GHG(s)	greenhouse gas(es)
GHGRP	Greenhouse Gas Reporting Program
gpm	gallons per minute

Hohe/Nakota	Assiniboine
IIJA	Infrastructure Investment and Jobs Act
IPaC	Information for Planning and Consultation
IWG Report	The Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under EO 13990 published in February 2021
IWG	Interagency Working Group
MBTA	Migratory Bird Treaty Act
MESC	Office of Manufacturing and Energy Supply Chains
Métis	Michif Piyii
MHA	Mandan, Hidatsa and Arikara
MMT	metric tons
MREC	mixed rare earth carbonate
MRY	Milton R. Young Station
MT	metric ton
mtph	metric tonnes per hour
mtpy	metric tonnes per year
N_2O	nitrous oxide
NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NATA	National-Scale Air Toxics Assessment
ND SHPO	North Dakota State Historic Preservation Office
Nd	Neodymium
ND	North Dakota
NDCRS	North Dakota Cultural Resources Survey
NDDEQ	North Dakota Department of Environmental Quality
NDEE	Nebraska Department of Environment and Energy
NDGF	North Dakota Game and Fish Department
NEPA	National Environmental Policy Act
NH_3	ammonia
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NPDES	National Pollution Discharge Elimination system
NRCS	Natural Resources Conservation Services
NRHP	National Register of Historic Places
O_3	ground-level ozone
OHWM	ordinary high water mark
Pb	lead
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
Pr	Praseodymium
PSD	Prevention of Significant Deterioration
REE	rare earth element
REM	rare earth metals
REO	rare earth oxides
RES	rare earth salts
RESS&R	Rare Earth Salts Separation & Refining

ROM	run of mine
SC-CH_4	social cost of methane
SC-CO_2	social cost of carbon
SC-GHG	social cost of greenhouse gas
SC-N_2O	social cost of nitrous oxide
Sioux	Očhéthi Šakówiŋ
SO_2	sulfur dioxide
TDS	total dissolved solids
TMDL(s)	total maximum daily load(s)
tph	tonne per hour
UIC	Underground Injection Control
UND	University of North Dakota
USC	United States Code
USDA	U.S. Department of Agriculture
USDW	underground source of drinking water
USFWS	U.S. Fish and Wildlife Service
VOC(s)	volatile organic compound(s)
WVU	West Virginia University

1 Introduction

The Department of Energy's (DOE) Office of Fossil Energy and Carbon Management (FECM) prepared this Environmental Assessment (EA) to analyze the potential environmental and social effects of funding the University of North Dakota's (UND) proposed rare earth element (REE) demonstration facilities. UND would develop two mixed rare earth carbonate (MREC) concentrate production demonstration facilities co-located with existing coal mines; one adjacent to The Falkirk Mining Company near Underwood, McLean County, North Dakota (Figure 1) and one adjacent to BNI Coal, Ltd. in Center, Oliver County, North Dakota (Figure 2). The MREC concentrate from both facilities would be transported to the existing Rare Earth Salts Separation & Refining (RESS&R) facility in Beatrice, Gage County, Nebraska (Figure 3). At the RESS&R facility, the MREC concentrate would be refined and purified to produce individually separated rare earth oxides or oxides blends and select rare earth metals or alloys. The RESS&R facility may also separate other critical minerals products, such as a cobalt concentrate.

1.1 Background

To address the requirement of the Bipartisan Infrastructure Law (BIL) for a REE demonstration facility, the DOE FECM, in collaboration with the Office of Manufacturing and Energy Supply Chains (MESC), issued a Funding Opportunity Announcement (FOA): DE-FOA-0002618 (FOA 2618) titled BIL - Rare Earth Element Demonstration Facility. FOA 2618 sought applications from academic institutions acting as the Prime Applicant for a Phase I Front-End Engineering Design (FEED) study and a Phase II design, construction, and operation of a first-of-a-kind, domestic, demonstration facility that produces REEs and critical minerals and materials (CMM) from domestic resources that include unconventional and secondary sources, such as acid mine drainage, mine waste, or other deleterious material. Accordingly, a key objective of the REE Demonstration Facility is the extraction, separation, and refining from unconventional feedstock materials to high-purity individual or binary rare earth metals (REM) and/or CMM. Another of its goals is the upgrading and modernizing of infrastructure, including strengthening critical domestic manufacturing and supply chains to maximize the benefits of the clean energy transition as the nation works to curb the climate crisis, empower workers, and advance environmental justice.

Congress appropriated significant funding for the REE Demonstration Facility in the BIL. In response, FOA 2618 sought applications to address priorities in the BIL regarding the establishment of a REE Demonstration Facility as per section 40205 and rare earth minerals security as per section 41003(b). Detailed technical descriptions of the specific Areas of Interest (AOI) are provided in the sections that follow. The FOA invited applications in two different areas of interest:

- AOI 1: AACE Class 3 FEED Study for REE Demonstration Facility
- AOI 2: Completed AACE Class 3 FEED Study Separately Funded for REE Demonstration Facility

This effort focuses on rebuilding the U.S. leadership role in the economically viable, environmentally benign extraction, separation, and processing technologies arena. This supports the generation of sustainable U.S. domestic supply chains for onshore production of REEs and CMM for commercial commodities, clean energy, and national defense industries and is in support of the Administration's goals of decarbonizing the electricity sector by 2035 and the economy by 2050. This facility will also provide environmental benefits using feedstocks derived from acid mine drainage, mine wastes, or other deleterious materials. The FOA will require projects to track and report on project results related to environmental effects, environmental justice, community engagement, and consent-based siting, equity, and workforce development.

Section 40205 of the BIL amended Section 7001 of the Energy Act of 2020 (codified at 42 U.S.C. 13344) and directs the establishment of a rare earth demonstration facility that will include a full-scale integrated REE extraction and separation facility and refinery. Additionally, Section 41003(b) of the BIL authorizes appropriations for related efforts for Rare Earth Minerals Security activities in section 7001(a) of the Energy Act of 2020 (codified at 42 U.S.C. 13344(a)).

1.2 Purpose and Need for Agency Action

The overall purpose and need for FECM, in collaboration with MESC, is issuing awards, in whole or in part, with funds appropriated by the Infrastructure Investment and Jobs Act (IIJA), also more commonly known as the BIL.

The BIL is a once-in-a-generation investment in infrastructure, which will grow a more sustainable, resilient, and equitable economy through enhancing U.S. competitiveness, driving the creation of good-paying union jobs, and ensuring stronger access to economic, environmental, and other benefits for disadvantaged communities. The BIL appropriates more than $132 billion to DOE to invest in American manufacturing and workers; expand access to energy efficiency; deliver reliable, clean, and affordable power to more Americans; and deploy the technologies of tomorrow through clean energy demonstrations.

As part of and in addition to upgrading and modernizing infrastructure, DOE's BIL investments will address the climate crisis and support efforts to build a clean and equitable energy economy that achieves zero-carbon electricity by 2035 and put the United States on a path to achieve net-zero emissions economy-wide by no later than 2050 to benefit all Americans.

The BIL will invest appropriations of $258 million for the design, construction, and operation of an REE Demonstration Facility that demonstrates the extraction, separation, and refining from unconventional feedstock materials to high-purity individual or binary REM and/or CMM.

1.3 National Environmental Policy Act and Other Regulations

DOE prepared this EA in accordance with the Council on Environmental Quality (CEQ) "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act," codified in Title 40 of the Code of Federal Regulations (CFR) in Parts 1500 through 1508 (40 CFR Parts 1500-1508) and DOE NEPA Implementing Procedures (10 CFR Part 1021). These implement the procedural requirements of the National Environmental Policy Act (NEPA), found in Title 40 of the United States Code (USC) in Section 4321 and the following sections (42 USC § 4321 et seq.). NEPA requires federal agencies to consider the potential environmental consequences of a Proposed Action in their decision-making processes. NEPA encourages federal agencies to protect, restore, or enhance the environment through well-informed federal decisions. The CEQ regulations specify that an EA be prepared to briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

Further, the CEQ regulations encourage agencies to integrate NEPA requirements with other environmental review and consultation requirements. The following federal and state statutes and regulations are relevant to this EA:

- Clean Air Act (CAA)
- Clean Water Act (CWA)

- Protection of Wetlands (Executive Order [EO] 11990)
- Floodplain Management (EO 11988)
- Endangered Species Act (ESA)
- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act (BGEPA)
- The Noise Control Act of 1972, as amended
- Federal Actions to Address Environmental Justice in Minority Populations and Low- Income Populations (EO 12898)
- National Historic Preservation Act (NHPA)

1.4 Environmental Assessment Scope

This EA describes the Proposed Action and its potential effects on multiple resource areas due to the construction and operation of the facilities. The resource areas assessed in this EA to determine the nature, extent, and significance of effects (Section 3) consist of:

- Land Use and Recreation
- Cultural Resources, including Native American interests
- Water resources, including wetlands, groundwater, and surface water
- Air Quality
- Greenhouse Gases
- Noise
- Transportation
- Aesthetic and Visual Resources
- Biological Resources
- Socioeconomics and Environmental Justice
- Health and Safety
- Waste Management
- Soils, Geology, and Prime Farmlands

The resources evaluated for the RESS&R facility consist of:

- Air Quality

- Greenhouse Gases
- Transportation
- Socioeconomics and Environmental Justice
- Health and Safety
- Waste Management

The scope of work at the RESS&R facility is limited to the installation of equipment within an existing building. Therefore, effects on the following resources are not anticipated to be significant and, therefore, are not included in the scope of this EA:

- land use and recreation
- cultural resources
- water resources
- noise, aesthetic, and visual resources
- biological resources
- soils
- geology
- prime farmland

2 Proposed Action and Alternatives

2.1 Proposed Action

The Proposed Action will extract REE from coal-based resources and convert them into rare earth metals. The Proposed Action will produce at least 1 metric ton (MT) per day of rare earth oxides (REO) or rare earth salts (RES) containing a minimum of 75 percent REO or RES by weight. The Proposed Action consists of:

- Construction and operation of two demonstration plants that will produce MREC concentrate.
- Purchasing and installing equipment to refine, purify, and metallize the MREC concentrate at the existing RESS&R facility.

These facilities are described further in Section 2.1.1.

2.1.1 Facilities Overview

2.1.1.1 Mixed Rare Earth Carbonate Concentrate Process Description

The MREC concentrate production facilities will use technology demonstrated at UND's 0.5-tonne-per-hour (tph) pilot facility. These facilities will produce the MREC concentrates from low rank coal (referred to as lignite mine waste) and co-products, including gallium and germanium concentrates and an upgraded lignite material. The lignite mine waste will consist of that lignite that is currently uncovered and not of a quality for combustion in Electric Generating Units (EGU); therefore, the Proposed Action will not require any additional coal mining, it will not require any changes to existing mine plans, and it will not require the acquisition of any additional coal reserves beyond those already controlled. Existing mines operated by The Falkirk Mining Company (near Underwood, McLean County, North Dakota) (referred to as Underwood MREC facility) and BNI Coal, Ltd. (in Center, Oliver County, North Dakota) (referred to as Center MREC facility) will provide lignite mine waste as the feedstock for the Proposed Action. Mining will occur within each facility's existing North Dakota Public Service Commission permits and associated approved Mine Plans. The mines will transport the lignite mine waste to the MREC concentration production facilities at the Falkirk Mine and Center Mine. The Proposed Action will not result in changes to the mine operations or facility emissions; therefore, environmental effects associated with mining are not considered further in this Environmental Assessment.

Following physical separation to reject high-mineral content materials and leaching of the recovered organic-rich content with dilute mineral acid, the MREC process separates solids from the saturated leach solution with filter presses, in which additional acid and REE/CM recovery from the pore water will occur by washing the dewatered lignite material and subsequently recycling to the leaching circuit. The primary post-leaching steps will consist of the following:

- Remove impurities from the leach solution to condition the pregnant leach solution. This consists of adding a base to adjust the pH of the pregnant leach solution, clarifying, and filtering to remove precipitates from the leach solution ahead of the recovery circuit.
- Calcine the precipitate to produce rare earth carbonates and use metal chelating resins to selectively recover the REE from the concentrated leach solution.

- Recycle the acidic solution to either the resin process or the leaching circuit after removing the REE.

- Strip the REE from the resin and precipitate as carbonates by pH adjustment in a carbonate solution, resulting in a greater than 75% pure mixed REE solid cake.

The Underwood MREC facility will process about 1.89 million metric tonnes per year (mtpy) of lignite mine waste to produce about 233 mtpy of the MREC concentrate. The Center MREC facility will process about 1.26 mtpy of lignite mine waste and produce about 134 mtpy of the MREC concentrate. The Underwood and Center MREC facilities will produce about 132 and 87.5 metric tonnes per hour (mtph), respectively, of upgraded lignite for beneficial use.

Underwood MREC Facility

The Underwood MREC facility will be on The Falkirk Mining Company property adjacent to the Coal Creek Station near Underwood, North Dakota (Figure 4). The Falkirk Mining Company currently stockpiles soil for future mine reclamation on this parcel. Construction of the Underwood MREC facility will disturb up to 84.5 acres, consisting of the following:

- Concentrator building
- Administration warehouse and maintenance building
- Parking lot and access road
- Reagent delivery and storage area
- Tailings stockpile
- Upgraded lignite loadout
- Scrubbing and secondary crushing
- Mobile equipment refueling
- Run of mine (ROM) handling sorting and crushing area
- Injection well facility

The Underwood MREC facility requires utility connections for natural gas (to be determined), sanitary water, and electricity (McLean Electric Cooperative). The Underwood MREC facility intends to use approximately 1,014 gallons per minute (gpm). The water will be supplied from the Coal Creek Station which is approximately 1.5 miles south of the Underwood MREC facility. Under normal operations, the water for the Coal Creek Station is drawn from the Missouri River.

Underwood MREC Tailings Management

The Underwood MREC facility will generate approximately 413,000 mtpy of mineral soil tailings (tailings) on a dry-solids basis, or approximately 280 acre-feet per year. Lignite mine waste will be slurried in the MREC process before separating tailings from coal using spiral concentrators (coal spirals). Thickened tailings slurry will be approximately 50 percent solids by weight before being dewatered to approximately 80 percent solid and hauled to either the Riverdale mine pit or the Underwood mine pit (Figure 5). The

Underwood mine pit is approximately 6.6 miles north of the Underwood MREC facility, and the Riverdale mine pit is approximately 7.5 miles south of the Underwood MREC facility. The tailings will be hauled along the existing mine haul routes and do not require the construction of new haul routes.

Center MREC Facility

The Center MREC facility will be on a vacant Minnkota Power Cooperative property near Center, North Dakota (Figure 6) near the Milton R. Young Station (MRY). Construction of the Center MREC facility will disturb up to 72.2 acres, consisting of the following:

- Concentrator building
- Administration warehouse and maintenance building
- Parking lot and access road
- Reagent delivery and storage area
- Tailings stockpile
- Upgraded lignite loadout
- Scrubbing and secondary crushing
- Mobile equipment refueling
- ROM handling sorting and crushing area
- Injection well facility

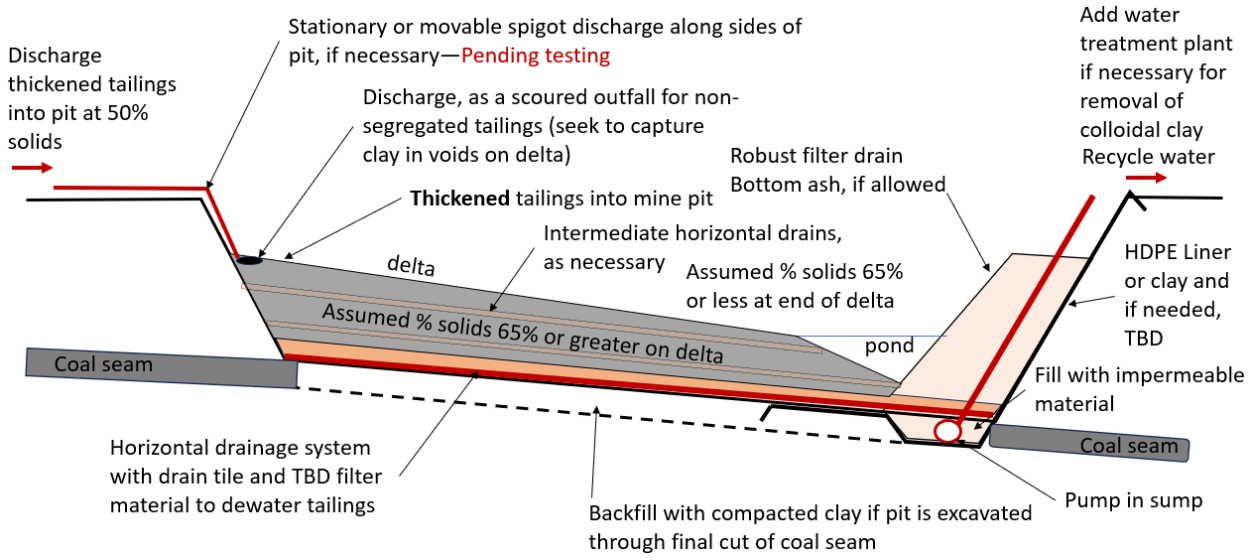
The Center MREC facility requires utility connections to natural gas (to be determined), electricity (Roughrider Electric Cooperative), and sanitary water. The Center MREC facility will use approximately 791 gpm drawing from Nelson Lake during its normal operation.

Center MREC Tailings Management

The Center MREC facility will generate approximately 308,000 mtpy of mineral soil tailings on a dry-solids basis, or approximately 200 acre-feet per year. The tailings will be stored in one of three Mine Pits referred to as Site A, Site B, and Site C (Figure 7). The lignite mine waste will be slurried in the MREC process before separating tailing from coal using coal spirals. The thickened tailings slurry will be approximately 50 percent solids by weight and pumped through on-grade pipelines to one of the three mine pits. Slurried tailings will consolidate in the mine pits by gravity, and water that separates from the tailings solids will pump back to the MREC for use as process water. Schematic 1 depicts the cross-section of the tailings impoundment.

The tailings pipeline will be 5-inch diameter and co-located along the existing haul road rights of ways. The returning water pipeline will be a 4-inch diameter pipe paralleling the tailings pipeline. The pipelines will be supported five inches above ground, which allows for routine visual inspection, and buried or bored under existing roadway crossings.

There will be three tailings pipelines (Pipeline A, Pipeline B, and Pipeline C) that lead to the three separate impoundment locations (Figure 7). Pipeline A is approximately 1.8 miles long, Pipeline B is approximately 3.3 miles long, and Pipeline C is approximately 2.4 miles long.



Schematic 1 Tailings Impoundment Conceptual Design – Cross-Section

Waste Generation

Wastewater

At full capacity, the Underwood and Center MERC facilities will generate an estimated 775 and 508 gpm of non-hazardous wastewater, respectively. Each facility requires the permitting and construction of Underground Injection Control (UIC) program Class I injection wells to dispose of the wastewater. The well pads will be approximately 3.4 to 4.6 acres and consist of a compacted aggregate surface. Each injection well pad will contain two to three injection wells. Underground pipelines will transport wastewater approximately 1,600 to 2,000 feet from the effluent tank at the MREC facilities to the injection wells. Infrastructure on each of the well pads will consist of an injection pump building, a transformer pad, an electrical building, and a building constructed around each well to protect the wellhead.

An approximately 1,000 to 3,000-square-foot injection pump building will house high-pressure injection pumps, pipelines, valves, instrumentation and controls, and related appurtenances. Additionally, this building will house filtration equipment for removal of suspended solids and a potential pre-injection water treatment system to reduce the risk of injection well scaling and plugging, if required. The injection pump building will range from approximately 1,000 to 3,000 square feet, depending on the number of injection pumps, water treatment requirements, the designed flow rates, and desired redundancies of major equipment.

An approximately 300 to 500 square foot electrical building will be near the injection pump building to house associated electrical equipment including the injection pumps, switchgears, controls, and low-voltage transformers. An approximately 200 to 300 square foot transformer pad will be near the electrical building to step down low voltage power.

An approximately 200 to 300-square-foot wellhead building will house instrumentation and controls, an annulus pressurization system, and protect related appurtenances and materials from environmental conditions. The wellhead buildings will allow for temporary removal should a well workover or other major well maintenance effort be necessary.

Other Waste Streams

The MREC facilities will generate mineral soil tailings, an iron-rich precipitate, and water treatment precipitates. The MREC facilities will dispose of the water treatment precipitate at an existing, off-site licensed disposal facility. The iron-rich precipitate may have beneficial reuse at existing taconite production facilities in Minnesota or will require disposal in an existing, off-site licensed disposal facility.

Transportation

The demonstration facilities will also require regular shipments of lignite mine waste and reagents for processing. Trucks will deliver lignite mine waste to the MREC facilities on day shifts, five days a week. At maximum operating capacity, the Underwood MREC facility will generate either 279 weekly truck trips or 56 train trips (Table 2-1) in addition to 449 truck trips along the existing mine haul roads to transport upgraded lignite and tailings. Similarly, the Center MREC facility will generate approximately 183 truck trips or 36 train trips per week (Table 2-2) in addition to 217 truck trips to haul washed coal along existing haul roads to the MRY.

Table 2-1 Underwood Facility Transportation Estimates

Material	Incoming/Outgoing	Weekly truck tips[1]	Weekly train cars[1]
Reagents	Incoming	279	56
Upgraded Lignite[2]	Outgoing	331	n/a
MREC Delivery	Outgoing	0.5	n/a
Tailings	Outgoing	118	n/a
Total	n/a	728[3]	56[3]

n/a – not applicable
1 Truck weights assumed to be 40,000 lbs/load; train weights assumed to be 200,000 lbs/load
2 Upgraded lignite will be transported using existing haul roads and will not affect public roadways.
3 Shipment estimates include the maximum number of trucks or train cars to operate the facility. The Proposed Action requires a combination of either truck or train trips depending on supplier/customer preferences.

Table 2-2 Center Facility Transportation Estimates

Material	Incoming/Outgoing	Weekly truck tips[1]
Reagents	Incoming	183
Upgraded Lignite[2]	Outgoing	217
MREC Delivery	Outgoing	0.5
Tailings	Outgoing	n/a
Total	n/a	400[3]

n/a – not applicable
1 Truck weights assumed to be 40,000 lbs/load; train weights assumed to be 200,000 lbs/load.
2 Upgraded lignite will be sent to MRY using existing haul roads and will not affect public roadways.
3 Shipment estimates include the maximum number of trucks to operate the facility.

Construction

The final engineering and procurement activities will occur over an approximate one-year timeframe. Construction of the Proposed Action will begin in 2025 and be complete in 2027. The construction contractor(s) will be responsible for completing the work according to the design documents, permits, and safety plan. The contractor(s) may pre-fabricate equipment required on-site or, alternatively, deliver prefabricated modules. Equipment installation will be in accordance with the final engineering design specifications. Grading and excavation activities will occur at each MREC facility with the implementation of best management practices (BMP) to control erosion and sediment during construction.

Construction of the Proposed Action requires preparation of laydown and fabrication areas. These areas will serve various construction needs including parking, construction trailers, material storage and fabrication, and other activities to support the influx of workers and construction activities. The final construction plan is under development and areas may change based on site investigations.

Operations

During the commissioning stages of the Proposed Action, the MREC facilities will use new operators to assist in the troubleshooting and commissioning of the equipment. In addition, maintenance technicians will perform maintenance work as necessary. This involvement prior to commercial operation allows for the MREC staff to familiarize themselves with the equipment and be in a better position for reliable operation.

After routine operation begins, the expected level of routine staffing will be four operators on shift 24 hours a day, seven days a week. Instrumentation, electrical, mechanical, maintenance, and support staff will be present for the day shift only unless otherwise necessary. In total, including operations, maintenance, quality control, and supervisory personnel, each MREC facility will require a staff of approximately 50-60 full-time equivalents.

2.1.1.2 RESS&R Facility Overview

The rare earth refining, purification, and metallization will occur at an existing facility owned and operated by Rare Earth Salts in Beatrice, Nebraska, in Gage County (Figure 8). The RESS&R facility will take the MREC concentrate and produce valuable individually separated REO for sale. The target conversion of these concentrate is 90 percent for Neodymium (Nd) and Praseodymium (Pr) and greater than 95 percent for other REEs. The rare earth metallization consists of converting specific REO into a metallic form using fused salt electrolysis. The specific REO (Nd, Pr, terbium, and dysprosium) input target is 21 metric ton per year at greater than 99 percent REO and expected to produce around 20 metric ton per year of REE metals/alloys. The Proposed Action consists of the purchase, installation, and operation of the equipment within the existing RESS&R facility. The Proposed Action will not produce any new waste streams from their current operations. However, there will be an increase in waste production.

Utilities

The RESS&R facility will use existing utilities that will not change significantly from their current use.

Transportation

MREC concentrate is the primary feedstock for the RESS&R facility. At full production, the RESS&R facility will accept less than one truck per week of MREC concentrate. The MREC concentrate will be transported approximately 730 miles from the Underwood MREC facility and 720 miles from the Center

MREC facility. The additional incoming raw materials and shipment of products will produce less than 20 incoming truck trips per week.

Construction

Contractors will install the new process equipment within the existing RESS&R building. The final engineering and procurement activities will occur over an approximate one-year timeframe. Installation of the equipment for the Proposed Action will begin in 2025 and be complete in 2028. The construction contractor will be responsible for completing the work according to the design documents, permits, and safety plan. The contractor may pre-fabricate equipment required on-site or, alternatively, deliver prefabricated modules. Equipment installation will be in accordance the final engineering design specifications.

Operations

Currently the RESS&R facility operates one shift from 6:00 am to 6:00 pm six days a week. During the commissioning stages of the Proposed Action, the RESS&R facility will use their existing staff to assist in the troubleshooting and commissioning of the equipment. In addition, maintenance technicians will perform maintenance work as necessary. This involvement prior to commercial operation allows for the RESS&R staff to familiarize themselves with the equipment and be in a better position for reliable operation. Once construction is complete, RESS&R will require an additional 10-20 personnel to operate the expanded operation. To accommodate the increase in production RES may add a second shift that will operate from 6:00 pm to 6:00 am. The second shift will be staffed with 8 personnel.

2.2 No Action Alternative

Under the No Action Alternative, DOE would not provide funding to UND's proposed project. For this analysis, DOE assumes that UND would not pursue alternative funding and would not construct the project. Therefore, extraction, separation and refining from unconventional feedstock materials to high purity individual or binary REM and/or CMM may not occur. Current operations at the RESS&R facility would continue.

2.3 Alternatives Considered but Dismissed

NEPA requires DOE to assess the range of reasonable alternatives to the Proposed Action. Because DOE has been instructed by Congress on how to use this funding, DOE does not have the authority to use these funds for any purpose other than REE demonstration facility projects. DOE can only choose to fund or not fund any of the projects applying under a competitive FOA. DOE's proposed action/purpose is to provide funding, and the only available alternative is not funding the proposed project. Alternatives to the proposed project include any other project that meets the goals and objectives of the same FOA. Applicants to DOE's FOAs are assessed for environmental effects, and the results of those assessments are provided to the selecting official prior to selection, in accordance with 10 CFR Part 1021.216. There is one other project from the West Virginia University (WVU) currently completing the NEPA process for Phase II of the REE demonstration facility funding. DOE will analyze effects of the WVU project separately and will not discuss further in this EA. DOE's consideration of reasonable alternatives to UND's project under NEPA is therefore limited to the No Action Alternative.

3 Environmental Consequences

3.1 Introduction

Sections 3.2 through 3.16 address a specific resource area with both qualitative and, where applicable, quantitative information to concisely describe the nature and characteristics of the resource that the Proposed Action and No Action Alternative may affect, as well as the potential direct and indirect effects on that resource given proposed avoidance and minimization measures. A conclusion regarding the significance of effects is provided for each resource area.

Section 3.13 provides a review of the present and reasonably foreseeable federal and nonfederal actions that may contribute to a cumulative effect when added to the effects of the Proposed Action. The effects of past actions were reviewed and are included as part of the affected environment to establish the current condition of the resource (the baseline condition) the Proposed Action may affect.

3.2 Land Use and Recreation

3.2.1 Proposed Action

3.2.1.1 Underwood MREC Facility

Affected Environment

The Underwood MREC facility would be on land owned by The Falkirk Mining Company. The Underwood MREC facility would occupy around 84.5 acres of land that The Falkirk Mining Company uses for storing soils for future mine reclamation and stormwater management ponds (Figure 4). Most land cover is herbaceous, with some barren land, developed land, stormwater management ponds, and cultivated crops (reference (1)). McLean County does not have a current zoning map however, the property owned by The Falkirk Mining Company is currently in industrial use.

Land use in and around the area includes coal mining, the power generation station, and agriculture areas. There are no isolated rural homes near the proposed Underwood MREC facility, the highest concentration of homes in the area are in the city of Underwood approximately four miles north.

There are no publicly available recreation opportunities within the Underwood MREC facility area. Recreation opportunities within the surrounding area include the Falkirk Waterfowl Production Area, Coal Lake Fishing Access, and the West Ridge Golf Course.

Environmental Consequences

The Proposed Action would not result in a change in the current zoning due to its current location within The Falkirk Mining Company property. According to the McLean County zoning ordinances, manufacturing and processing plants are permittable under a conditional use in the Industrial Districts (reference (2)). The land use effects from the Underwood MREC facility would be minor. Construction of the Underwood MREC facility would require the relocation of the reclamation soil piles and stormwater management ponds. The Proposed Action would fill one stormwater management pond, create one new stormwater pond south of the injection well facility, and expand two of the existing stormwater ponds to accommodate the new impervious surface (Figure 4). Construction of the aboveground facilities and the injection well would include use of temporary laydown areas. Following construction, the contractor(s) would restore laydown areas to original conditions.

Construction of the Underwood MREC facility would have no effect on recreational activities due to its location within the existing industrial property. The Underwood MREC facility would not indirectly affect the use of Falkirk Waterfowl Production Area, Coal Lake Fishing Access, or the West Ridge Golf Course.

3.2.1.2 Center MREC Facility

Affected Environment

The Center MREC facility would occupy approximately 72.2 acres of vacant Minnkota property. The tailings impoundments would be within existing BNI mine pits, and the tailings pipelines would be collocated with existing mine haul roads. Most land cover in the Center MREC facility area is herbaceous, with some deciduous forest, woody wetlands, emergent herbaceous wetlands, developed land, open water, and shrub land (reference (1)). Oliver County does not have a current zoning map; however, this property is currently owned by Minnkota and is intended for industrial use. Land use in and around the area includes coal mining, a power generation station, and agriculture areas. There are no isolated rural homes near the Center MREC facility, with the highest concentration of homes in the area located in the city of Center, approximately 3.5 miles northwest.

There are no publicly available recreation opportunities within the Center MREC facility area. However, the Center MREC facility is directly southeast of Nelson Lake and approximately 1.14 miles southeast of the Square Butte Creek Golf Course. Nelson Lake is used for fishing and has a public boat launch.

Environmental Consequences

The Proposed Action would not result in a change in the current zoning due to its current location within the Minnkota property. According to the Oliver County zoning ordinances refining plants are permittable under a conditional use in Industrial Districts. The land use effects from the Center MREC facility would be minor. All aboveground facilities, including the tailings and reclaim water pipelines would be on Minnkota or BNI properties. Construction of the aboveground facilities and the injection well would include the use of temporary laydown areas. Following construction, the contractor(s) would restore laydown areas to original conditions.

Construction of the Center MREC facility would have no effect on recreational activities due to its location within the existing industrial property. The Center MREC facility would not indirectly affect Nelson Lake recreation use or the Square Butte Creek Golf Course.

3.2.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure would not occur. No changes to existing land uses would occur.

3.3 Cultural Resources

Cultural resources are managed by federal and state regulations, including Section 106 of the NHPA, which requires that federal agencies assess the effects of their actions on properties that are listed or eligible for listing on the National Register of Historic Places (NRHP).

Cultural resources include archaeological sites, historic architectural resources, and traditional cultural properties. Traditional Cultural Properties are resources that contain significance to tribal communities. A Traditional Cultural Properties review is not within the scope of this cultural resources review. However,

the Proposed Action is on the traditional lands of the Očhéthi Šakówiŋ (Sioux), Assiniboine (Hohe/Nakota), Michif Piyii (Métis), and the Tséstho'e (Cheyenne) peoples (reference (3)).

Barr Engineering Co. (Barr) conducted an in-person records check at the North Dakota State Historic Preservation Office (ND SHPO) on April 29, 2024, to identify previously recorded archaeological sites and historic architectural resources located within 1-mile of the Proposed Action areas in Underwood and Center, ND.

3.3.1 Proposed Action

3.3.1.1 Underwood MREC Facility

Affected Environment

The ND SHPO data includes eight archaeological sites within the 1-mile study area, two of which intersect the proposed Underwood MREC facility and one historic architectural resource within the 1-mile study area. No historic architectural resources were identified within the proposed Underwood MREC facility area (Table 3-1).

Table 3-1 Cultural Resources within the Underwood 1-Mile Study Area

Resource Number	Resource Type/Description	Location	NRHP Eligibility
32MLX269	Historic Archaeological Site Lead/Abandoned Mine	Underwood MREC facility	Unevaluated
32MLX32	Historic Archaeological Site Lead/Borchardt Coal Mine	Underwood MREC facility	Unevaluated
32MLX33	Historic Archaeological Site Lead/Weller Post Office	1-Mile Study Area	Unevaluated
32MLX34	Historic Archaeological Site Lead/Wellerville Townsite	1-Mile Study Area	Unevaluated
32MLX285	Historic Archaeological Site Lead/Malloy Mine	1-Mile Study Area	Unevaluated
32ML105	Archaeological Site/Stone Circles	1-Mile Study Area	Unevaluated
32ML109	Archaeological Site/Rock Cairn	1-Mile Study Area	Unevaluated
32ML206	Historic Archaeological Site/Abandoned Coal Mine	1-Mile Study Area	Unevaluated
32ML851	Historic Architecture/Farmstead	1-Mile Study Area	Not Eligible

Archaeological Sites

The sites located immediately adjacent to the northern boundary of the Underwood MREC facility area consist of sites 32MLX269, an abandoned mine land (AML) site, and 32MLX32, the Borchardt Coal Mine. Both resources are considered "site leads," defined as "resources that lack sufficient information to fully record and complete all necessary data fields on the North Dakota Cultural Resources Survey (NDCRS) site forms. Examples of site leads include: (1) locations recorded from various historic documents, (2) locations reported by a landowner or other non-professional, (3) a location with five or fewer surface visible artifacts which, in the professional judgment of the archaeologist(s), is likely to be a limited surface expression of a former occupation area where most of the artifacts are still buried, and/or (4) locations recorded by a cultural resource specialist outside of their project area(s), and thus not fully recorded" (reference (4)). Site 32MLX269 was recorded in 1990 and has not been evaluated for listing on the NRHP. Site 33MLX32 was recorded in 1980 and has not been evaluated for listing on the NRHP.

Six additional archaeological sites fall outside of the Underwood MREC facility boundaries but within the 1-mile study area. These sites include a stone circle site (32ML105/Falkirk Office Site), a rock cairn site (32ML109/K.P. Site), an abandoned coal mine (32ML206), and three site leads. The site leads consist of the historic Weller Post Office, circa 1884 (32MLX33), the Wellerville Townsite, circa 1884 (32MLX34), and the abandoned Malloy Mine, circa 1931-1937 (32LX285). None of these sites have been evaluated for listing on the NRHP. However, it should be noted that stone circle sites are often of cultural significance to Native American communities.

Historic Architectural Resources

ND SHPO records do not include identified historic architectural resources within the proposed Underwood MREC facility boundary. One previously identified historic architectural resource was identified within the 1-mile study area (Table 3-1).

Resource 32ML00851 consists of a historic farmstead, the components of which were constructed between the 1920s and the 1990s. The property includes 11 features: a residence, steel grains bins, a cow barn, a windmill, two additional barns, an outhouse, a detached summer kitchen, a smokehouse, a shop, and a garage. This property is approximately one mile south of the proposed Underwood MREC facility and is not considered eligible for the NRHP.

Cultural Resource Surveys

No cultural resource surveys have been recorded within the proposed Underwood MREC facility. However, portions of the 1-mile study area have been previously surveyed between 1975 and 1994.

Environmental Consequences

Two archaeological sites intersect the Underwood MREC facility and consist of two former mining site leads. Neither of these sites has been evaluated for listing on the NRHP. As both resources are former mining sites with significant ground disturbance and given only a small portion of the Underwood MREC facility area intersects with the site boundaries, construction activities would be unlikely to effect these sites.

While portions of the 1-mile study area have been previously surveyed, there have been no recorded surveys within the boundaries of the Underwood MREC facility area. Therefore, cultural resource investigations of the Underwood MREC facility are underway. DOE will consult with the ND SHPO regarding the findings of the survey.

3.3.1.2 Center MREC Facility

Affected Environment

The ND SHPO data includes 106 archaeological sites within the 1-mile study areas for the Center MREC facility and pipeline alignments, five of which are within or adjacent to the Proposed Action areas (Table 3-2). This includes one site that has been recommended eligible for the NRHP (site 32OL497) and intersects with the southern portion of Pipeline B. Other sites within the Proposed Action area include two sites that are unevaluated for NRHP eligibility and two that have been recommended not eligible for listing on the NRHP. These consist of an unevaluated site that is immediately south of the Center MREC facility (320L127/stone circle site), an unevaluated site lead that intersects with Pipeline A (32OLX123/Baukol-Noonan Coal Mine), an ineligible site that intersects Pipeline B (32OL333/stone feature site), and an ineligible site immediately adjacent to Pipeline C (32OL525/stone circle site).

Nine historic architectural resources were identified within the 1-mile study area, one of which intersects Pipeline B (32OL515/Windmill and concrete pile) (Table 3-2). This site has been recommended not eligible for listing on the NRHP.

Table 3-2 Cultural Resources within the Center 1-Mile Study Area

Resource Number	Resource Type	Location
32OL497	Archaeological Site/Lithic Scatter/NRHP Eligible	Proposed Action Area/Pipeline B
32OL127	Archaeological Site/Stone Circles & Cairns	Proposed Action Area/Center MREC facility
32OLX123	Historic Archaeological Site Lead/Baukol-Noonan Coal Mine	Proposed Action Area/Pipeline A
32OL333	Archaeological Site/Stone Circles & Cairns	Proposed Action Area/Pipeline B
32OL525	Archaeological Site/Stone Circle	Proposed Action Area/Pipeline C
32OL515	Historic Architectural Resource	Proposed Action Area/Pipeline B
32OL112	Historic Archaeological Site	1-Mile Study Area
32OL116	Archaeological Site	1-Mile Study Area
32OL118	Archaeological Site	1-Mile Study Area
32OL120	Archaeological Site	1-Mile Study Area
32OL321	Historic Archaeological Site	1-Mile Study Area
32OL326	Archaeological Site	1-Mile Study Area
32OL327	Archaeological Site	1-Mile Study Area
32OL328	Archaeological Site	1-Mile Study Area
32OL329	Archaeological Site	1-Mile Study Area
32OL330	Archaeological Site	1-Mile Study Area
32OL331	Historic Archaeological Site	1-Mile Study Area
32OL332	Archaeological Site	1-Mile Study Area
32OL334	Historic Archaeological Site	1-Mile Study Area
32OL446	Archaeological Site	1-Mile Study Area
32OL496	Historic Archaeological Site	1-Mile Study Area
32OL498	Archaeological Site	1-Mile Study Area
32OL499	Historic Archaeological Site	1-Mile Study Area
32OL504	Archaeological Site	1-Mile Study Area
32OL505	Archaeological Site	1-Mile Study Area
32OL506	Archaeological Site	1-Mile Study Area
32OL507	Archaeological Site	1-Mile Study Area
32OL508	Archaeological Site	1-Mile Study Area
32OL518	Historic Archaeological Site	1-Mile Study Area
32OL519	Archaeological Site	1-Mile Study Area
32OL520	Archaeological Site	1-Mile Study Area
32OL521	Archaeological Site	1-Mile Study Area
32OL522	Historic Archaeological Site	1-Mile Study Area
32OL524	Historic Archaeological Site	1-Mile Study Area
32OL526	Archaeological Site	1-Mile Study Area
32OL527	Archaeological Site	1-Mile Study Area

Resource Number	Resource Type	Location
32OL528	Archaeological Site	1-Mile Study Area
32OL529	Archaeological Site	1-Mile Study Area
32OL530	Historic Archaeological Site	1-Mile Study Area
32OL531	Archaeological Site	1-Mile Study Area
32OL532	Archaeological Site	1-Mile Study Area
32OL533	Archaeological Site	1-Mile Study Area
32OL535	Archaeological Site	1-Mile Study Area
32OL536	Historic Archaeological Site	1-Mile Study Area
32OL537	Historic Archaeological Site	1-Mile Study Area
32OL539	Historic Archaeological Site	1-Mile Study Area
32OL540	Historic Archaeological Site	1-Mile Study Area
32OL542	Archaeological Site	1-Mile Study Area
32OL543	Archaeological Site	1-Mile Study Area
32OL544	Archaeological Site	1-Mile Study Area
32OL545	Archaeological Site	1-Mile Study Area
32OL546	Archaeological Site	1-Mile Study Area
32OL547	Archaeological Site	1-Mile Study Area
32OL548	Archaeological Site	1-Mile Study Area
32OL550	Archaeological Site	1-Mile Study Area
32OL554	Archaeological Site	1-Mile Study Area
32OL555	Archaeological Site	1-Mile Study Area
32OL556	Archaeological Site	1-Mile Study Area
32OL557	Archaeological Site	1-Mile Study Area
32OL559	Archaeological Site	1-Mile Study Area
32OL561	Historic Archaeological Site	1-Mile Study Area
32OL562	Archaeological Site	1-Mile Study Area
32OL563	Archaeological Site	1-Mile Study Area
32OL564	Archaeological Site	1-Mile Study Area
32OL565	Archaeological Site	1-Mile Study Area
32OL566	Archaeological Site	1-Mile Study Area
32OL567	Archaeological Site	1-Mile Study Area
32OL568	Archaeological Site	1-Mile Study Area
32OL569	Archaeological Site	1-Mile Study Area
32OL570	Archaeological Site	1-Mile Study Area
32OL571	Archaeological Site	1-Mile Study Area
32OL572	Archaeological Site	1-Mile Study Area
32OL573	Archaeological Site	1-Mile Study Area
32OL575	Archaeological Site	1-Mile Study Area
32OL576	Archaeological Site	1-Mile Study Area
32OL577	Archaeological Site	1-Mile Study Area
32OL579	Archaeological Site	1-Mile Study Area

Resource Number	Resource Type	Location
32OL580	Historic Archaeological Site	1-Mile Study Area
32OL587	Archaeological Site	1-Mile Study Area
32OL588	Historic Archaeological Site	1-Mile Study Area
32OL589	Archaeological Site	1-Mile Study Area
32OL624	Archaeological Site	1-Mile Study Area
32OL629	Archaeological Site	1-Mile Study Area
32OL630	Archaeological Site	1-Mile Study Area
32OL815	Archaeological Site	1-Mile Study Area
32OL816	Archaeological Site	1-Mile Study Area
32OL857	Archaeological Site	1-Mile Study Area
32OL858	Archaeological Site	1-Mile Study Area
32OL977	Archaeological Site	1-Mile Study Area
32OL982	Archaeological Site	1-Mile Study Area
32OL999	Historic Archaeological Site	1-Mile Study Area
32OL1000	Historic Archaeological Site	1-Mile Study Area
32OLX117	Historic Archaeological Site Lead	1-Mile Study Area
32OLX122	Historic Archaeological Site Lead	1-Mile Study Area
32OLX254	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX460	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX461	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX465	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX505	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX226	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX227	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX229	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX230	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX231	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX133	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX12	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OLX13	Archaeological Site/Single Artifact Find	1-Mile Study Area
32OL513	Historic Architectural Resource	1-Mile Study Area
32OL560	Historic Architectural Resource	1-Mile Study Area
32OL578	Historic Architectural Resource	1-Mile Study Area
32OL125	Historic Architectural Resource	1-Mile Study Area
32OLX83	Historic Architectural Site Lead Resource	1-Mile Study Area
32OL512	Historic Architectural Resource	1-Mile Study Area
32OL534	Historic Architectural Resource	1-Mile Study Area
32OL538	Historic Architectural Resource	1-Mile Study Area

Archaeological Sites

The ND SHPO includes 106 recorded archaeological sites within the 1-mile study area, five of which intersect or are immediately adjacent to the Center MREC and pipeline areas. One site intersecting Pipeline B has been recommended eligible for listing on the NRHP (Site 32OL497), two have been recommended not eligible, and two are unevaluated for listing on the NRHP.

Site 32OL497 intersects the southern extent of Pipeline B in Section 8 of Township 141N, Range 83W, and consists of a lithic scatter situated on a knoll. It was first identified in 2007 during a Phase I archaeological survey by Ethnoscience, Inc. The site integrity was described as poor by Ethnoscience (reference (5)), and further investigation was recommended to evaluate NRHP eligibility under Criterion D. During this investigation, 20 Knife River Flint lithic flakes, one porcellanite flake, and one uniface were recovered. The site was reinvestigated by Ethnoscience in 2009 (reference (6). Artifacts recovered during the 2009 investigation include 74 Knife River Flint flakes and nine Tongue River silicified sediment flakes. Broedel recommended the site eligible for listing on the NHRP due to the potential for intact deposits and the potential for the site to provide information about a “poorly understood period of occupation in central North Dakota” (reference (6)).

Site 32OL127 is adjacent to but not within the proposed Center MREC facility on the southern boundary. It consists of two stone circles and two rock cairns. The site was first recorded in 1968 by Sperry and again investigated in 1976 by C. L. Dill, who reported that the site had since been destroyed by construction (reference (7)). This site is unevaluated for listing on the NRHP. However, it should be noted that stone circles often hold cultural significance for Native American communities.

Site 32OLX123 is a site lead consisting of the Baukol-Noonan Coal Mine, a strip mine circa 1970. The mine intersects Pipeline A. This site is unevaluated for listing on the NRHP.

Site 32OL333 intersects Pipeline B and consists of 23 stone features, including 17 stone circles, three partial circles, and three cairns. It is in Section 5 of Township 141N, Range 83W. Originally recorded in 1992 (reference (8)), the site was re-identified during a Phase I archaeological survey conducted for the North Dakota Department of Transportation in 2000, by which time it had been impacted by construction activities related to a tree planting program. According to the 2000 report, four of the features had been relocated, but had still been negatively impacted by agricultural activities. The 2000 survey also recovered 3 Knife River Flint flakes, 1 biface and 1 core from this site. Due to poor site integrity, it has been recommended not eligible for listing on the NRHP (reference (9)).

Site 32OL525 is immediately adjacent to but not within Pipeline C. It consists of a single stone circle composed of 45 stones, 7.5 meters in diameter. The site has been recommended not eligible for listing on the NRHP. However, it should be noted that stone circles often have cultural significance for Native American communities.

Historic Architectural Resources

There are nine historic architectural resources within the 1-mile study area, one of which is within the Proposed Action areas (Table 3-2).

Resource 32OL515 was recorded by Ethnoscience, Inc. during a 2007 survey and intersects with the southern portion of Pipeline B. This resource consists of two features: a windmill and a concrete pile, dated between 1910 and 1950. Both features are described as being of poor integrity. This site was recommended not eligible for listing on the NRHP (reference (5)).

Cultural Resource Surveys

A total of 32 cultural resource surveys have been recorded within portions of the 1-mile study area between 1974 and 2022. Five of those surveys intersected portions of the Proposed Action. No surveys were conducted within the Center MREC facility, two intersected portions Pipeline A, two intersected portions of Pipeline B, and one survey included both Pipeline B and C.

Environmental Consequences

Five of archaeological sites intersect with the Center MREC facility and pipelines, one of which has been recommended eligible for listing on the NRHP. Two of the sites have not been evaluated for listing on the NRHP and two have been recommended not eligible. One historic architectural resource, recommended not eligible for listing on the NRHP, intersects with one of the pipelines. DOE will consult with the ND SHPO regarding these sites.

While portions of the 1-mile study area have been previously surveyed, there have been no recorded surveys within the boundaries of the Center MREC facility area. Therefore, cultural resource investigations of the Center MREC facility are underway. DOE will consult with the ND SHPO regarding the findings of the survey.

3.3.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure would not occur. No changes to known cultural resources would occur.

3.4 Water Resources

This section describes the water resources in and around the Proposed Action. Water resources generally include surface water features (streams, lakes, and wetlands) and subsurface water features (groundwater). Surface water features are within watersheds that drain to an outlet that may be another stream, lake, or ocean. Groundwater may be within surficial geologic deposits within deeper geologic units. Both surface water and groundwater interact together to form an interconnected environment; effects to the surface or subsurface may result in an environmental consequence.

3.4.1 Proposed Action

3.4.1.1 Underwood MREC Facility

Affected Environment

Wetlands

There are no natural wetlands located within the Underwood MREC facility (Figure 9). The National Wetland Inventory identified four potential wetland basins within the Underwood MREC facility however these features are constructed sediment basins.

Surface Water

The Underwood MREC facility is near the Missouri River in the Weller Slough-Coal Lake Coulee watershed (HUC12 10130101704). Surface water generally flows from north to south through intermittent stream channels. The intermittent channels flow to wetlands and lakes. The Underwood MREC facility

and northern haul road are within the same HUC 12. The northern haul road crosses intermittent streams and have established crossings. Major lakes within the Weller Slough–Coal Lake Coulee watershed include Coal Lake, a surface water impoundment east of the Underwood MREC facility, and Weller Slough, a natural lake south of the facility. Other smaller lakes are present within the watershed; however, the lakes are not impacted by adjacent mine facilities. Intermittent streams in the watershed flow through cropped areas and prairie landscapes.

The southern haul road is within a different HUC 12 watershed – Coal Lake Coulee-Missouri River (HUC12 101301010705). There are no major lake or wetland complexes in the Coal Lake Coulee-Missouri River watershed. Surface waters are limited as the watershed is well draining near the Missouri River.

The State of North Dakota is required to submit biennial reporting on the status of their waters. This report includes assessments from the prior two-years to determine if waterbodies are impaired. The report includes the causes of impairment and their impaired use. This is submitted to the EPA as an integrated water quality assessment and waters needing total maximum daily loads (TMDLs) (reference (10)). The assessment process first determines the uses of the waterbody. After uses have been assigned, the waterbody is assessed in according to the designated use with a 1 through 5 assessment category (reference (11)). Category 1 indicates the waterbody has been fully assessed and uses are fully supported. Category 5 indicates a waterbody has been assessed and the beneficial uses are not supported. Category 5 waters typically need a TMDL to meet beneficial uses that are not supported by the current water quality state. The Underwood MREC facility is not within one mile of Category 5 waterbodies and there are no active TMDLs within one mile of the facility.

Groundwater

Groundwater in McLean County is comprised of glacial and preglacial aquifers. For glacial deposits, aquifers are categorized in four main groups: (1) buried valleys, (2) meltwater channels, (3) surficial outwash, and (4) undifferentiated sand and gravel (reference (12)). The Underwood MREC facility is near the Weller Slough aquifer. The aquifer formed in a buried valley that consists of beds and lenses of sand and gravel that extend up to 300 feet in depth (reference (12)). Wells in this aquifer are used for domestic and livestock purposes.

The Underwood MREC facility also sits on top of bedrock aquifers. The Fox Hills and Hell Creek Formations are within the Cretaceous age rocks. The Fox Hills Formation, which is the lower most used underground source of drinking water (USDW) at the Underwood MREC facility, underlies all of McLean County and consists of interbedded sandstone, shale, and siltstone (reference (12)). The formation is approximately 233 to 450 feet in thickness and ranges in depth from 540 feet to 1,200 feet below the surface. This aquifer is considered saline with elevated concentrations of total dissolved solids (TDS). The Hell Creek Formation overlies the Fox Hills Formation and consists of interbedded silty shale and sandstone. The approximate thickness of the formation is 220 feet and was observed at approximately 320 feet below the surface. The Hell Creek Formation has similar water quality characteristics as the Fox Hills aquifer, with elevated TDS and high salinity. The shallowest aquifer encountered is the Fort Union Group. The Fort Union Group is below the glacial deposits and consists of interbedded silt, siltstone, clay, shale, sandstone, and lignite. This aquifer is used for domestic, livestock, and municipal use.

To manage the process wastewaters generated at the Underwood MREC facility, two Class I (non-hazardous) injection wells are planned to be permitted and constructed. Wastewater is likely to be injected into the Inyan Kara Formation, which is approximately 3,600 to 4,000 feet below ground surface.

The Inyan Kara Formation is confined and isolated from the Fox Hills Aquifer by approximately 2,600 feet of impermeable formations, including many significant shales. Specifically, the proposed injection interval is isolated from the lowermost used USDW (Fox Hills) by calcareous shales within the Skull Creek, Mowry, Belle Fourche, Greenhorn, Carlile, Niobrara, and Pierre Formations, which make up the Cretaceous Confining Unit.

The Inyan Kara Formation underlying the Underwood MREC facility is expected to have a TDS concentration between 3,000 and 10,000 mg/L, which classifies it as a potential USDW under 40 CFR Part 144.3. It is anticipated that the Inyan Kara Formation at the Underwood MREC facility qualifies for consideration as an exempted aquifer, as described in 40 CFR Part 146.4 and NDAC 33.1-25-01-05. As such, an aquifer exemption for nonhazardous Class I wastewater injection into the Inyan Kara Formation would be pursued through the North Dakota Department of Environmental Quality (NDDEQ) and the U.S. Environmental Protection Agency (EPA). There is an existing Class II injection well area aquifer exemption within the Inyan Kara Formation at the Underwood MREC facility. The Inyan Kara Formation is unlikely to serve as a USDW in the future due to the presence of high-quality surface water and shallow aquifer systems already used as drinking water sources. It is uneconomical to extract groundwater from the Inyan Kara Formation and transport and treat for drinking water purposes in the vicinity of the Underwood MREC facility.

Environmental Consequence

Wetlands

The construction footprint for the Underwood facility is not expected to affect wetlands. No wetlands were delineated in the Proposed Action footprint prior to mining. BMPs would be implemented in and adjacent to the construction zone to minimize effects from stormwater runoff. Indirect effects to wetlands may include increased flow from dewatered stormwater basins. The dewatering will likely follow existing drainage routes. If discharge rates are not controlled, there may be potential for erosion and increased sedimentation further downstream.

Surface Water

Construction of the Underwood MREC facility does not require fill or excavation of surface water features. The Underwood MREC facility would be on land previously used for mineral processing and have constructed stormwater basins to capture runoff. Stormwater basins were constructed to control runoff for the 10-year, 24-hour storm event (reference (13)). The Proposed Action would modify the existing stormwater basin layout and construct new basins as depicted on Figure 4. A new NPDES permit would be obtained prior to constructing and operating the facility. During construction, sediment and erosion control BMPs would be implemented. Stormwater sedimentation basins would meet the following criteria:

- Designed for the calculated volume of runoff from the 2-year, 24-hour storm per acre drained, and provide not less than 1,800 cubic yards of sediment storage below the invert of the outlet pipe. If the storm event is not calculated, a minimum of 3,600 cubic feet of storage per acre drained is needed for sediment below the outlet invert.
- Basin outlets must be designed to avoid short-circuiting and discharge debris.
- Basins must be designed to completely drawdown for maintenance activities
- Basins must release the storage volume in at least 24-hours

- Outlet structures must be designed to withdraw water from the surface, unless not practicable. If not practicable, rationale must be provided in the SWPPP.

- The basin must have a stabilized emergency overflow to prevent failure of pond integrity. Energy dissipation must be provided for the basin outlet.

Temporary drainage swales may need to be constructed to redirect runoff from barren construction areas to sedimentation ponds. Runoff velocities in the temporary drainage ditches may be controlled with straw waddles, haybales, or rock check-dams. Sedimentation levels in the drainage ditches would be monitored and maintenance would be performed as needed.

The direct effects to surface water resources would not result from construction of the Proposed Action, although there may be indirect effects to surface waters. The current land use is undeveloped with grass cover. The Underwood MREC facility would increase the runoff potential by removing the grass cover and installing impervious surfaces. Surface runoff would be redirected to stormwater basins to capture and treat runoff. Dewatering the basins to drainage channels may lead to erosion if discharge rates are not controlled.

The haul roads used to transport the mined lignite and waste material are not expected to change because of the Proposed Action. Therefore, there would be no additional effects to surface waters from the haul roads.

The Underwood MREC facility would use existing groundwater sources and make-up water from the Missouri River for dust suppression and for processing. Wastewater produced during processing would use an underground injection system and not discharge to surface waters.

Groundwater

The Underwood MREC facility would not affect groundwater during construction; however, at full capacity, would generate an estimated 775 gpm of non-hazardous wastewater for disposal via injection wells during operations.

The proposed Class I injection wells would be designed, constructed, and operated in accordance with applicable state and federal regulations to protect the existing USDW in the vicinity of the Underwood MREC facility. The proposed injection wells would be constructed with multiple casing strings cemented to ground surface to provide multiple barriers against vertical migration of injected wastewater. The thick, low permeability confining unit will serve to isolate the injected wastewater within the injection interval (the Inyan Kara Formation). The annular space around the innermost injection tubing would be filled with fluid, pressurized, and continuously monitored to demonstrate mechanical integrity of the injection wells.

The stormwater basins are north of the Weller Slough aquifer and are not expected to interact with the aquifer.

3.4.1.2 Center MREC Facility

Affected Environment

Wetlands

The Center MREC facility is on vacant land adjacent to existing coal mining support facilities. The tailings and retuning water pipelines would parallel existing haul roads, no wetlands are present.

Surface Waters

The Center MREC facility is in the Painted Woods-Square Butte watershed (HUC8 10130101) within the Missouri River system. The Proposed Action area is situated on a watershed ridgeline between the Hagel Creek (HUC12 101301010802) and Nelson Lake – Square Butte Creek watersheds, the facility footprint would be in the Nelson Lake – Square Butte Creek watershed. The tailings and return water pipelines would extend further upstream into the Hagel Creek watershed and cross into the Square Butte Creek Number 5 Dam (HUC12 101301010804), and Square Butte Creek (HUC12 101301010806) that is downstream of the Nelson Lake Dam. The contributing watersheds to Nelson Lake are intermittent and perennial. Intermittent streams in the Hagel Creek watershed have been impacted by active mining. Perennial streams have not been impacted by active mining. Hagel Creek, which flows to Nelson Lake, is a high sinuosity stream with several meander scars. Intermittent streams contributing to Hagel Creek have some sinuosity, water flows seasonally through the drainage.

The Center MREC facility is adjacent to Nelson Lake a surface water impoundment. MRY uses Nelson Lake water for cooling. In addition, Nelson Lake is also used for recreation. There are no impaired surface waters within the Proposed Action area. The nearest impaired surface water is Square Butte Creek located approximately one mile downstream from Nelson Lake. Square Butte Creek is impaired for sedimentation/siltation and fecal coliform (reference (10)). The impaired water body extends from the outlet at Nelson Lake to the confluence with Otter Creek. The TMDL priority for the impaired waterbody is classified as low.

The tailings and return water pipelines would cross Hagel Creek and intermittent drainages.

The Proposed Action would not be within mapped floodplains. Figure 10 shows the location of the Center MREC facility in relation to surface water resources and the Square Butte Creek impairment.

Groundwater

Groundwater under the Center MREC facility is comprised of several units ranging from glacial Quaternary aquifers to aquifers in consolidated rocks of the Lake Cretaceous. The Center MREC facility is within the Square Butte Creek aquifer ranging from 130 feet to 39 feet in thickness (reference (14)). The aquifer formed in a deep valley and filled with alluvial and glaciofluvial deposits. The Tongue River Formation consists of interbedded light-olive-gray to dark-greenish-gray claystone, siltstone, fine-grand sandstone, and lignite. Below the Tongue River, the aquifers follow a similar layering to the Underwood MREC facility – Hell Creek Formation and Fox Hills, the latter of which is the lowermost USDW at the Center MREC facility.

To manage the process wastewaters generated at the Center MREC facility, two Class I (non-hazardous) injection wells would be permitted and constructed. Wastewater would be injected into the Inyan Kara Formation, approximately 3,600 to 4,000 feet below ground surface. The Inyan Kara Formation is confined and isolated from the Fox Hills Aquifer by approximately 2,600 feet of impermeable formations (significant shales). Specifically, the proposed injection interval is isolated from the lowermost used USDW (Fox Hills) by calcareous shales within the Skull Creek, Mowry, Belle Fourche, Greenhorn, Carlile, Niobrara, and Pierre Formations, which make up the Cretaceous Confining Unit.

Existing Water quality in the Inyan Kara Formation is expected to have a TDS concentration between 3,000 and 10,000 mg/L, which classifies it as a potential USDW under 40 CFR Part 144.3. It is anticipated that the Inyan Kara Formation at the Center MREC facility qualifies for consideration as an exempted aquifer, as described in 40 CFR Part 146.4 and NDAC 33.1-25-01-05. As such, an aquifer exemption for

non-hazardous Class I wastewater injection into the Inyan Kara Formation would be through the NDDEQ and the EPA. There is an existing Class II injection well area aquifer exemption within the Inyan Kara Formation less than two miles west of the Center MREC facility. Because of the presence of much higher quality surface waters and much shallower aquifers in the region, the Inyan Kara Formation is unlikely to serve as a USDW in the future. It is uneconomical to extract groundwater from the Inyan Kara Formation and transport and treat for drinking water purposes in the vicinity of the Center MREC facility.

Environmental Consequences

Wetlands

Construction of the Center MREC facility would not occur within wetlands (Figure 12). The contractor would implement BMPs to limit construction stormwater runoff to the constructed channel where cooling water discharges to the lake. The final engineering design would incorporate permanent stormwater management. The Center MREC facility would construct a sedimentation basin in the southeast corner of the site boundary to capture and treat runoff. The basin would use the same design criteria as described for the Underwood MREC facility. Figure 6 shows the location of the sedimentation pond.

Construction of the tailings and return water pipelines would not affect wetlands.

Surface Water

The Center MREC facility would not fill or excavate surface waters in the permanent or temporary construction footprint. The new facility would be adjacent to Nelson Lake, near the outflow channel for the cooling water return from MRY. A construction SWPPP would be developed to control stormwater runoff from disturbed areas.

During construction, there may be potential for runoff to enter the cooling water outflow channel. Sedimentation may lead to increased turbidity, nutrient loading, and oil and grease. The increase in turbidity may lead to increased water temperature. Sediments washing into the channel and lake from construction activities may lead to increases in nutrients to the waterbody. This may lead to increases in aquatic plant growth with increased dissolved oxygen (DO) initially; however, the DO is depleted when the plants start to die and are consumed by microorganisms.

To limit construction stormwater runoff to Nelson Lake, BMPs would be implemented to control runoff. BMPs may include straw waddles, hay bales, silt fences, and temporary sedimentation basins. The final BMPs selected to control stormwater would be included in the construction drawings erosion control plan. Prior to construction, UND would apply for and receive an approved SWPPP.

The final engineering design would incorporate permanent stormwater management, Figure 6 provides the preliminary stormwater layout. A sedimentation basin would be constructed in the southeast corner of the site boundary to capture and treat runoff. Stormwater sedimentation basins would meet the following criteria:

- Designed for the calculated volume of runoff from the 2-year, 24-hour storm per acre drained, and provide not less than 1,800 cubic yards of sediment storage below the invert of the outlet pipe. If the storm event is not calculated, a minimum of 3,600 cubic feet of storage per acre drained is needed for sediment below the outlet invert.

- Basin outlets must be designed to avoid short-circuiting and discharge debris.

- Basins must be designed to completely drawdown for maintenance activities
- Basins must release the storage volume in at least 24 hours
- Outlet structures must be designed to withdraw water from the surface, unless not practicable. If not practicable, rationale must be provided in the SWPPP.

The aboveground tailings and return water pipelines would cross perennial and intermittent streams. The pipelines would not affect the plan or profile of the streams; construction would be outside of the ordinary high water mark (OHWM).

Groundwater

The Center MREC facility would not affect groundwater during construction; however, at full capacity, would generate an estimated 508 gpm of non-hazardous wastewater for disposal via injection wells during operation.

Ground disturbance activities or operations are not expected to interact with the fluvial glacial aquifer present near Nelson Lake. The Center MREC facility proposes the use of Class I injection wells for managing their process wastewaters.

The proposed Class I injection wells would be designed, constructed, and operated in accordance with applicable state and federal regulations to protect USDWs in the vicinity of the Center MREC facility. The proposed injection wells would be constructed with multiple casing strings cemented to the ground surface to provide multiple barriers against vertical migration of injected wastewater. The thick, low permeability confining unit will serve to isolate the injected wastewater within the injection interval (the Inyan Kara Formation). The annular space around the innermost injection tubing would be filled with fluid, pressurized, and continuously monitored to continuously demonstrate the mechanical integrity of the injection well(s).

3.4.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure would not occur. No changes to existing water resources would occur.

3.5 Air Quality

3.5.1 Proposed Action

3.5.1.1 MREC Facilities

Affected Environment

The CAA requires the EPA to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, referred to as “criteria pollutants” (reference (15)):

- ground-level ozone (O_3)
- particulate matter less than 10 and 2.5 microns (PM_{10}/$PM_{2.5}$)
- sulfur dioxide (SO_2)

- nitrogen dioxide (NO_2)
- carbon monoxide (CO)
- lead (Pb)

Ozone forms through atmospheric chemical reactions and is not a direct emission. Nitrogen oxides (NO_X) and volatile organic compounds (VOC) contribute to O_3 formation in the atmosphere and are regulated through equipment standards and emissions limits.

The CAA categorizes NAAQS as “primary” or “secondary.” Primary standards provide public health protection, including the health of at-risk populations, with an adequate margin of safety, and secondary standards provide for public welfare, including protection against degraded visibility and damage to animals, crops, vegetation, and buildings (reference (15)).

Compliance with the NAAQS is typically demonstrated through monitoring ground-level concentrations of atmospheric air pollutants. Geographic areas not complying with primary NAAQS requirements for criteria pollutants are considered nonattainment areas. A particular geographic region may be designated an attainment area for some pollutants and a nonattainment area for others. All counties within the state of North Dakota are in attainment with NAAQS for all criteria pollutants.

The NDDEQ is responsible for monitoring the levels of criteria pollutants to demonstrate compliance with NAAQS in North Dakota. NDDEQ – Division of Air Quality maintains a network of ten Ambient Air Quality Monitoring (AAQM) sites. Nine of these sites are operated directly by DEQ, and one additional site is operated in partnership with the National Park Service in the Theodore Roosevelt National Park South Unit at Painted Canyon. The AAQM sites closest to the Underwood and Center MREC facilities are Beulah-North and Hannover monitoring sites. The DEQ monitors the following parameters at the Beulah-North site:

- SO_2
- NO_2
- O_3
- PM_{10} and $PM_{2.5}$
- Ammonia (NH_3)

The DEQ monitors the following parameters at the Hannover site:

- SO_2
- NO_2
- O_3
- PM_{10} and $PM_{2.5}$

According to the most recent DEQ report, concentrations of the above parameters are below the applicable NAAQS standards for both monitoring locations (reference (16)).

HAPs, which are a class of 187 toxic air pollutants, are known or suspected to cause cancer or other serious health effects, or adverse environmental effects. HAPs would be emitted from fuel combustion sources during construction and operations.

The EPA Air Toxics Screening Assessment tool (AirToxScreen) evaluates the effects of existing HAP emissions in North Dakota (reference (17)). Per the AirToxScreen Technical Support Document, this national-scale assessment (AirToxScreen) is consistent with the EPA's definition of a cumulative risk assessment as "an analysis, characterization, and possible quantification of the combined risks to health or the environment from multiple agents or stressors." (reference (18)). Table 3-3 shows the cancer risk (per million) for McLean and Oliver Counties in North Dakota.

Table 3-3 Cancer Risk within MREC Facilities Analysis Area

County	Background Cancer Risk (per million)	Total Cancer Risk (per million)
McLean	20.00	2.89
Oliver	20.00	2.87

The Prevention of Significant Deterioration (PSD) is a CAA permitting program for new or modified major sources of air pollution located in attainment areas. It is designed to prevent NAAQS violations, preserve, and protect air quality in sensitive areas, and protect public health and welfare (reference (19)). Under PSD regulations, the EPA classifies airsheds as Class I, Class II, or Class III. The CAA PSD requirements give more stringent air quality and visibility protection to national parks and wilderness areas designated as Class I areas, but a PSD designation does not prevent emission increases. Federal land managers are responsible for defining specific air quality-related values, including visual air quality (haze) and acid (nitrogen and sulfur) deposition, for an area and establishing the criteria to determine an adverse effect on the air quality-related values. The nearest Class I area to the MREC facilities is Theodore Roosevelt National Park to the west.

Environmental Consequences

Air emissions would result from the construction and operation of the Underwood and Center MREC facilities. During construction, air emissions would primarily consist of emissions from construction equipment and include criteria pollutants with exception for Pb. Dust generated from earth disturbing activities also gives rise to particulate matter. Emissions from construction vehicles would be minimized by using modern equipment with lower emissions ratings. If construction activities generate problematic dust levels, construction-related practices to control fugitive dust may be employed. Adverse effects on the surrounding environment are expected to be negligible due to the temporary disturbance during construction and the intermittent nature of the emission- and dust-producing construction phases.

The Underwood and Center MREC facilities operations would generate emissions of:

- NOx
- VOCs
- SO_2
- CO

- PM_{10} and $PM_{2.5}$
- HAPs
- GHGs

Any new emissions in the airshed that are subject to CAA permitting would have to comply with CAA regulations. Due to the location of the Underwood MREC facility and existing air quality conditions, the amount of anticipated air emissions, the baghouse controls that would be implemented during operation, and meeting applicable emission standards, effects on air quality because of the MREC facilities would not be significant.

3.5.1.2 RESS&R facility

Affected Environment

The Nebraska Department of Environment and Energy (NDEE) monitors the levels of criteria pollutants in Nebraska. The Nebraska Ambient Air Monitoring Network collects the ambient air quality data for the following pollutants:

- SO_2
- NO_2
- CO
- O_3
- PM_{10} and $PM_{2.5}$
- Lead

According to the most recently available 2023 NDEE report, concentrations of the above parameters are below the applicable NAAQS standards (reference (20)). Therefore, all counties within the state of Nebraska are in attainment with NAAQS for all criteria pollutants. The RESS&R facility is within this attainment area and is thus considered to be in attainment with NAAQS.

The AirToxScreen evaluates the effects of existing HAP emissions in Nebraska (reference (17)). Table 3-4 shows the cancer risk (per million) for Gage County in Nebraska.

Table 3-4 Cancer Risk within RESS&R facility Analysis Area

County	Background Cancer Risk (per million)	Total Cancer Risk (per million)
Gage	20.07	2.88

The nearest Class I areas to the RESS&R facility are Rocky Mountain National Park to the west and Badlands National Park to the northwest.

Environmental Consequences

The Proposed Action includes the purchase, installation, and operation of the equipment within the existing RESS&R facility. Air emissions would result from the construction and operation of the RESS&R facility. During construction, air emissions would be minimal because it is an existing facility.

Due to the location of the RESS&R facility and existing air quality conditions, the amount of anticipated air emissions, the controls that would be implemented during operation, and meeting applicable emission standards, effects on air quality because of the modifications to the RESS&R facility would not be significant.

3.5.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. No changes to existing air quality would occur.

3.6 Greenhouse Gases

3.6.1 Proposed Action

3.6.1.1 MREC Facilities

Affected Environment

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. Some of the solar radiation that reaches Earth's surface radiates back toward space as infrared radiation. GHGs trap heat in the atmosphere from the absorption of this infrared radiation, which causes a rise in the temperature of Earth's atmosphere. This warming process is known as the greenhouse effect (reference (21)).

The most common GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases. Anthropogenic CO_2 emissions are responsible for about two-thirds of the energy imbalance that is causing Earth's temperature to rise, which has direct and cascading effects on weather and climate patterns, vegetation, agriculture, disease, availability of water, and ecosystems (reference (22)).

Climate change and decarbonization have been discussed for decades at all levels of government, as well as in global, national, and local institutions. There is general agreement that immediate and large-scale progress toward carbon neutrality is needed. Many countries have announced decarbonization initiatives. The first binding global agreement, the Paris Agreement, was established in 2016. The Paris Agreement goal is to keep the rise in mean global temperature to well below 3.6°F, and preferably limit the increase to 2.7°F. To meet this goal, global emissions will need to be reduced as soon as possible and reach net-zero by the middle of the 21st century (reference (23)).

More recently in 2021, the United States announced the Net Zero World Initiative to reach net zero by 2050 and the 2030 Greenhouse Gas Pollution Reduction target to achieve a 50-52% reduction in greenhouse gas emissions from 2005 levels. The reductions would be accomplished by accelerating transitions to net zero, resilient, and inclusive energy systems (references (24); (25)).

In 2021, the North Dakota governor expressed a goal that the state of North Dakota be carbon neutral by 2030 (reference (26)). The DEQ has developed the North Dakota Priority Climate Action Plan. The plan is aimed at environmental sustainability and reducing greenhouse gas emissions (reference (27)).

Environmental Consequences

GHG emissions would result from the construction and operation of the Underwood and Center MREC facilities. Identified GHG emissions associated with the construction and operation of the MREC facilities consist of direct emissions generated from combustion sources (e.g., stationary, and mobile on- and off-road sources) and land use change. Indirect emissions associated with the construction and operation of the MREC facilities include the GHG emissions associated with electrical consumption and transportation.

Emission factors used to calculate emissions from construction and operation are based on the EPA Emissions for Greenhouse Gas Inventories 2024 Emission Factors Hub (reference (28)). Emissions calculated for land use change were based on CO_2e flux estimates from the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022 (reference (29)). The indirect emissions from electrical consumption were calculated based on the EPA Emissions & Generation Resource Integrated Database (eGRID) for the Midwest Reliability Organization West subregion (reference (29)).

GHG emission sources from construction activities could include but are not limited to:

- fuel combustion equipment
- off-road combustion such as backhoes and skid steers, mobile source combustion
- electrical consumption
- land use change

Emissions from electrical consumption and land use change are anticipated to be minimal and have not been included in calculations. Table 3-5 summarizes the estimated Proposed Action construction GHG emissions; associated calculations are summarized in Appendix A.

Table 3-5 Proposed Action Construction GHG Emissions

Project Area	Fuel Combustion CO_2e (metric tons)
MREC facilities	8,376

Direct operational GHG emission sources include fuel combustion from stationary kilns and mobile equipment. Indirect operational emissions would include the estimated 8,190,000 kWh/year electrical consumption, transportation, and land use change. The Proposed Action would change the land use within the facility boundaries. Table 3-6 summarizes the estimated MREC facilities operational GHG emissions; associated calculations are summarized in Appendix A. The total MREC facilities operational emissions are estimated to be 32,124 MT CO_2e annually.

Table 3-6 MREC Facilities Operational GHG Emissions

Project Area	Stationary Fuel Combustion CO_2e (metric tons/yr)	Mobile Fuel Combustion CO_2e (metric tons/yr)	Land Use Change CO_2e (metric tons/yr)	Truck Traffic CO_2e (metric tons/yr)	Electrical Consumption CO_2e (metric tons/yr)	Total CO_2e (metric tons/yr)
MREC facilities	199	7,174	944	20,523	3,504	32,145

3.6.1.2 RESS&R facility

Affected Environment

In 2021, the Nebraska Public Power approved a goal to achieve net-zero carbon emissions from generation resources by 2050. It is believed that reaching the goal will include using alternative fuels, energy efficiency projects, lower or zero carbon emission generation resources, carbon capture, carbon-offsets, beneficial electrification, energy storage, and other new emerging technologies (reference (21)).

Environmental Consequences

The Proposed Action includes the purchase, installation, and operation of the equipment within the existing RESS&R facility. GHG emissions would result from the construction and operation of the equipment at the RESS&R facility. Identified GHG emissions associated with the construction and operation of the consist of direct emissions generated from combustion sources (e.g., mobile on- and off-road sources). Indirect emissions associated with the construction and operation of the Proposed Action include the GHG emissions associated with electrical consumption.

Table 3-5 summarizes the estimated Proposed Action construction GHG emissions; associated calculations are summarized in Appendix A. The total Proposed Action construction emissions are estimated to be 8,376 metric tons CO_2e.

Direct operational GHG emission sources include fuel combustion from mobile sources. Indirect operational emissions would include the estimated 595,855 kWh/year electrical consumption. Table 3-7 summarizes the estimated RESS&R facility operational GHG emissions; associated calculations are summarized in Appendix A. The total RESS&R facility operational emissions are estimated to be 655 metric tons CO_2e annually.

Table 3-7 RESS&R facility Operational GHG Emissions

Project Area	Stationary Fuel Combustion CO_2e (metric tons/yr)	Mobile Fuel Combustion CO_2e (metric tons/yr)	Truck Traffic CO_2e (metric tons/yr)	Electrical Consumption CO_2e (metric tons/yr)	Total CO_2e (metric tons/yr)
RESS&R facility	n/a	400	n/a	255	655

n/a – not applicable

3.6.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. There would be no additional greenhouse gas emissions.

3.7 Noise

3.7.1 Proposed Action

3.7.1.1 Underwood MREC Facility

Affected Environment

The Underwood MREC facility would be in an area with existing industrial activities, and further surrounded by largely agricultural property. The area has no noise ordinances outside of county zoning requirements for industrial uses to provide buffers for adjacent residential areas. Existing noise sources include existing industrial activity at the Falkirk Mine, Coal Creek Station, and Blue Flint Ethanol, as well as agricultural equipment, rail traffic, vehicles on adjacent roadways, area vegetation, and noises of wildlife and insects. The Underwood MREC facility would be adjacent to existing mining operations, which will continue. The current environment includes a mix of industrial and agricultural sounds.

Environmental Consequences

Noise effects are likely to be minimal as the area already includes similar, related industrial activity. Construction of the Underwood MREC facility may result in short-term increases in noise level in the immediate area, with indirect effects associated with the additional activity on surrounding roads and in the broader community. These effects are expected to be like normal new construction activity, both temporary and with limited overall effect.

Once the Underwood MREC facility is in operation, increases in noise levels may occur in the immediate area of the facility, while at increasing distances the increase is expected to become indistinguishable from existing industrial activities. Tailings hauling would occur over existing haul routes, with effects expected to blend with existing haulage and yield minimal change to overall effects. Additional vehicle traffic associated with the construction and operation of the Underwood MREC facility would largely blend with existing traffic in the area given the other industrial activities in the vicinity.

3.7.1.2 Center MREC Facility

Affected Environment

The Center MREC facility would be in an area with existing industrial activities, and further surrounded by largely agricultural activities. The area has no noise ordinances outside of county zoning requirements for industrial uses to provide buffers for adjacent residential areas. Existing noise sources in the Proposed Action t area include: BNI Coal mining activity, power generation at MRY, agricultural equipment, wind farms, vehicles on adjacent roadways, area vegetation, and noises of wildlife and insects. The Center MREC facility would be adjacent to existing mining operations which will continue. The current environment includes a mix of industrial and agricultural sounds.

Environmental Consequences

Noise effects are likely to be minimal as the area already includes similar, related industrial activity. Construction of the facility may result in short-term increases in noise level in the immediate area, with indirect effects associated with the additional activity on surrounding roads and in the broader community. These effects are expected to be like normal new construction activity, both temporary and with limited overall effect.

Once the Center MREC facility is in operation, increases in noise levels may occur in the immediate area of the facility, while at increasing distances any increase is expected to become indistinguishable from existing industrial activities. Pumped tailings disposal will limit the potential for any noise associated with that process. Limited mobile equipment operations at the tailings impoundment areas would blend with equipment activity already occurring in the mine area. Additional vehicle traffic associated with the Center MREC facility would largely blend with existing traffic in the area given the other industrial activities in the vicinity.

3.7.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. No changes to existing noise would occur.

3.8 Transportation

3.8.1 Proposed Action

3.8.1.1 Underwood MREC Facility

Affected Environment

During construction and operation, the Underwood MREC facility would be accessed from U.S. Highway 83. U.S. 83 is a two-lane, divided expressway with a posted speed limit of 70 miles per hour (reference (30)). The nearest city is Underwood, approximately three miles north via Highway 83. Underwood can be accessed from Highway 83 via Old Highway 83. This intersection is controlled by stop signs for traffic on Old Highway 83. The posted speed within residential areas is 25 miles per hour. The city of Washburn, is approximately 8.5 miles south area via Highway 83, and can be accessed via North Dakota Highway 200A/25th Ave SW. This intersection is controlled by stops signs for traffic on Highway 200A/25th Ave SW.

The North Dakota Department of Transportation's Traffic Volume Dashboard was used to assess annual average daily traffic (AADT), a measure of baseline traffic conditions in the vicinity of the Underwood MREC facility. In 2024, the AADT was 4,744 trips along U.S. Highway 83 (2,165 Northeast bound and 2,579 southwest bound) (reference (31)). Workers accessing the site during construction and operation of the Underwood MREC facility would contribute to local traffic volumes.

Environmental Consequences

Future parking would consist of approximately 112 spaces, to accommodate peak staffing shifts, vendors, and contractors. The Underwood MREC facility would be operational 24 hours per day, divided into four shifts. Peak traffic volumes would occur during shift changes. Using the personnel data provided and assuming all future employees drive their own vehicles to work, it is anticipated that 12-15 employees will

travel in and out of the area for each of the four scheduled shifts, constituting an additional 96-120 trips per day. However, as this is a very minor increase in AADT (two to three percent), employee traffic during operation is unlikely to significantly affect overall daily traffic volumes.

Truck traffic during operation is expected to increase daily truck and train trips to transport reagents required for process. The sources of these reagents are unknown and would be delivered by either truck or train. It is anticipated that a combination of truck and train trips would be used to source processing materials.

A total of 39 heavy trucks (18.1 tonnes) daily accessing the Underwood MREC facility for delivery of reagents required for processing. Using the existing Soo Line Railway, train traffic supporting operations would increase by 8 daily train cars. This additional truck or train traffic has the potential to affect local and commuter traffic, particularly during peak hours. Furthermore, noise and exhaust generated by this additional traffic may affect residents, pedestrians, and bicyclists.

In addition, an estimated 47 daily truck (100 tonnes) trips of upgraded lignite and 17 daily truck trips to the tailing impoundment locations would also occur. These truck trips would be isolated to the existing Falkirk Mine haul roads and would not affect public roadways.

Incremental traffic, including employee vehicle trips and trucks, would be an additional 135 to 216 trips per day on public roads assuming all processing materials would be delivered by truck. This constitutes an increase to AADT of approximately 2.8 to 4.5 percent.

3.8.1.2 Center MREC Facility

Affected Environment

During construction and operation, the Center MREC facility would be accessed from existing roadways, North Dakota (ND) Highway 25 and municipal street 36th Ave SW. ND Highway 25 is a two-lane undivided highway with a posted speed limit of 65 miles per hour. ND Highway 25 runs east-west, approximately 2.5 miles north of the Proposed Action area. The highway provides access to the city of Center, which is the closest municipality to the Proposed Action area. From ND Highway 25, the Center MREC facility would be accessed via 36th Ave SW, which intersects ND Highway 25 approximately 1.65 miles east of Center. This intersection is controlled by stop signs for traffic on 36th Ave SW approaching ND Highway 25. Traffic will turn south onto 36th Ave SW, which is a two-lane undivided, paved roadway, to access the Center MREC facility. North of ND Highway 25, 36th Ave SW is a gravel road. This street passes the Square Butte Creek Golf Course and appears to be the only access to this facility.

The North Dakota Department of Transportation's Traffic Volume Dashboard was used to assess AADT, a measure of baseline traffic conditions near the Center MREC facility. AADT information was not available for ND Highway 25 or 36th Ave SW. However, to glean a sense of current traffic volumes, the analysis was expanded to include the nearest recorded AADT counts. 2023 data show an AADT of approximately 750 on Highway 31 (6 miles northwest of Center, running north-south) (reference (31)). However, it should be noted that traffic volumes along ND Highway 25 may differ. Workers accessing the site during construction and operation of the Center MREC facility would contribute to local traffic volumes.

Environmental Consequences

Future parking would consist of approximately 106 spaces, to accommodate peak staffing shifts, vendors, and contractors. The Center MREC facility would be operational 24 hours per day, divided into four shifts. Peak traffic volumes would occur during shift changes. Using the personnel data provided and assuming all future employees drive their own vehicles to work, it is anticipated that 12-15 employees will travel in and out of the area for each of the four scheduled shifts, constituting an additional 96-120 trips per day. As current traffic volumes are not available for ND Highway 25 or for 36th Ave SW, determining the potential increase to ADT with certainty is not possible. However, based on the most proximal data available, employee-generated daily traffic volumes would increase current AADT between 13 and 16 percent.

Truck traffic during operation is expected to increase daily truck and train trips to transport reagents required for process. The sources of these reagents are unknown.

A total of 26 heavy trucks (18.1 tonnes) daily accessing the Center MREC facility for delivery of reagents required for processing This additional truck traffic has the potential to affect local and commuter traffic, particularly during peak hours. Furthermore, noise and exhaust generated by this additional traffic may affect residents, pedestrians, bicyclists, and patrons of the Square Butte Creek Golf Course.

The tailings for the Center MREC facility would be transported by pipeline to the impoundment locations and would not require any additional truck trips. It is estimated that there would be 31 daily truck (100 tonnes) trips of upgraded lignite to the MRY. These truck trips would be isolated to the existing MRY haul roads and would not affect public roadways.

Incremental traffic, including both employee vehicle trips and trucks, would be an additional 122 to 146 trips per day. This constitutes an increase to ADT of approximately 16 to 19 percent.

3.8.1.3 RESS&R facility

Affected Environment

The existing RESS&R facility is within the city limits of Beatrice, NE. Construction would be limited to the installation of new equipment within the existing facility which would result in minor traffic increases for deliveries and equipment installation. During operation, the RESS&R facility would be accessed from existing roadway, U.S. Highway 77. U.S. 77 is a 4-lane, undivided highway with a posted speed limit of 35 miles per hour in the vicinity of Proposed Action area. The Nebraska Department of Transportation's Average Daily Traffic Counts mapping application was used to assess AADT, a measure of baseline traffic conditions near Beatrice. In 2023, the AADT was 4,450 trips along U.S. Highway 77, recorded in Riverside, NE. Of those trips, 450 were made by heavy trucks.

Environmental Consequences

The RESS&R facility would continue to be operational 24 hours per day, divided into two 12-hour shifts. Peak traffic volumes would occur during shift changes at 6am and 6pm daily. Using the personnel data provided and assuming all future employees drive their own vehicles to work, it is anticipated that 5-10 employees will travel to and from the RESS&R facility for each of the two scheduled shifts, constituting an additional 10-20 trips per day. However, as this is a very minor increase in AADT (less than one percent), employee traffic during operation is unlikely to significantly affect overall daily traffic volumes.

Truck traffic during operation is expected to increase by one heavy truck (18.1 tonnes) a week to supply MREC concentrate. Total incremental traffic, including both employee vehicle trips and trucks, would be an additional 32 trips per day. This constitutes an increase to ADT of approximately 7.1 percent. As the increase in traffic volume would be minor, no significant effects to local traffic are anticipated.

3.8.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. No changes to existing traffic counts and patterns would occur.

3.9 Aesthetic and Visual Resources

3.9.1 Proposed Action

3.9.1.1 Underwood MREC Facility

Affected Environment

The affected environment for visual resources would include the current view, which is adjacent to the existing Falkirk Mine and the Coal Creek Station. The Underwood MREC facility would be an addition to the mining site and therefore is in character with the existing viewshed. The Sakakawea Scenic Byway is more than 10 miles south and is adjacent to the Missouri River. It follows Highway 200A from Washburn to Stanton and provides a view of the Missouri River

The area surrounding the Underwood MREC facility is generally undeveloped grassland/herbaceous areas and cultivated crops. The existing Falkirk Mine and Coal Creek Station is a developed, industrial area that is visible from surrounding roads. Existing security and safety lighting at the facilities create a visual contrast at night.

Environmental Consequences

Construction of the Underwood MREC facility would introduce additional permanent structures to the existing environment; however, the new features would align with the surrounding industrial development. The tallest structure in the surrounding area are the stacks of the Coal Creek Station. The Underwood MREC facility would be below this height. The Underwood MREC facility would be visible to landowners and community residents who live and travel nearby. The Underwood MREC facility would not present a change to the visual landscape out of character with the existing and adjacent mining operations.

Lighting is currently in place at the Falkirk Mine. The Underwood MREC facility would include additional lighting for maintenance, access, and egress in and around the new facilities as necessary. Some temporary lighting would also be necessary to support construction activities. Other short- and long-term visual effects associated with Underwood MREC facility construction and operation would include increased human activity and associated vehicles and equipment in the surrounding vicinity. The Underwood MREC facility construction and operation would affect the Sakakawea Scenic Byway due to its distance.

3.9.1.2 Center MREC Facility

Affected Environment

The affected environment for visual resources would include the current view of the Proposed Action area, which is an adjacent to an existing power plant, an existing coal mine, and an existing coal wholesaler in a generally rural landscape in central North Dakota. The Proposed Action would be an addition to the power plant site and therefore is in character with the existing viewshed. The Sakakawea Scenic Byway is more than 11 miles north of the Proposed Action area.

The area surrounding the Center MREC Facility is generally undeveloped grassland/herbaceous areas and cultivated crops. The existing Center Mine and the MRY is a developed industrial area that is visible from surrounding roads. Existing security and safety lighting at the facilities create a visual contrast at night.

Environmental Consequences

Construction of the Proposed Action would introduce additional permanent structures to the existing environment; however, the new features would align with the surrounding industrial development. The tallest structure in the surrounding area are the stacks of the MRY. The Center MREC facility would be below this height. The Center MREC facility would be visible to landowners and community residents who live and travel nearby. The Underwood MREC facility would not present a change to the visual landscape out of character with MRY and adjacent mining operations. The Proposed Action would not present a change to the visual landscape out of character with the existing and adjacent MRY.

Lighting is currently in place at the MRY. The Proposed Action would include additional lighting for maintenance, access, and egress in and around the new facilities as necessary. Some temporary lighting would also be installed to support construction activities. Other short- and long-term visual effects associated with Proposed Action construction and operation would include increased human activity and associated vehicles and equipment within the Proposed Action area and the surrounding vicinity. The Proposed Action is not anticipated to affect the Sakakawea Scenic Byway due to its distance.

3.9.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. No changes to existing aesthetic and visual resources would occur.

3.10 Biological Resources and Threatened and Endangered Species

A desktop review of biological resources, including federally protected species, was conducted within the approximate Proposed Action areas, which included a review of aerial photographs, North Dakota Game and Fish Department (NDGF) file information, and the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) database. The review evaluated the likelihood for federally protected species effects in accordance with the Endangered Species Act of 1973, the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (BGEPA). Federally listed species data were derived from the USFWS's IPaC database. Species effect determinations were made using IPaC's North Dakota Determination Key (DKey) and desktop review information. Consultation letters were sent to USFWS for concurrence of species effect determinations.

At the state level, the NDGFD identifies species that are considered Species of Conservation Priority and set a strategic vision with the goal of preserving the state's wildlife diversity through their State Wildlife Action Plan. However, North Dakota does not have a state endangered or threatened species list; only those species listed under the ESA are considered threatened or endangered in North Dakota.

3.10.1 Proposed Action

3.10.1.1 Underwood MREC Facility

Affected Environment

Wildlife, Vegetation, and Aquatic Resources

The Underwood MREC facility would be on The Falkirk Mining Company property. Land use within the area is predominantly grassland/pasture with constructed sediment ponds scattered throughout the parcel. No natural or previously undisturbed areas are present on site and wildlife and aquatic habitat is considered low-quality. Herbaceous areas are routinely disturbed and lack cover to support a diversity of wildlife. Sedimentation ponds experience a significant amount of runoff from surrounding land use, resulting in lowered water quality and habitat for aquatic species. Surrounding land use consists of surface coal mine and active agriculture land, which are isolated from high-quality wildlife habitat.

Given the active power generation facility, coal and industrial operations, and roadways, typical wildlife species likely to occur in the area could include animals well-adjusted to human disturbance such as (reference (32)):

- squirrels
- fox
- shorebirds
- raptors
- skunks
- otters
- toads
- snakes
- rabbits
- songbirds
- grassland birds
- coyotes
- raccoons
- white-tailed deer
- turtles
- butterflies

Federally Protected Species

A review of USFWS IPaC identified four federally threatened and endangered species and one candidate species, the monarch butterfly (*Danaus plexippus*) for review with the Underwood MREC facility area (Table 3-8). The monarch butterfly is not protected under the ESA as a candidate species and therefore was not evaluated in this EA. No critical habitats were identified within the Underwood MREC facility area.

Table 3-8 Federally Listed Species - Underwood MREC Facility

Common Name	Scientific Name	Potential to Occur within the Proposed Action Vicinity
Dakota Skipper	*Hesperia dacotae)*	Unlikely to occur, the Proposed Action area consists of disturbed uplands and sedimentation ponds and does not contain native prairie habitat with a diversity and abundance of native forbs and grasses
Piping Plover	*Charadrius melodus*	May occur, but habitat is largely unsuitable. There are no suitable shoreline areas within the Proposed Action vicinity suitable for nesting. Water features are manmade or seasonal and would not support this species. This species nests along sandy shoreline areas along the Missouri River and Lake Sakakawea. Nearest suitable nesting habitat is greater than 8 miles south along the Missouri River.
Rufa Red Knot	*Calidris canutus rufa*	Unlikely to occur, species nests in the Canadian arctic. There are no suitable coastal marine or estuarine habitat located within the Proposed Action vicinity that would serve as stopover habitat for this species.
Whooping Crane	*Grus americanus*	May occur, migrates through the state in April to mid-May and September to early November. Species is not known to nest within North Dakota. Suitable stopover habitat is present in the Proposed Action vicinity, consisting of stormwater/sedimentation ponds and nearby row-crops. However, these areas are not of sufficient size and quality typically associated with this species. Areas outside of the Proposed Action vicinity provide equal and/or better stopover habitat, and this species would likely use those areas during Proposed Action operation and construction.

Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

A review of IPaC identified black tern (*Chlidonias niger surinamenisis*) as potentially occurring within the Underwood MREC facility area. This species typically nests within large wetland complexes adjacent to open water. There are no large wetland complexes or waterbodies suitable for nesting within the Underwood MREC facility area.

Based on IPaC results, there are no documented cases of bald or golden eagles at the Underwood MREC facility location. Mature tree cover is minimal and there are no waterbodies suitable for foraging within one mile of the site.

Environmental Consequences

Due to the site's lack of natural habitat, current and planned land use, distance from potential wildlife habitat, and proximity to industrial activities and active agriculture, the Underwood MREC facility is anticipated to have little to no disturbance to wildlife and effects to biological resources would not be significant. While wildlife may potentially use the area, the past and present disturbances for the facility operations provide limited, minimally vegetated wildlife habitat. The Underwood MREC facility would occupy 84.5 acres of land including temporary construction and laydown areas. However, following construction, the construction and laydown areas would be restored to original conditions. Potential habitat in the areas retained for the Underwood MREC facility would be permanently removed and would result in displacement of wildlife species. However, effects would be low due to the limited existing habitat in the area and abundance of additional and higher quality habitat in the surrounding area.

The USFWS determination key was used to identify potential effects to threatened and endangered species within the Proposed Action area. It was determined that the Underwood MREC facility would

have “no effect” to the Dakota Skipper and Rufa Red Knot due to the lack of available habitat. It was also determined that the Underwood MREC facility “is not likely to adversely affect” the Whooping Crane and Piping Plover due to the lack of suitable habitat and abundance of similar habitat within the surrounding area. The DOE requested USFWS concurrence with the threatened and endangered species determinations. USFWS concurred with the species determinations in accordance with Section 7(c) of the Endangered Species Act (ESA), as amended, 16 U.S.C 1531 et seq. (Appendix B).

Migratory birds have a low potential to occur within the Underwood MREC facility area and occurrences are anticipated to be limited to individuals passing through. Direct effects to migratory birds are not anticipated during and following facility construction due to lack of suitable nesting habitat. Indirect effects to migratory birds passing through the area and adjacent areas are possible from increased visual and noise disturbance associated with facility construction and operation. However, disturbance from nearby industrial use and active agriculture already exist adjacent to the proposed Underwood MREC facility.

3.10.1.2 Center MREC Facility

Affected Environment

Wildlife, Vegetation, and Aquatic Resources

Land use with the Center MREC facility is characterized predominantly as grassland/pasture with a sedimentation pond and forested/shrub areas, interspersed throughout the parcel. No natural or previously undisturbed areas are present on site and wildlife and aquatic habitat is considered low-quality. Herbaceous and wooded areas are routinely disturbed and do not occur within the vicinity of high-quality habitat to support diversity of wildlife. The sedimentation pond experiences a significant amount of runoff from surrounding land use, resulting in lowered water quality and habitat for aquatic species. Surrounding land use consists of a lignite coal mine, a power generation facility, active agriculture, and Nelson Lake. Nelson Lake supports various fish species such as (references (33); (34)):

- largemouth bass (*Micropterus salmoides*)
- black crappie (*Pomoxis nigromaculatus*)
- white crappie (*Pomoxis annularis*)
- northern pike (*Esox lucius*)
- walleye (*Sander vitreus*)
- bluegill (*Lepomis macrochirus*)
- perch (*Genus perca*)

(Per the NDGF, Nelson Lake is regarded as the best largemouth bass lake in the state and sustains open water year-round which allows warm water fish to grow better than in other lakes (reference (34)).

Given the active power generation facility, industrial operations, and roadways, typical wildlife species likely to occur in the Proposed Action vicinity could include animals well-adjusted to human disturbance such as (reference (32)):

- squirrels
- rabbits

- fox
- songbirds
- shorebirds
- grassland birds
- raptors
- coyotes
- skunks
- raccoons
- otters
- white-tailed deer
- toads
- turtles
- snakes
- butterflies

Threatened and Endangered Species

A review of USFWS IPaC identified five federally threatened and endangered species and one candidate species, the monarch butterfly as potentially occurring within the Center MREC facility area (Table 3-9). No critical habitats were identified within the Center MREC facility. The monarch butterfly is not protected under the ESA as a candidate species and therefore was not evaluated in this EA.

Table 3-9 Federally Listed Species - Center MREC Facility

Common Name	Scientific Name	Potential to Occur within the Proposed Action Vicinity
Northern Long-eared Bat	*Myotis septentrionalis*	May occur; tree removal is anticipated, but forested areas are isolated from large, forested tracts suitable for roosting and the Proposed Action is not within the vicinity of known NLEB sensitive areas.
Dakota Skipper	*Hesperia dacotae)*	Unlikely to occur. Proposed Action area does not overlap with a county where this species has been recorded.
Piping Plover	*Charadrius melodus*	May occur, species nests in North Dakota between April 15 and August 15 but species is not known to nest along Nelson Lake. Shoreline habitat of Nelson Lake within the Proposed Action vicinity is herbaceous and lacks large sandy areas suitable for nesting.
Rufa Red Knot	*Calidris canutus rufa*	May occur, but species nests in the Canadian arctic and is a rare migrant through North Dakota in mid-May and mid-September to October. There are no known stopover sites consistently used by this species Shoreline areas within the Proposed Action vicinity are herbaceous and lack sandy beach habitat and mudflats this species prefers to use during stopover. Areas outside of the Proposed Action vicinity provide equal and/or better stopover habitat, and this species would likely use those areas during Proposed Action operation and construction.
Whooping Crane	*Grus americanus*	Unlikely to occur. Species is not known to nest within North Dakota. There are no large open wetlands or cropland ponds with the Proposed Action vicinity suitable for roosting or feeding.

Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

A review of IPaC identified eleven migratory bird species, including bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) as potentially occurring within the Center MREC facility. These species and habitat requirements are included in Table 3-10.

Table 3-10 Migratory Bird Species – Center MREC Facility

Common Name	Scientific Name	Habitat
Bald Eagle	*Haliaeetus leucocephalus*	Forested areas adjacent to large bodies of water, using select super-canopy roost trees that are open and accessible.
Bobolink	*Dolichonyx oryzivorus*	Grasslands, hayfields, and marshes with dense vegetation of grass, weeds, with low bushes.
Franklin's Gull	*Leucophaeus pipixcan*	Prairie marshes with low vegetation density; prefers patchy areas with interspersed open water.
Golden eagle	*Aquila chrysaetos*	Open and semi-open prairies, woodlands, and barren areas; preference for hilly or mountainous regions.
Grasshopper Sparrow	*Calidris canutus rufa*	Idle or lightly grazed tall or mixed-grass prairie, shrub prairie meadows, and hayfields.
Long-eared Owl	*Asio otus*	Roosts in dense vegetation near open prairies and grasslands which are used for foraging.
Marbeled Godwit	*Limosa fedoa*	Species breeds in marshes and flooded plains, also found on mudflats and beaches during winter & migration.
Northern Harrier	*Circus hudsonius*	Open grasslands, wet meadows, marshes, and areas not heavily grazed.
Prairie Falcon	*Falco mexicanus*	Prefers wide-open habitats, including prairies and agricultural fields. Also found in deserts and alpine meadows in the western United States.
Western Grebe	*Aechmophorus occidentalis*	Freshwater lakes and marshes with large open water areas surrounded by emergent vegetation. Nesting typically on floating vegetation well-hidden along shorelines.
Willet	*Tringa semipalmata*	Nesting in grasslands and prairies near freshwater. Feeding on beaches, rocky coasts, mudflats, and marshes.

Environmental Consequences

Due to the site's lack of natural habitat, current and planned land use, distance from potential aquatic and wildlife habitat, and proximity to industrial activities and active agriculture, the Center MREC facility is anticipated to have little to no disturbance to aquatic species and wildlife and effects to biological resources would not be significant. While wildlife may potentially use the area, the past and present disturbances for plant operations provide limited and isolated wildlife habitat. Erosion, sedimentation, and wastewater discharge from construction and facility operations could affect Nelson Lake and negatively affect aquatic species; however, the use of erosion and sediment control BMPs would limit such effects. All surface runoff and wastewater generated during construction and operations would be controlled, contained, and treated prior to any discharge to Nelson Lake per the SWPPP and NPDES permits. These discharges to Nelson Lake would be compliant with water quality standards and would not affect aquatic habitat quality. The Center MREC facility will occupy around 72.2 acres of land. This would include laydown areas and other various construction needs. Following construction, the construction and laydown areas would be restored to original conditions. Potential habitat in the areas retained for the Center MREC facility would be permanently removed and would result in displacement of wildlife species. However, effects would be low due to the limited existing habitat in the Proposed Action area and abundance of additional and higher quality habitat in the surrounding area.

The USFWS determination key was used to identify potential effects to threatened and endangered species within the Proposed Action area. It was determined that the Center MREC facility would have "no effect" to the Dakota skipper and whooping crane due to the lack of available habitat. It was also determined that the Center MREC facility "is not likely to adversely affect" northern long-eared bat, piping plover, and rufa red knot due to the presence of suitable habitat and abundance of similar habitat within the surrounding area. The DOE requested USFWS concurrence with the threatened and endangered species determinations. USFWS concurred within the determinations in accordance with Section 7(c) of the ESA, as amended, 16 U.S.C 1531 et seq., the USFWS concurred with the determinations (Appendix B).

As identified in Table 3-10, migratory birds have the potential to occur within the Center MREC facility; however, occurrences are anticipated to be limited to individuals passing through. Direct effects to migratory birds are not anticipated during and following facility construction due to minimally suitable nesting habitat and significant anthropogenic disturbance within the Proposed Action vicinity. Indirect effects to migratory birds passing through the Proposed Action area and adjacent areas are possible from increased visual and noise disturbance associated with facility construction and operation. However, disturbance from nearby industrial use and active agriculture already exist in area surrounding the Proposed Action area and any effects would be short-term and unlikely to result in take.

3.10.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. No changes to existing biological resources would occur.

3.11 Socioeconomics and Environmental Justice

This section describes the socioeconomics and environmental justice indicators in and around the proposed Underwood MREC facility in McClean County, North Dakota; the Center MREC facility in Oliver County, North Dakota; and the RESS&R facility in Gage County, Nebraska.

The review of environment justice (EJ) focuses on Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations," and the National-Scale Air Toxics Assessment (NATA) cancer risk and respiratory hazard index. Definitions and analysis are taken from the EPA's EJ screening tool (reference (35)).

In accordance with EPA's EJ guidelines, minority populations are identified when either the minority population of the affected area exceeds 50 percent; or 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.

3.11.1 Proposed Action

3.11.1.1 Underwood MREC Facility

Affected Environment

Socioeconomics

The Underwood MREC facility would contribute to economic activity in McLean County and the surrounding areas. Table 3-11 summarizes the local and state population information.

Table 3-11 Demographics Near the Underwood MREC Facility

Demographics	Underwood City [1]	McLean County [2]	North Dakota [3]
Total Population	740	9,771	779,094
Percent of population under 18 years of age	25.9%	22.4%	23.5%
Percent of population under 65 years of age	77.6%	74.9%	84.2%
White	92.1	86.0	82.9
Black or African American	0.5	0.3	3.4
American Indian and Alaska Native	1.3	8.3	5.0
Asian	0	0.5	1.7
Native Hawaiian and Other Pacific Islander	0.1	0.1	0.1
Some Other Race	0.4	0.4	1.5
Two or More Races	5.6	4.5	5.4
Hispanic or Latino (of any race)	1.3	1.5	4.3

[1] Source: reference (36)
[2] Source: reference (37)
[3] Source: reference (38)

The 2022 American Community 5-Year Estimates Survey found the three biggest occupation groups for the population of McLean County to be management, business, science, and arts (36%), natural resources, construction, and maintenance (19%), and sales and office (17%) (reference (39)). The top three industries for the County are educational services, and health care and social assistance (23%), Agriculture, forestry, fishing and hunting, and mining (18%), and transportation and warehousing, and utilities (10%) (reference (40)).

EJ indicators were analyzed using the EPA's EJ Screening Tool (reference (35)), to understand potential effects of the Underwood MREC facility on local and surrounding communities. Table 3-11 summarizes the racial/ethnic composition of Underwood City, McLean County, and North Dakota. People of color comprise 15.6 percent of the total population of McLean County, with most of the population identifying as White. The Underwood MREC facility would be within census tract 38055960800. Nineteen percent of the population are low-income, which is seven percent below the State average (26%) (reference (41)). The Underwood MREC facility would not be within an EJ community and none of the surrounding counties are considered an EJ community. The Mandan, Hidatsa and Arikara (MHA) Nation reservation is partially within McLean County. The MHA Nation reservation consists of 988,000 acres total and is also within Mountrail, Dunn, McKenzie, Mercer, and Ward counties.

The NATA cancer risk and respiratory hazard Index was used to analyze indirect effects to the local and surrounding areas. They are screening tools used to understand the existing risks and hazards present in a specific area, state, or across the nation (reference (42)). McLean County shows a NATA Air Toxics Cancer Risk (lifetime risk per million) of 10. This is characterized as being in the "less than 50th percentile", while also being less than in the state (16), and the nation (25). The NATA Air Toxics Respiratory HI for the facility area is 0.1, which is significantly lower than the state (0.16) and the nation (0.31). There are no air toxics-related health risks or pollution sources of greatest concern in the census tract.

Environmental Consequences

Socioeconomics

Construction and operation of the Underwood MREC facility would bring new socioeconomic activity to McLean County. The construction period of the Underwood MREC facility is estimated to last two years. Because the Underwood MREC facility requires a specialized workforce, most construction contractors and workers would temporarily relocate. During this time there would be an influx of construction workers, electricians, welders, laborers, and carpenters in the area. Length of employment for workers would vary depending on skill and specialty of work need. There are expected to be 120 to 150 persons employed during Underwood MREC facility construction. It is anticipated that much of the workforce will come from outside the region, due to the specialized nature of the work. There would be work available to local construction workers who have specialized experience and more for more general activities, such as such as clearing, grading, and earthwork.

A temporary increase in business for gas stations, convenience stores, restaurants, hotels, campgrounds, and retail shops in Underwood and other communities in the area during the construction is anticipated. Other business effects would be to services that are directly related to the construction of the Underwood MREC facility (fuel, building supplies, mechanics, etc.). Because of the workforce temporarily relocating, there would be short-term and minimal effects on housing for varying periods of time. Housing could consist of hotels, crew camps, RV camps, or more permanent rentals.

During operation of the Underwood MREC facility there would be an estimated 50-60 full time, permanent employees at the facility. There is potential for additional local services to occur during Proposed Action operations due to maintenance and repair, or during operation for scheduled outages and maintenance. These new staffing opportunities provide minimal new growth in the area, which would not result in a noticeable increase. Therefore, overall socioeconomic Proposed Action effects are minimal.

Environmental Justice

The Underwood MREC facility would not be within or near an EJ community or area of concern for the NATA cancer risk and respiratory hazard index (reference (41)). There are currently no anticipated disproportionate effects on minority or low-income population in the area.

3.11.1.2 Center MREC Facility

Affected Environment

Socioeconomics

The Center MREC facility would contribute to economic activity in Oliver County and the surrounding areas. Table 3-12 summarizes the local and state population information.

Table 3-12 Demographics for the Center MREC Facility

Demographics	City of Center City[1]	Oliver County[2]	North Dakota[3]
Total Population	588	1,877	779,094
Percent of population under 18 years of age	24.6	24.7	23.5
Percent of population under 65 years of age	78.6	78.4	84.2
White	90	93.6	82.9
Black or African American	0.3	0.2	3.4
American Indian and Alaska Native	2.6	1.3	5.0
Asian	0.2	0.3	1.7
Native Hawaiian and Other Pacific Islander	0.3	0.2	0.1
Some Other Race	0.2	0.7	1.5
Two or More Races	6.5	3.8	5.4
Hispanic or Latino (of any race)	1.5	1.5	4.3

[1] Source: reference (43)
[2] Source: reference (44)
[3] Source: reference (38)

The 2022 American Community 5-Year Estimates Survey found the three biggest occupation groups for the population of Oliver County to be management, business, science, and arts (38%), sales and office (22%), and service occupations (16%) (reference (45)). The top three industries for the County are Agriculture, forestry, fishing and hunting, and mining (19%), educational services, and health care and social assistance (17%), and transportation and warehousing, and utilities (12%) (reference (46)).

Environmental Justice

EJ indicators were analyzed using the EPA's EJ Screening Tool (reference (35)), to understand potential effects of the Center MREC facility on local and surrounding communities. Table 3-12 summarizes the racial/ethnic composition of City of Center, Oliver County, and North Dakota. People of color comprise around 8.2 percent of the total population of Oliver County, with most of the population identifying as White. Per the EPA EJ Screening Report, twenty-seven percent of the population are low-income, which is only a percent above the state average (reference (47)). The Center MREC facility would be in census tract 38065961200, which also comprises all of Oliver County. It would not be within an EJ community, but one of the neighboring counties is considered an EJ community.

The NATA cancer risk and respiratory hazard index was used to analyze indirect effects to the local and surrounding areas. They are screening tools used to understand the existing risks and hazards present in a specific area, state, or across the nation (reference (42)) Oliver County shows a NATA Air Toxics Cancer Risk (lifetime risk per million) of 10. This is characterized as being in the "less than 50th percentile", while also being less than in the state (16), and the nation (25). The NATA Air Toxics Respiratory HI for the facility area is 0.1, which is significantly lower than the state (0.16) and the nation (0.31). There are no air toxics-related health risks or pollution sources of greatest concern in the census tract.

Environmental Consequences

Socioeconomics

Construction and operation of the Center MREC facility would bring new socioeconomic activity to Oliver County. The construction period of the Center MREC facility is estimated to last two years. Because the Center MREC facility requires a specialized workforce, most construction contractors and workers would temporarily relocate. During this time there would be an influx of construction workers, electricians, welders, laborers, and carpenters in the area. Length of employment for workers would vary depending on skill and specialty of work need. There are expected to be 120 to 150 persons employed during construction. It is anticipated that much of the workforce will come from out the region, due to the specialized nature of the work. There would be work available to local construction workers who have specialized experience and more for more general activities, such as such as clearing, grading, and earthwork.

A temporary increase in business such as gas stations, convenience stores, restaurants, hotels, campgrounds, and retail shops in Center and other communities in the area during the construction is anticipated. Other business effects would be to services that are directly related to the construction of the Proposed Action (fuel, building supplies, mechanics, etc.). Because of the workforce temporarily relocating, there would be short-term and minimal effects on housing for varying periods of time. Housing could consist of hotels, crew camps, RV camps, or more permanent rentals.

During operation of the Proposed Action there would be an estimated 50-60 full time, permanent employees at the facility. There is potential for additional local services to occur during Proposed Action operations due to maintenance and repair, or during operation for scheduled outages and maintenance. These new staffing opportunities provide minimal new growth in the area, which would not result in a noticeable increase. Therefore, overall socioeconomic Proposed Action effects are minimal.

Environmental Justice

The Center MREC facility would not be within or near an EJ community or area of concern for the NATA cancer risk and respiratory hazard index (reference (47)). There are currently no anticipated disproportionate effects on minority or low-income population in the area.

3.11.1.3 RESS&R facility

Affected Environment

Socioeconomics

The Proposed Action would contribute to economic activity in the city of Beatrice and the surrounding areas. Table 3-13 summarizes the local and state population information.

Table 3-13 Demographics for the RESS&R facility

Demographics	Beatrice City[1]	Gage County[2]	Nebraska[3]
Total Population	12,261	21,704	1,961,504
Percent of population under 18 years of age	23.8	22.6	24.7
Percent of population under 65 years of age	77.1	78.1	83.6
White	91.6	93.5	78.4
Black or African American	1.0	0.6	4.9
American Indian and Alaska Native	0.5	0.5	1.2
Asian	0.7	0.5	2.7
Native Hawaiian and Other Pacific Islander	0.0	0.0	0.1
Some Other Race	1.2	0.9	5.4
Two or More Races	4.9	4.0	7.3
Hispanic and Latino (of any race)	4.0	2.9	12.0

[1] Source: reference (48)
[2] Source: reference (49)
[3] Source: reference (50)

The 2022 American Community 5-Year Estimates Survey found the three biggest occupation groups for the population of Gage County to be management, business, science, and arts (36%), service occupations (20%), and production, transportation, and material moving occupations (20%) (reference (51)). The top three industries for the County are educational services, and health care and social assistance (25%), manufacturing (17%), and retail trade (11%) (reference (52)).

Environmental Justice

EJ indicators were analyzed using the EPA's EJ Screening Tool (reference (35)), to understand potential effects of the Proposed Action at RESS&R facility on local and surrounding communities. Table 3-13 summarizes the racial/ethnic composition of Beatrice city, Gage County, and Nebraska. People of color comprise 9.4 percent of the total population of Gage County, with most of the population identifying as White. Per the EPA Screening Report thirty-nine percent of the population are low-income, which is around ten percent above the State average (reference (53)). The RESS&R facility is in census tract 31067965100, which also comprises all of Gage County. The RESS&R facility is not within an EJ community. The closest EJ community is Crete, Nebraska, census tract 31151960602, around 25 miles northwest of Beatrice. The census tract is comprised of 55.5% people of color.

The NATA cancer risk and respiratory hazard Index was used to analyze indirect effects to the local and surrounding areas. They are screening tools used to understand the existing risks and hazards present in a specific area, state, or across the nation (reference (42)) Gage County shows a NATA Air Toxics Cancer Risk (lifetime risk per million) of 20. This is characterized as being in the "less than 50th percentile," while also being one point more than in the state (19), and less than the nation (25). The NATA Air Toxics Respiratory HI for the facility area is 0.3, which is more than the state (0.23) but less than the nation (0.31). There are no air toxics-related health risks or pollution sources of greatest concern in the census tract.

Environmental Consequences

Socioeconomics

Construction and operation of the Proposed Action at the RESS&R facility would bring new socioeconomic activity to Gage County. The construction period of the Proposed Action would be two years. During this time there may be an influx of construction workers, electricians, welders, laborers, and carpenters in the area. Length of employment for workers would vary depending on skill and specialty of work need for the Proposed Action. There are expected to be 120 to 150 persons employed during construction. It is anticipated that much of the workforce will come from out the region, due to the specialized nature of the work. There would be work available to local construction workers who have specialized experience and more for more general activities, such as such as clearing, grading, and earthwork.

A temporary increase in business to gas stations, convenience stores, restaurants, hotels, campgrounds, and retail shops in Beatrice and other communities in the area during the construction may occur. Other business effects would be to services that are directly related to the construction of the Proposed Action (fuel, building supplies, mechanics, etc.). Because of the workforce temporarily relocating, there would be short-term and minimal effects on housing for varying periods of time. Housing could consist of hotels, crew camps, RV camps, or more permanent rentals.

During construction the local county and city governments could have short and/or long-term benefits from sales tax revenue collected. During operation of the Proposed Action only minimal property taxes would be collected.

During operation of the Proposed Action there would be an estimated 10-20 full time, permanent employees at the facility. There is potential for additional local services to occur during Proposed Action operations due to maintenance and repair, or during operation for scheduled outages and maintenance. These new staffing opportunities provide minimal new growth in the area, which would not result in a noticeable increase. Therefore, overall socioeconomic Proposed Action effects are minimal.

Environmental Justice

The RESS&R facility is not within or near an EJ community or area of concern for the NATA cancer risk and respiratory hazard index (reference (53)). There are currently no anticipated disproportionate effects on minority or low-income population in the area.

3.11.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. As a result, the additional construction/operations jobs and financial benefits to the local communities would not be realized.

3.12 Health and Safety

3.12.1 Proposed Action

3.12.1.1 Underwood and Center MREC Facility

Affected Environment

The affected environment for health and safety includes the MREC facilities' construction and operations personnel, adjacent facility employees, as well as members of the public that could be potentially exposed to health and safety effects of the Proposed Action. Construction and Falkirk and Center Mines personnel would be at a higher risk than the public during the construction period; however, these increased human safety hazards are temporary.

Peak labor force is anticipated to be approximately 120-150 persons during construction of various trades and assignments, plus project management and administrative personnel. Construction workers on site could be exposed to workplace hazards and health and safety effects during construction and during decommissioning after the end of operations.

There would be personnel on-site 24 hours per day for the operation of the MREC facilities. Workers also would be involved in overseeing deliveries, materials management, and waste management activities, and could potentially be exposed to workplace hazards and health and safety effects during operations.

Environmental Consequences

Construction and operation of the MREC facilities would result in the potential for health and safety effects to the personnel associated with construction, operations, and decommissioning, adjacent facilities employees, and members of the public. Potential health and safety effects to MREC facilities construction and operations personnel would include workplace (occupational) injuries including those related to the following:

- operation for mechanical and electrical equipment
- fall hazards
- vehicle accidents
- dust hazards
- potential occupational exposure to hazardous materials from transport, storage, and use of process chemicals (including diesel fuel, gasoline, lubricating oils, hydraulic fluid, paints, solvents, or other corrosive, flammable, or toxic chemicals)

The construction site would be managed to reduce risks to the public, who would not be allowed to enter any construction areas within the MREC facilities areas. The highest risk to the public would be increased traffic volume on the roadways near or adjacent to the MREC facilities due to commuting construction workers and equipment and materials transportation. These effects would be both temporary during construction and minimal during long-term daily operation of the MREC facilities. Based on these measures, it is not anticipated that the MREC facilities would create additional demands on human health services or the safety of the local community.

Storage tanks associated would be within secondary containment systems, and piping systems would be designed to reduce the potential for a pollutant discharge. Reagents used for the process would be stored in storage tanks within the MREC facilities' boundaries.

Construction personnel would receive training in areas relevant to construction and their job requirements including Hazard Communication/Right-to-Know, Hazardous Materials Management/Chemical Hygiene, Job Safety Assessment, and Hazardous and Solid Waste Management. Construction and operations personnel would use personal protective equipment appropriate for their work activities in accordance with applicable safety requirements. The MREC facilities would have eye wash stations and emergency showers for response to chemical exposure and from handling of other hazardous materials.

3.12.1.2 RESS&R facility

Affected Environment

The affected environment for health and safety includes the RESS&R facility construction and operations personnel, adjacent facility employees, as well as members of the public that could be potentially exposed to health and safety effects of the Proposed Action. Construction and existing RESS&R personnel would be at a higher risk than the public during the construction period; however, these increased human safety hazards are temporary.

Peak labor force is anticipated to be approximately 120-150 persons during construction of various trades and assignments, plus project management and administrative personnel. Construction workers on site could be exposed to workplace hazards and health and safety effects during construction.

Workers would be involved in overseeing deliveries, materials management, and waste management activities, and could potentially be exposed to workplace hazards and health and safety effects during operations.

Environmental Consequences

Construction and operation of the Proposed Action would result in the potential for health and safety effects to the personnel associated with construction and operations of the existing facility. Potential health and safety effects to construction and operations personnel would include workplace (occupational) injuries during construction, operation, operation for mechanical and electrical equipment; fall hazards; vehicle accidents; dust hazards and potential occupational exposure to hazardous materials from transport, storage, and use of process chemicals (including diesel fuel, gasoline, lubricating oils, hydraulic fluid, paints, solvents, or other corrosive, flammable, or toxic chemicals). RESS&R could continue to operate their facility following their existing health and safety requirement. The Proposed Action would not result in a change in the health and safety practices at the RESS&R s facility.

3.12.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. No changes to existing human health and safety hazards would occur.

3.13 Waste Management

3.13.1 Proposed Action

3.13.1.1 MREC Facility

Affected Environment

The affected environment for solid and hazardous waste for the Underwood MREC facility includes onsite areas within The Falkirk Mining Company property in which solid and hazardous wastes would be generated and stored. Hazardous waste generated from Underwood MREC facility construction, operation, and decommissioning would be transported and disposed of appropriately in accordance with applicable regulations depending on the generated waste. The tailings from the Underwood MREC facility would be disposed of according to state and federal regulations in two existing mine pits as described in the Underwood MREC Facility in Section 2.1.1.1 and the Center MREC Tailings Management section under the Center MREC Facility section in Section 2.1.1.1.

Falkirk Mine generates non-hazardous solid wastes from its existing coal mine. Wastes produced include spent solvents, waste oil, municipal solid waste, and non-hazardous wastes. Municipal solid waste from Falkirk Mine is transported off-site to local municipal solid waste landfills for disposal. Other non-hazardous wastes are disposed of in off-site landfills or recycled off-site.

3.13.1.2 Center MREC Facility

The affected environment for solid and hazardous waste for the Center MREC facility includes onsite areas within Minnkota property in which solid and hazardous wastes would be generated and stored. Hazardous waste generated from Center MREC facility construction, operation, and decommissioning would be transported and disposed of appropriately in accordance with applicable regulations depending on the generated waste. The tailings from the Center MREC facility would be disposed of according to state and federal regulations in mine pits on BNI Coal property.

MRY generates non-hazardous solid wastes and is a very small quantity generator of hazardous wastes from its existing power plant operations. Wastes produced include coal combustion solids, spent solvents, waste oil, municipal solid waste, and non-hazardous and hazardous wastes. Minnkota maintains non-hazardous solid waste landfills adjacent to the MRY. Municipal solid waste from MRY is transported off-site to local municipal solid waste landfills for disposal. Other non-hazardous wastes are disposed of in on-site landfills.

Environmental Consequences

Adverse environmental effects associated with the MREC facilities' construction and operation would not be likely with the proper management of solid and hazardous wastes.

Construction of the MREC facilities would generate non-hazardous waste such as construction debris and scrap metal. Waste such as spent solvents and used oils resulting from construction activities may also be generated. Waste, both hazardous and non-hazardous, would be managed pursuant to federal and state environmental regulations.

Waste streams would be profiled and either sent offsite to be disposed of by properly licensed disposal providers or disposed of in the MRY landfill in accordance with the landfill's permits. Hazardous waste

would not be expected from any of the new waste streams, but if a waste was determined to be hazardous it would be disposed of in accordance with state and federal regulations.

3.13.1.3 RESS&R facility

Affected Environment

The RESS&R facility generates non-hazardous solid wastes and is a very small quantity generator of hazardous wastes from its existing operations. Wastes produced include non-hazardous liquids, spent solvents, waste oil, municipal solid waste, and non-hazardous and hazardous wastes. Municipal solid waste from the RESS&R facility is transported off-site to local municipal solid waste landfills for disposal. Non-hazardous liquid waste is disposed of in the local sanitary sewer system.

Environmental Consequences

The Proposed Action at the RESS&R facility could generate non-hazardous waste, spent solvents, and used oils. Waste, both hazardous and non-hazardous, would continue to be managed pursuant to federal and state environmental regulations. Therefore, no new waste management effects associated with the Proposed Action at the RESS&R facility are anticipated.

3.13.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. No changes to existing waste generation and management would occur.

3.14 Geology

3.14.1 Proposed Action

3.14.1.1 Underwood MREC Facility

Affected Environment

The surface geology is dominated by quaternary aged glacial deposits of the Coleharbor Formation which originated from the most recent Wisconsinian glaciation. This glacial till is composed of unbedded and unsorted mixtures of clays, silts, and sands, with some cobbles. Thickness of the glacial deposits vary depending on the location, ranging from 20-100 feet (reference (54)).

Below the quaternary aged glacial deposits, the bedrock geology is associated with the Sentinel Butte Formation, at the eastern flank of the Williston Basin. Depth to bedrock ranges from ground surface to approximately 100 feet below ground surface. The Sentinel Butte Formation is a relatively flat-lying sedimentary formation, overlying the Bullion Creek Formation; and can reach up to 600 feet in thickness. Figure 11 provides the topography of the area surrounding the proposed Underwood MREC facility. The Sentinel Butte formation is composed of a mixture of sand, silts, clay, and sandstone from fluvial and lacustrine deposits, including lignite coal beds, deposited during the Paleocene epoch (reference (55)). Both the Sentinel Butte and Bullion Creek Formations are part of the Williston Basin, which is a large intracratonic sedimentary basin extending from western South Dakota and North Dakota to eastern Montana and into southern Saskatchewan (reference (56)).

Overall, the stratigraphy of the Williston Basin has been well studied. The Williston Basin has been identified as an excellent candidate for injection wells, in part, to the thick sequence of clastic and carbonate sedimentary rocks and the basin's subtle structural character and tectonic stability (reference (57)).

The seismic risk is very low; it is within an area rated as less than two-percent chance of damage from natural or human induced earthquake in 10,000 years (reference (58)).

Landslides are common throughout North Dakota due to the unconsolidated glacial till deposits located at the surface and over steepened slopes caused from glacial meltwater. Landslide susceptibility can vary based on several factors including the slope angle, water content, and sediment properties. Landslides most commonly occur in North Dakota along the edges of floodplains where fluvial erosion has undermined the base pf the valley walls. No landslide deposits are currently mapped within the area (reference (59)).

Environmental Consequences

The Underwood MREC facility would include an injection well pad with two to three injection wells for disposal of non-hazardous wastewater. An estimated 838 gpm of non-hazardous wastewater would be injected below the ground surface. An approved injection well permit from the North Dakota Department of Mineral Resources would be received prior to injection. The Williston Basin has been identified as an ideal injection and no effects to geologic resources are anticipated.

Earthquakes are unlikely to occur in or near the proposed Underwood MREC facility. Changes in slope are not anticipated and as a result, there would be limited risk of landslides.

3.14.1.2 Center MREC Facility

Affected Environment

The geology in the vicinity of the proposed Center MREC facility is associated with the Sentinel Butte Formation, at the eastern flank of the Williston Basin. The Sentinel Butte Formation a relatively flat-lying sedimentary formation, overlying the Bullion Creek Formation; and can reach up to 600 feet in thickness. Figure 12 provides the topography of the area surrounding the proposed Center MREC facility. The Sentinel Butte formation is composed of a mixture of sand, silts, clay, and sandstone from fluvial and lacustrine deposits, including lignite coal beds, deposited during the Paleocene epoch (reference (55)). Both the Sentinel Butte and Bullion Creek Formations are part of the Williston Basin, which is a large intracratonic sedimentary basin extending from western South Dakota and North Dakota to eastern Montana and into southern Saskatchewan (reference (60)).

Overall, the stratigraphy of the Williston Basin has been well studied. The Williston Basin has been identified as an excellent candidate for injection wells, in part, to the thick sequence of clastic and carbonate sedimentary rocks and the basin's subtle structural character and tectonic stability (reference (57)).

The seismic risk is very low. The Center MREC facility would be within an area rated as a less than one-percent chance of damage from natural or human induced earthquake (reference (58)).

Landslides are common throughout North Dakota due to the unconsolidated glacial till deposits located at the surface and over steepened slopes caused from glacial meltwater. Landslide susceptibility can vary

based on several factors including the slope angle, water content, and sediment properties. Landslides most commonly occur in North Dakota along the edges of floodplains where fluvial erosion has undermined the base pf the valley walls. No landslide deposits are currently mapped within the area (reference (59)).

Environmental Consequences

The Center MREC facility would include an injection well pad with two to three injection wells for disposal of non-hazardous wastewater. An estimated 651 gpm of non-hazardous wastewater would be injected below the ground surface. An approved injection well permit from the North Dakota Department of Mineral Resource would be received prior to injection. The Williston Basin has been identified as an ideal injection and no effects to geologic resources are anticipated.

Earthquakes are unlikely to occur in or near the proposed Center MREC facility. Changes in slope are not anticipated and as a result, there would be limited risk of landslides.

3.14.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. No changes to existing geology would occur.

3.15 Soils

This section describes the soil resources in and around the Underwood and Center MREC facilities. Soil map units were assessed through the U.S. Department of Agriculture, Natural Resources Conservation Services (NRCS) Web Soil Survey (references (56); (61)).

3.15.1 Proposed Action

3.15.1.1 Underwood MREC Facility

Affected Environment

The Underwood MREC facility lies within the Missouri Coteau Slope ecoregion of North Dakota. This ecoregion marks the western most extent of continental glaciation, tends to have simple drainage patterns and fewer wetland depressions, and a level to gently rolling topography (reference (62)). The dominant soil map unit located within the Underwood MREC facility is the William-Bowbells-Haplustolls complex (Table 3-14), covering approximately 34 percent of the area. This soil is classified as a well-drained loam to clay loam that was derived from a fine loamy till.

Table 3-14 Soils within the Underwood MREC Facility

Map Unit Symbol	Map Unit Name	Acres in Study Area	Percent of Area	Erosion K Factor	Farmland Status
C1012F	Urban land, industrial-Ustorthents complex, 0 to 25 percent slopes	18.4	21.5	Not rated	Not prime farmland
C1013F	Argiustolls loamy, mineland, 0 to 35 percent slopes	14.3	16.7	0.24	Not prime farmland
C1017A	Williams-Bowbells-Haplustolls complex, 0 to 3 percent slopes	31.0	36.3	0.24	Farmland of statewide importance
C1017B	Williams-Bowbells-Haplustolls complex, 3 to 6 percent slopes	21.7	25.4	0.28	Farmland of statewide importance
Total	n/a	85.3	100	n/a	n/a

n/a – not applicable

Prime farmland is land that has the best physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for this use. Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops. In addition, state agriculture agencies may designate additional areas as farmland of statewide importance. These areas are considered locally important for production of high yields of crops with important economic value. No prime farmland is within the Underwood MREC area; however, approximately 52.6 acres of farmland of statewide importance is with the area (Figure 13).

The Farmland Protection Policy Act (FPPA), the USDA regulation implementing FPPA (7 CFR Part 658), and the USDA Departmental Regulation No. 9500-3-Land Use Policy, provide protection for prime and important farmland and prime rangeland and forestland. Section 658.5 of the FPPA provides criteria for federal agencies to identify and consider the adverse effects of federal programs on the protection of farmland. Federal agencies are to consider alternate actions, as appropriate, that could lessen adverse effects; and to assure that such federal programs, to the extent practicable, are compatible with state, local government, and private programs and policies to protect farmland (reference (63)).

Environmental Consequences

Construction activities would result in a temporary and permanent effects to soils within the Underwood MREC facility footprint. Areas of permanent effects may require removal of vegetation, grading, excavation, and construction of various facility components. Use of the construction and laydown areas would require removal of vegetation and addition of rock or gravel as needed to allow vehicle and equipment access. However, following construction, the construction and laydown areas would be restored to original conditions, resulting in a temporary effect.

Construction activities would take place in an agricultural setting, adjacent to land previously disturbed for coal mining and the active Falkirk Mine. However, the Underwood MREC facility is in an industrial setting and no prime farmland is present (Figure 13). Therefore, the FPPA would not apply to the Proposed Action at the Underwood MREC facility. No effects to agricultural commodity production in the surrounding area is anticipated.

3.15.1.2 Center MREC Facility

Affected Environment

The Center MREC facility lies within the Missouri Plateau ecoregion of North Dakota. This ecoregion is a semiarid rolling plain of shale, siltstone, and sandstone that is occasionally punctuated by buttes and badlands. This ecoregion was largely unaffected by glaciation and retain its original soils and complex drainage patterns (reference (62)).

Soil map units were assessed through the U.S. Department of Agriculture, NRCS Web Soil Survey. The dominant soil map units within the Center MREC facility are the Werner-Chama-Sen silt loams (Table 3-15), covering approximately 69 percent of the area. The Werner-Chama-Sen silt loam is classified as a well-drained, fine silty soil that was derived from a weathered siltstone. The Center MREC facility includes 0.32 acres of prime farmland and approximately 36.3 acres of farmland of statewide importance (Figure 14).

Table 3-15 Soil within the Center MREC Facility

Map Unit Symbol	Map Unit Name	Acres in Study Area	Percent of Area	Erosion K Factor	Farmland Status
E0515C	Rhoades-Daglum complex, 6 to 9 percent slopes	0.06	0.08	0.43	Not prime farmland
E0617B	Belfield-Wyola-Daglum complex, 2 to 6 percent slopes	5.43	7.53	0.32	Farmland of statewide importance
E0812A	Grail silt loam, 0 to 2 percent slopes	0.47	0.66	0.32	All areas are prime farmland
E0814B	Grail-Farland silt loams, 2 to 6 percent slopes	3.72	5.16	0.32	Farmland of statewide importance
E1865B	Tally-Parshall fine sandy loams, 2 to 6 percent slopes	4.02	5.57	0.15	Farmland of statewide importance
E2609C	Amor-Werner-Farnuf loams, 6 to 9 percent slopes	1.38	1.92	0.28	Not prime farmland
E2747D	Werner-Chama-Sen silt loams, 9 to 15 percent slopes	29.14	40.37	0.32	Not prime farmland
E2803B	Amor-Shambo loams, 3 to 6 percent slopes	2.64	3.66	0.28	Farmland of statewide importance
E2933C	Morton-Werner silt loams, 6 to 9 percent slopes	20.49	28.39	0.37	Farmland of statewide importance
E3555D	Zahl-Williams loams, 9 to 15 percent slopes	2.84	3.94	0.28	Not prime farmland
E3733C	Flaxton-Williams complex, 6 to 9 percent slopes	0.54	0.75	0.15	Not prime farmland
E4911F	Mined land complex, 0 to 60 percent slopes	1.42	1.97	0.28	Not prime farmland
Total	n/a	72.2	100	n/a	n/a

n/a – not applicable

Environmental Consequences

Construction activities would result in a temporary and permanent effects to soils within the Center MREC facility footprint. Areas of permanent effects may require removal of vegetation, grading, excavation, and construction of various facility components. Use of the construction and laydown areas would require removal of vegetation and addition of rock or gravel as needed to allow vehicle and equipment access. However, following construction, the construction and laydown areas would be restored to original conditions, resulting in a temporary effect.

Approximately 88.9 acres of soil would be temporary effected by installation of the above ground pipelines. Construction of the pipeline would temporarily affect approximately 5.7 acres of prime farmland and approximately 21.3 acres of farmland of statewide importance. The pipeline route is predominately within the ROW of active mine haul roads and would not affect the current use of the land.

Construction activities would take place in a predominantly industrial setting, adjacent to the active BNI Coal mine. Consultation with the USDA-NRCS indicates that the USDA-NRCS considers a portion of the Proposed Action area to be prime farmland and the FPPA would apply Approximately 0.32 acres of prime farmland and approximately 36.3 acres of farmland of statewide importance is with the Proposed Action area (Figure 14).

3.15.2 No Action Alternative

Under the No Action Alternative, construction of the MREC facilities and associated infrastructure as well as new equipment installation within the existing RESS&R facility would not occur. No changes to existing soils would occur.

3.16 Cumulative Effects

Cumulative effects are effects on the environment that result from the incremental effects of the Proposed Action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from actions with individually minor but collectively significant effects taking place over a period of time (40 CFR Part 1508.1 (i)(3)). Projects were identified through a review of active project lists and planning documents from the Counties, and DOTs, with additional information provided by the Applicant. The review identified the following current and reasonably foreseeable future projects:

- **Project Tundra:** Minnkota is proposing to construct and operate an amine-based post combustion carbon dioxide capture system for the MRY. The carbon capture system would be approximately 2,000 feet southeast of the Proposed Action area.
- **400-MW Discovery Wind Project**: Apex Clean Energy is proposing to construct a 400-MW wind project a in McLean County, North Dakota.
- **Highway 31 North**: The North Dakota Department of Transportation is proposing to widen and pave Highway 31 from the Junction of I-94 to Hannover. The roadway construction would occur between 2024-2027 and is approximately 4.5 miles northwest of the Proposed Action area.

DOE reviewed the identified projects in the region to determine the resources that may be subject to a cumulative effect. The reviewed projects focused on the resources affected by the Proposed Action and identified resources that may be affected by both the Proposed Action and other projects in the region. It

is anticipated that cumulative effects would not occur at the RESS&R facility due to the limited scope of work at this location. Therefore, only the following recourses were evaluated for cumulative effects to the MREC facilities:

- Air Quality and Climate Change
- Socioeconomics and Environmental Justice
- Transportation

The Proposed Action, when considered together with the identified projects in the region, does not have the potential to result in significant cumulative effects on other resources due to the geographic location and separation of the projects, the disturbed nature of the project sites, and/or the lack of construction or operational overlap that would result in an incremental effect on a particular resource.

3.16.1 Air Quality

The current and reasonably foreseeable future projects would overlap with the construction phase of the Proposed Action. In However, air emissions resulting from construction would be temporary and minimized based on the use of BMPs such as using modern equipment and construction-related practices to control fugitive dust. Cumulatively, these activities may have temporary effects during the construction phase.

The potential emissions associated with the project have the potential to result in cumulative effects on the regional air quality. As discussed in Section 3.16.1, all counties in North Dakota and Nebraska are in attainment of for NAAQS. Any new emissions in the airshed, to include those of the identified projects in the region, which are subject to CAA permitting would have to comply with CAA regulations and would be reviewed to maintain compliance with NAAQS. Therefore, the cumulative effects on air quality associated with the operation of the Proposed Action and the other projects in the region would not be significant.

3.16.2 Greenhouse Gas Emissions and Climate Change

The current science and study of the earth's climate now shows with 95-percent certainty that human activity is the dominant cause of observed global warming since the mid-twentieth century (reference (64)). Since the beginning of the industrial era, circa 1750, human activities have increased the concentration of GHGs (primarily CO_2, NO_X, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) in the atmosphere. The rising global temperatures have been accompanied by changes in weather and climate (e.g., changes in rainfall that result in more floods, droughts, or intense rain; rising sea levels, Arctic sea ice decline, more frequent and severe heat waves) (reference (64)). It is now well established that rising atmospheric GHG emission concentrations are significantly affecting the Earth's climate (reference (65)).

Table 3-16 summarizes the estimated Proposed Action construction and operational GHG emissions; associated calculations are summarized in Appendix A. The total Proposed Action construction emissions are estimated to be 8,376 MT CO_2e, and operational emissions are estimated to be 32,800 MT CO_2e annually.

Table 3-16 Proposed Action Construction and Operation GHG Emissions

Project Area	Project Phase	Mobile Sources CO_2e (metric tons)	Stationary Sources CO_2e (metric tons/yr)	Mobile Sources CO_2e (metric tons/yr)	Land Use Change CO_2e (metric tons/yr)	Transport CO_2e (metric tons/yr)	Electrical CO_2e (metric tons/yr)	Total Construction CO_2e (metric tons)	Total Operations CO_2e (metric tons/yr)
All Facilities	Construction	8,376	n/a	n/a	n/a	n/a	n/a	8,376	n/a
MREC facilities	Operations	n/a	199	7,174	944	20,523	3,504	n/a	32,145
RESS&R facility	Operations	n/a	n/a	400	n/a	n/a	255	n/a	655
Total	**--**	**8,376**	**199**	**7,574**	**944**	**20,523**	**3,759**	**8,376**	**32,800**

n/a – not applicable

The EPA tracks GHG emissions in the United States through two complementary programs. First is the Inventory of U.S. Greenhouse Gases and Sinks, which is the annual GHG emissions inventory published by EPA that represents all United States emissions (reference (29)). The second is the Greenhouse Gas Reporting Program (GHGRP), which generally applies to facilities that emit more than 25,000 MT of CO_2e each year. The facility-level emissions reported under GHGRP are published through the Facility Level Information on Greenhouse Gases Tool (FLIGHT). EPA estimates that the FLIGHT data reported by large emitters reflect 85% to 90% of the total United States emissions (reference (66)).

In 2022, total gross United States GHG emissions were 6,343.2 MMT CO_2e, and net emissions were 5,489.0 MMT CO_2e. Net GHG emissions include both anthropogenic and natural emissions of GHGs, as well as removals by sinks (e.g., carbon uptake by forests). CO_2 is the primary GHG contributing to total United States emissions, accounting for 79.7% of the total GHG emissions in 2022. By comparison, CH_4 accounted for 11.1%, N_2O accounted for 6.1% of emissions, and fluorinated gases accounted for 3.1% of emissions (reference (29)). The Proposed Action annual emissions represent approximately 0.001% of 2022 net annual US GHG emissions.

In 2022, total North Dakota GHG emissions were 37.2 MMT CO_2e. The Proposed Action annual emissions represent approximately 0.09% of 2022 annual North Dakota GHG emissions.

3.16.2.1 Social Cost of Carbon

The social cost of GHG (SC-GHG) is a metric designed to quantify climate damages, representing the net economic cost of CO2 emissions. Estimates of SC-GHG emissions provide an aggregated monetary measure (in U.S. dollars) of the net harm to society associated with an incremental metric ton of emissions in a given year. These estimates include, but are not limited to, climate change effects associated with net agricultural productivity, human health effects, property damage from increased risk of natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. In this way, SC-GHG estimates can help the public and federal agencies understand or contextualize the potential effects of GHG emissions and, along with information on other potential environmental effects, can inform the comparison of alternatives.

The Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under EO 13990 published in February 2021 by the United States Interagency Working Group (IWG) on Social Cost of Greenhouse Gases (IWG Report) was referenced to prepare the analysis below. The analysis contains interim estimates of the SC-GHG split to reflect the cost of carbon, methane, and nitrous oxide emissions individually (SC-CO_2, SC-CH_4, SC-N_2O). These estimates are provided by the IWG to allow analysts to incorporate, when appropriate, net social benefits or costs of GHG emissions in benefit-cost analyses and in policy decision making processes.

In the 2021 IWG Report, the SC-GHG monetary values were calculated for discount rates 5 percent, 3 percent, and 2.5 percent. Discount rates are used to determine how much weight is placed on effects that occur in the future. High discount rates reflect future effects of an action, in this case the emission of GHGs, as less significant than present effects. Low discount rates reflect that future and present effects are closer to equally significant. Discount rates are used to convert the damages of future actions into present-day values. The social cost values are found in Appendix A-1 through A-3 of the IWG Report (reference (67)). The IWG Report presents the SC-GHG in 2020 dollars per metric ton. For consistency, the results of this analysis are also presented in 2020 dollars.

For this analysis, the operation start date for the Proposed Action is targeted for 2028. This analysis calculates the SC-GHG from 2028 to 2048 (analysis lifespan) using the estimated operational mobile source, transportation, and electrical consumption (Table 3-16). Table 3-17 summarizes the estimated Proposed Action SC-GHG for the Proposed Action; associated calculations are summarized in Appendix C.

Table 3-17 Proposed Action GHG Emission Social Costs

Social Cost Metric	5% Average Discount Rate	3% Average Discount Rate	2.5% Average Discount Rate	3% Average Discount Rate, 95th Percentile
SC-CO_2	$9,909,932	$35,270,634	$52,410,943	$107,685,677
SC-CH_4	$9,922	$23,654	$31,276	$63,151
SC-N_2O	$79,406	$261,354	$385,987	$695,737
Total	$9,999,260	$35,555,642	$52,828,206	$108,444,565

3.16.3 Socioeconomics and Environmental Justice

The construction and operation of the Proposed Action, along with the construction and operation of the identified projects in the region, would result in an increase in temporary construction workers and long-term employment. The increase in short-term and long-term jobs in the region would result in a beneficial socioeconomic effect. However, significant cumulative effects on the existing infrastructure and services (e.g., roads, schools, fire departments, police force) are not anticipated because the Proposed Action and the other projects in the region are subject to regional planning and coordination via state and county.

The proportion of the population in McLean and Oliver Counites that is minority or low-income is not significantly greater than the neighboring communities or state overall; therefore, no cumulative effects would disproportionally affect the EJ communities in the Proposed Action area.

3.16.4 Transportation

As discussed in Section 3.8, operation of the Underwood and Center MREC facilities would require regular shipments of reagents for processing in addition to deliveries of MREC to the RESS&R facility. The Proposed Action would lead to an increase in the overall traffic within the region. The identified projects in this region would also lead to an incremental increase in overall traffic; however, no significant adverse cumulative effects on the region's overall transportation network are anticipated.

4 Draft Finding

Based on this EA, DOE has determined that providing cooperative agreement funding to UND to construct the Underwood and Center MREC facilities and equipment installation at the RESS&R facility will not have a significant effect on the human environment. The preparation of an environmental impact statement is, therefore, not required, and DOE will be issuing a Finding of No Significant Impact.

5 List of Agencies Contacted

DOE coordinated with the following agencies, tribal nations, and stakeholders throughout the preparation of this EA. These agencies were notified of the availability of the Draft EA through consultation letters and/or direct notification of the availability of the Draft EA.

- U. S. Department of Agriculture
- U.S Fish and Wildlife Service
- State Historic Preservation Offices

6 List of Preparers

DOE

- Fred Pozzuto, Director, NETL NEPA Division
- Harry E Taylor, NEPA Compliance Officer

Barr Engineering Co.

- Rachael Shetka, Vice President Senior Environmental Specialist
- Tyler Conley, Environmental Scientist
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- Allison Hawley, Cultural Resources Specialist
- Andrew Skoglund, Senior Environmental Engineer
- Sarah Wicklund, Environmental Engineer
- Shaughn Barnett, Ecologist
- Anna Nieuwsma, Geologist

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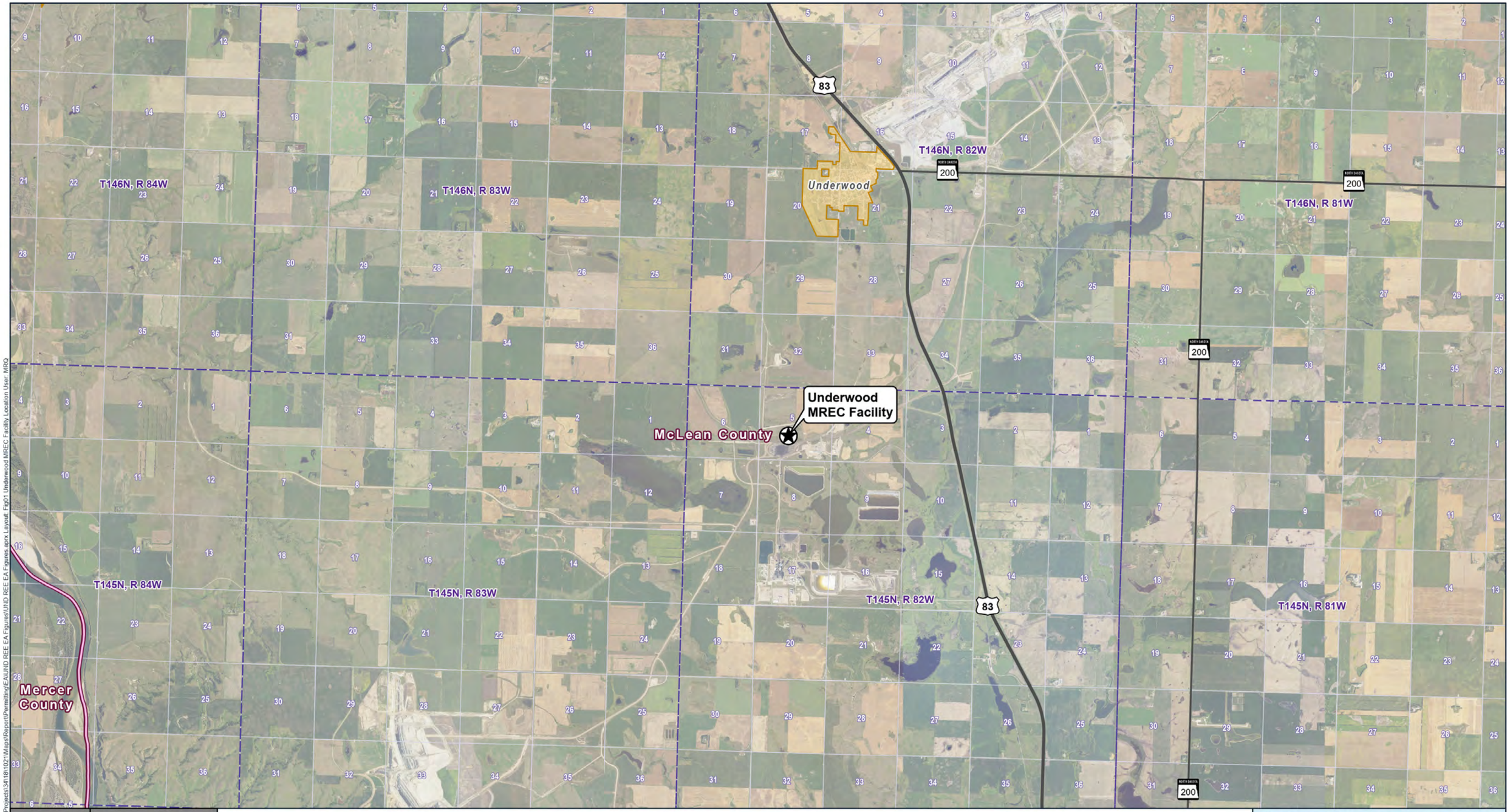
Figures



MREC Facility Location

Major Highway

County Boundary

Municipality

Public Land Survey Township

Public Land Survey Section

Imagery Source: USDA NAIP (2023)

0 1 2
Miles

Underwood MREC Facility Location
University of North Dakota
Rare Earth Element
Demonstration Facilities
McLean County, North Dakota

FIGURE 1

BARR

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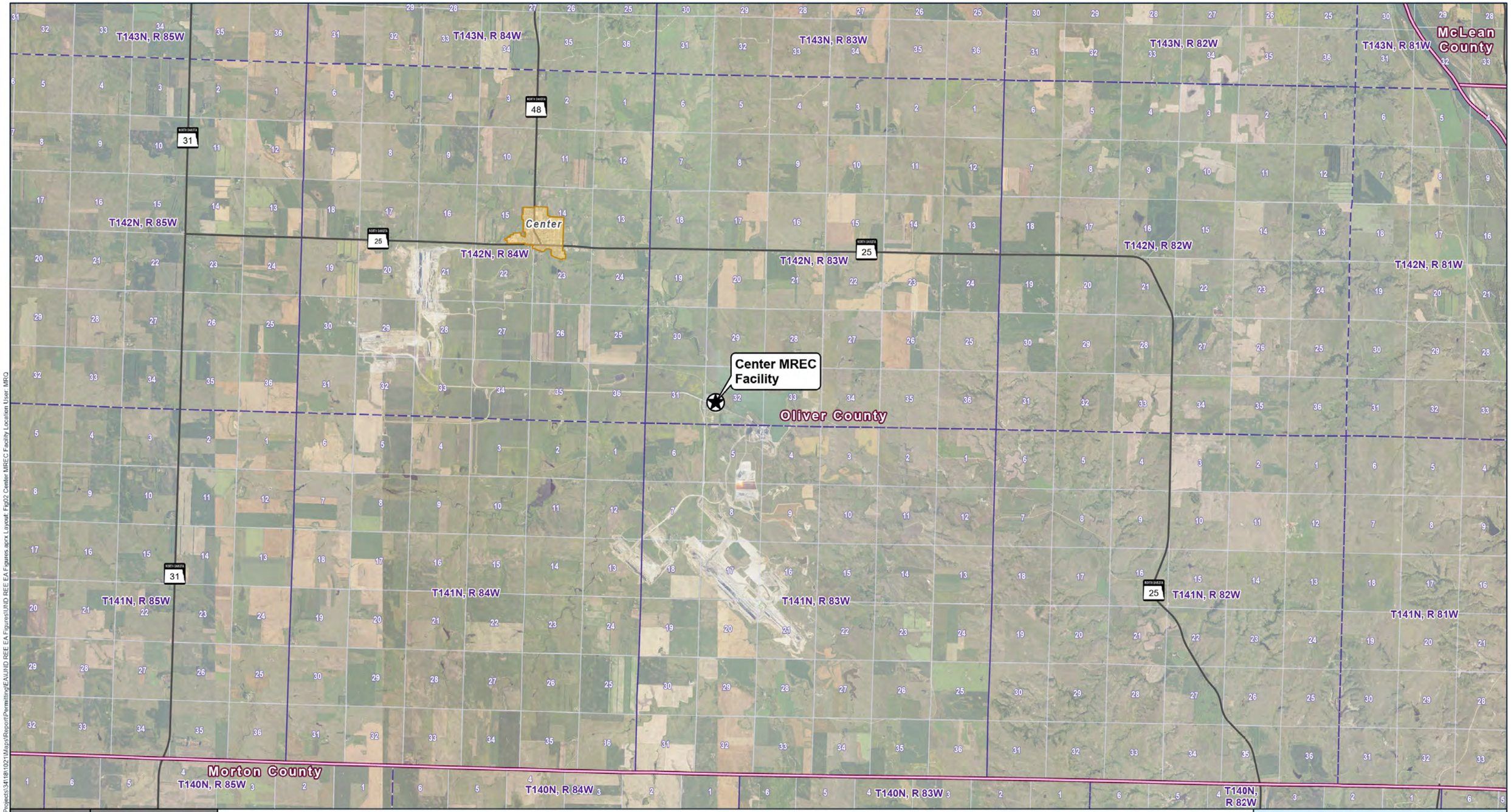

MREC Facility Location

Major Highway

County Boundary

Municipality

Public Land Survey Township

Public Land Survey Section

Imagery Source: USDA NAIP (2023)

0 1 2
Miles

Center MREC Facility Location
University of North Dakota
Rare Earth Element
Demonstration Facilities
Oliver County, North Dakota

FIGURE 2

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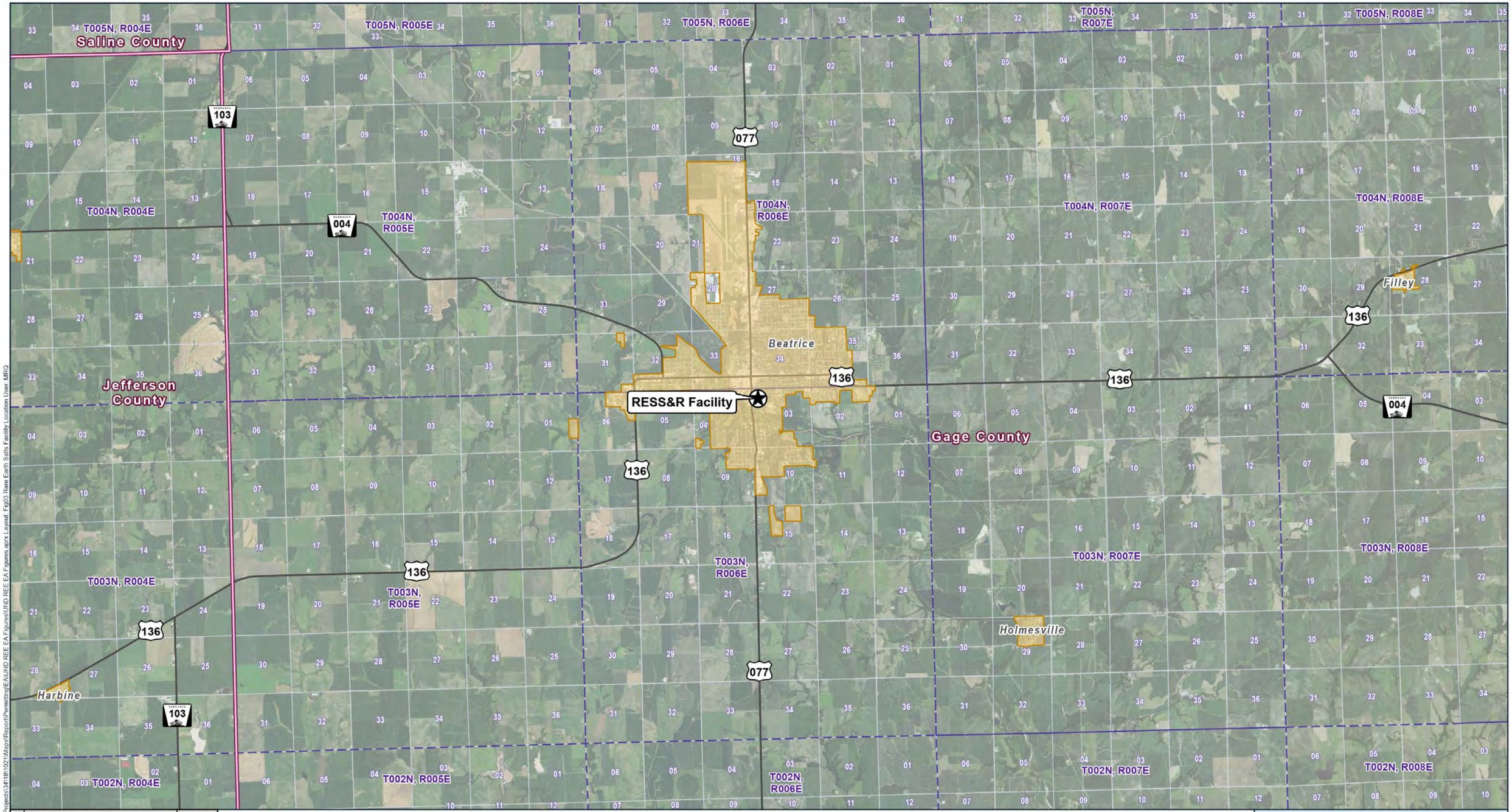

RESS&R Facility Location

Major Highway

Municipal Boundary

County Boundary

Public Land Survey Township

Public Land Survey Section

Imagery Source: USDA NAIP (2022)

0 1 2
Miles

RESS&R Facility Location
University of North Dakota
Rare Earth Element
Demonstration Facilities
Beatrice, Nebraska

FIGURE 3

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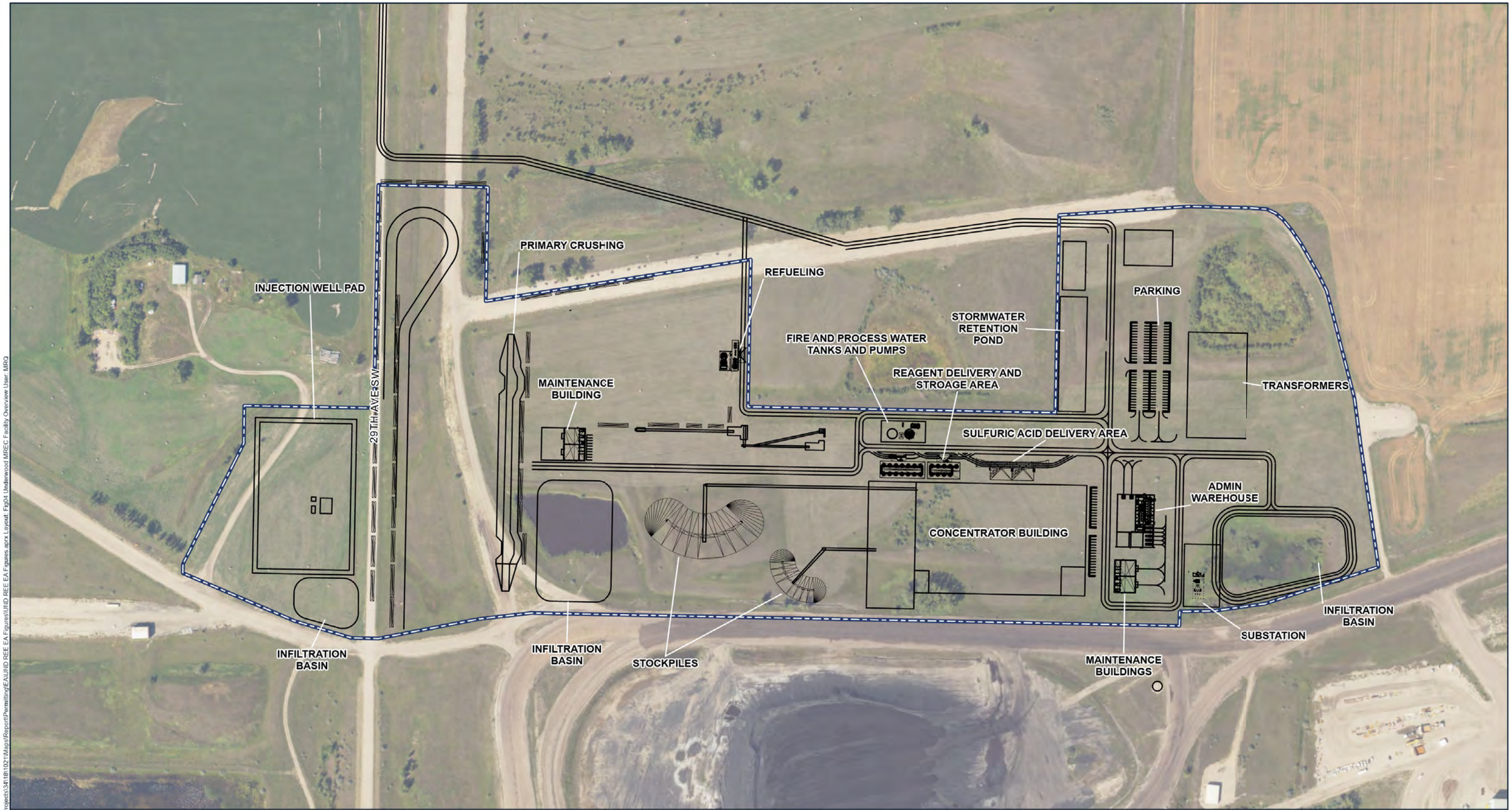

Project Area

Imagery Source: USDA NAIP (2023)

0 300 600

Feet

Underwood MREC Facility Overview
University of North Dakota
Rare Earth Element
Demonstration Facilities
McLean County, North Dakota

FIGURE 4

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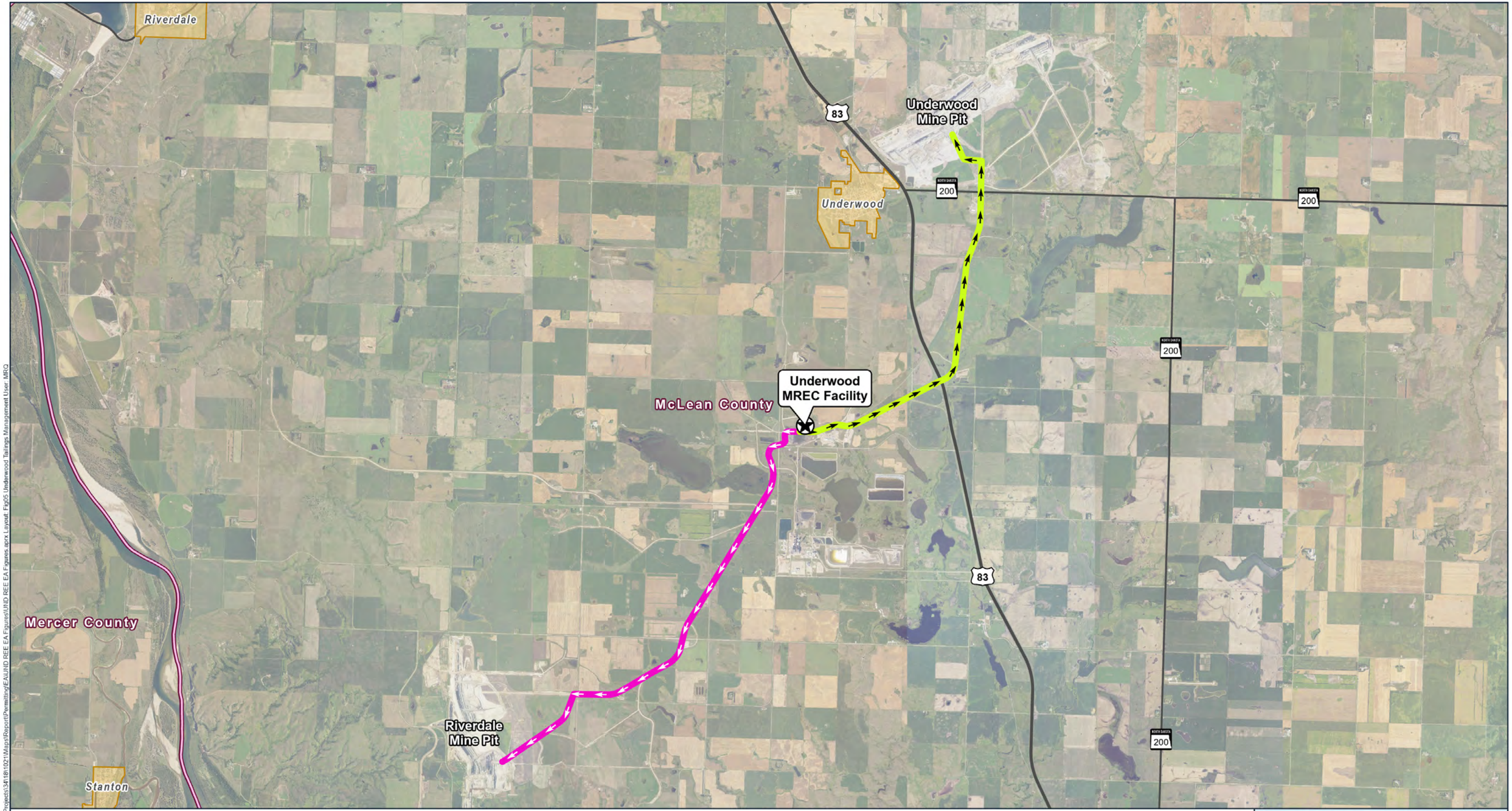

MREC Facility Location

Major Highway

County Boundary

Municipality

Proposed Haul Route to Riverdale Mine Pit

Proposed Haul Route to Underwood Mine Pit

Imagery Source: USDA NAIP (2023)

0 1 2

Miles

Underwood Tailings Management
University of North Dakota
Rare Earth Element
Demonstration Facilities
McLean County, North Dakota

FIGURE 5

BARR

Project Area

Imagery Source: USDA NAIP (2023)

0 300 600
Feet

Center MREC Facility Overview
University of North Dakota
Rare Earth Element
Demonstration Facilities
Oliver County, North Dakota

FIGURE 6

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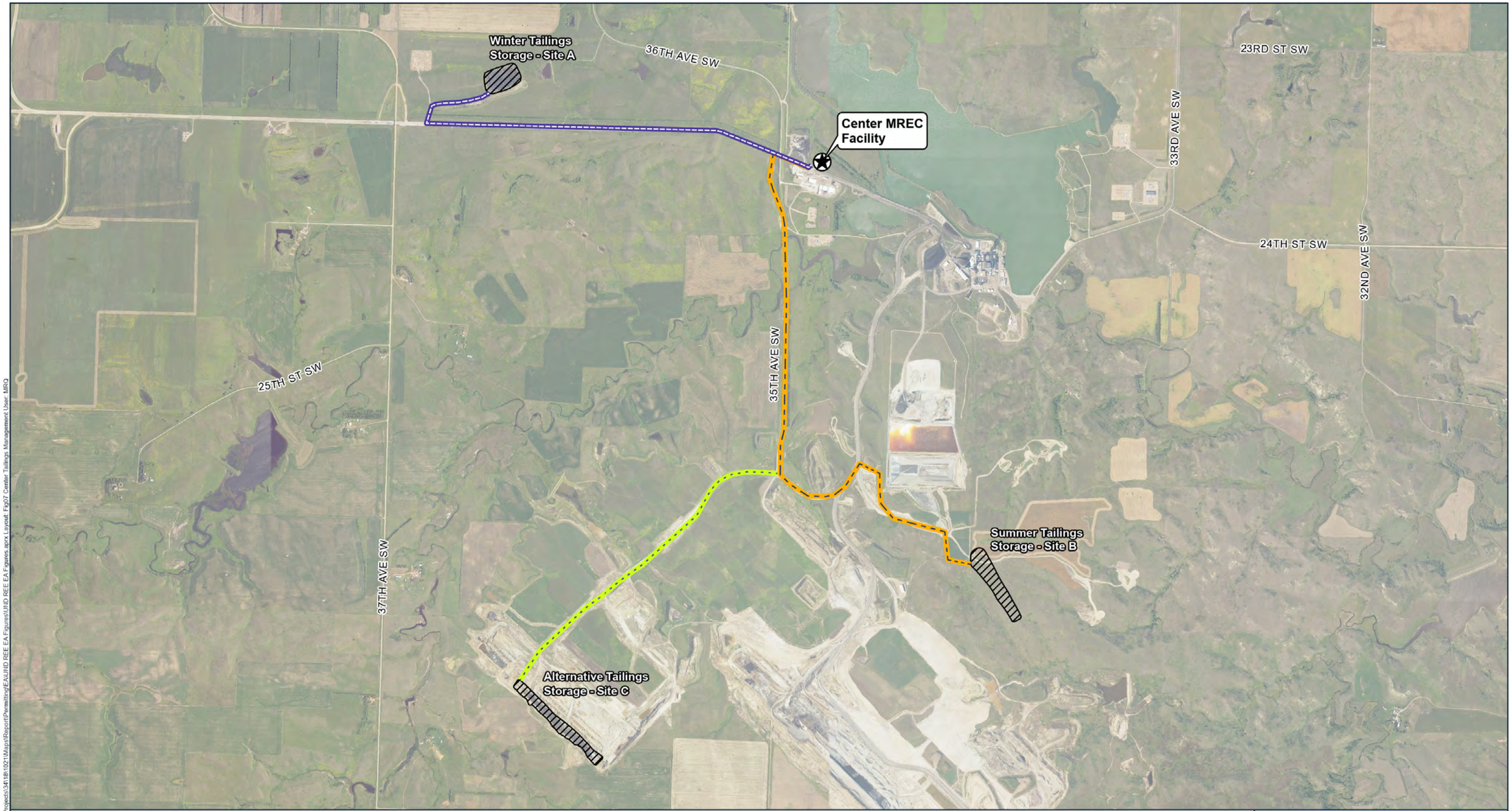

MREC Facility Location

Tailings Slurry Storage

Tailings Slurry Pipeline A

Tailings Slurry Pipeline B

Tailings Slurry Pipeline C

Imagery Source: USDA NAIP (2023)

0 3,000 6,000

Feet

Center Tailings Management
University of North Dakota
Rare Earth Element
Demonstration Facilities
Oliver County, North Dakota

FIGURE 7

BARR

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Project Area

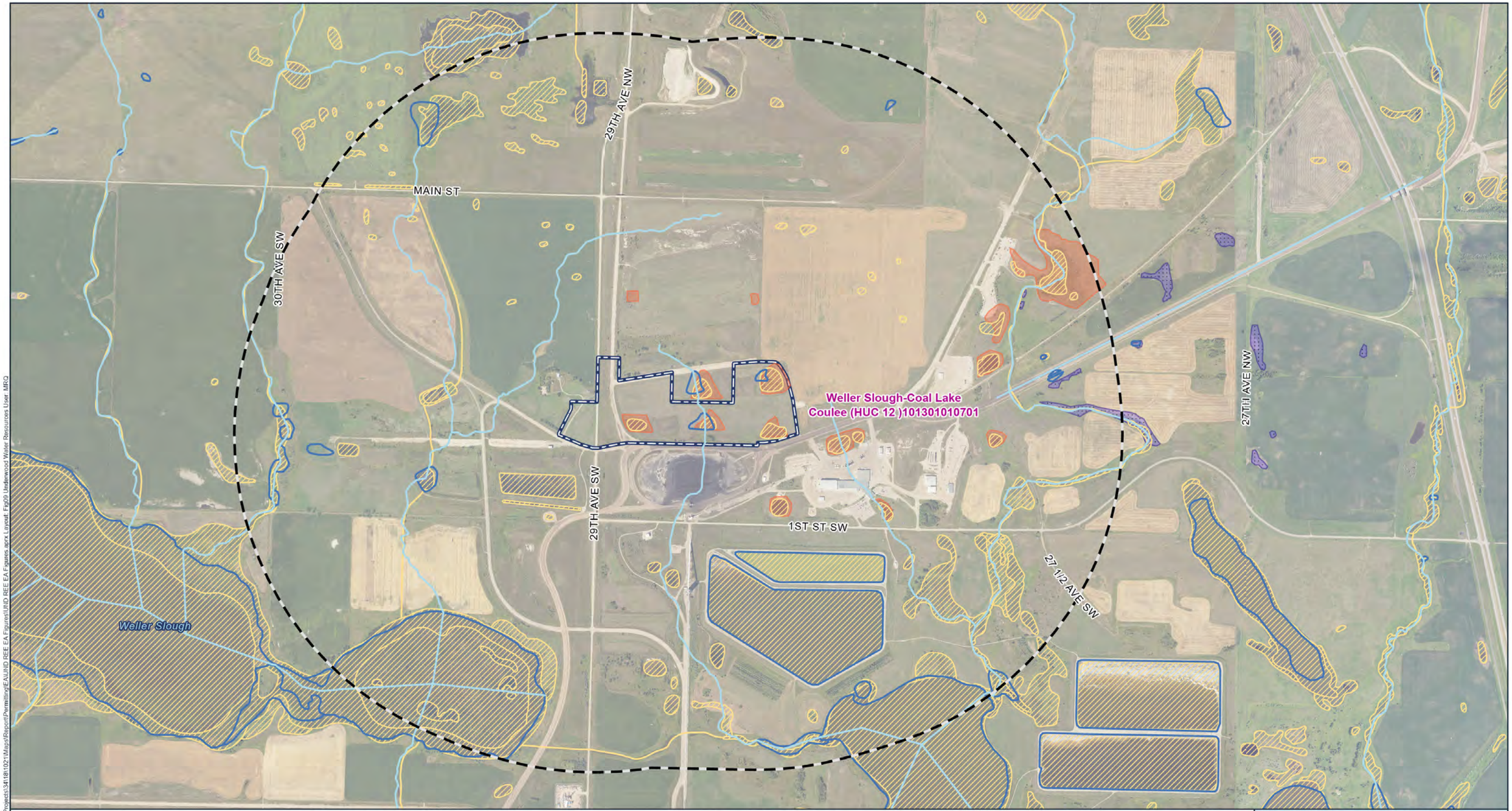
Imagery Source: Esri World Imagery, Gage County

0 80 160
Feet

RESS&R Facility Overview
University of North Dakota
Rare Earth Element
Demonstration Facilities
Beatrice, Nebraska

FIGURE 8

BARR



Project Area

1-Mile Buffer

National Hydrography Dataset Flowline

National Hydrography Dataset Waterbody

Wetlands (National Wetlands Inventory)

Delineated Wetland

Sedimentation Pond

HUC 12 Watershed Boundary

Imagery Source: USDA NAIP (2023)

0 1,500 3,000

Feet

Underwood MREC Facility
Water Resources
University of North Dakota
Rare Earth Element
Demonstration Facilities
McLean County, North Dakota

FIGURE 9

BARR

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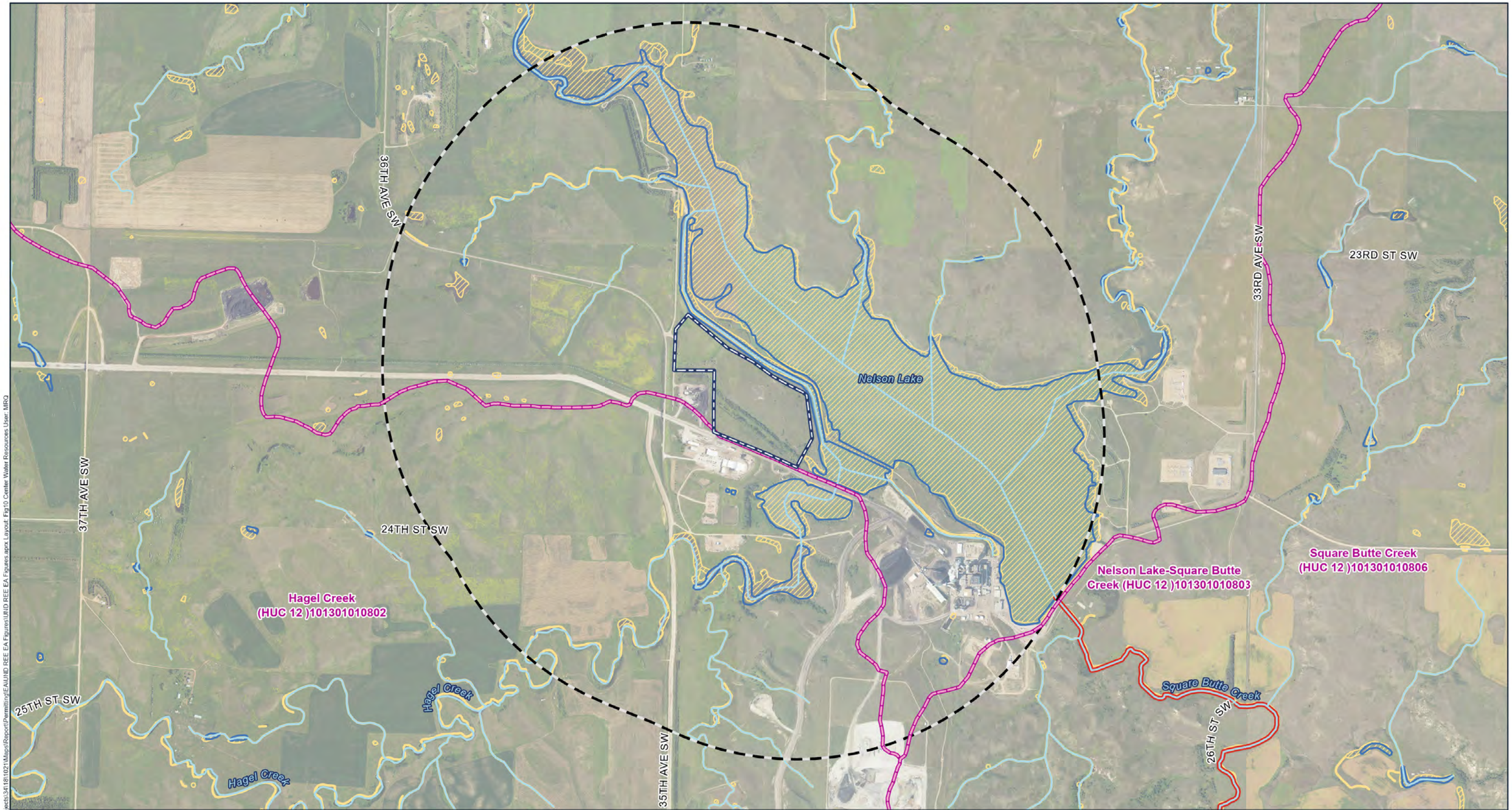

Project Area

1-Mile Buffer

National Hydrography Dataset Flowline

Impaired Stream

National Hydrography Dataset Waterbody

Wetlands (National Wetlands Inventory)

HUC 12 Watershed Boundary

Imagery Source: USDA NAIP (2023)

0 1,500 3,000

Feet

Center MREC Facility
Water Resources
University of North Dakota
Rare Earth Element
Demonstration Facilities
Oliver County, North Dakota

FIGURE 10

BARR

Project Area

10-foot Contour

2-foot Contour

Elevation Data Source: ND Dept. of Water Resources, NRCS, USACOE, James River Basin Phase 5 Collect, 2015.
Available online at https://lidar.dwr.nd.gov/

Imagery Source: USDA NAIP (2023)

0 300 600
Feet

Center MREC Facility
Topography
University of North Dakota
Rare Earth Element
Demonstration Facilities
Oliver County, North Dakota
FIGURE 11

BARR

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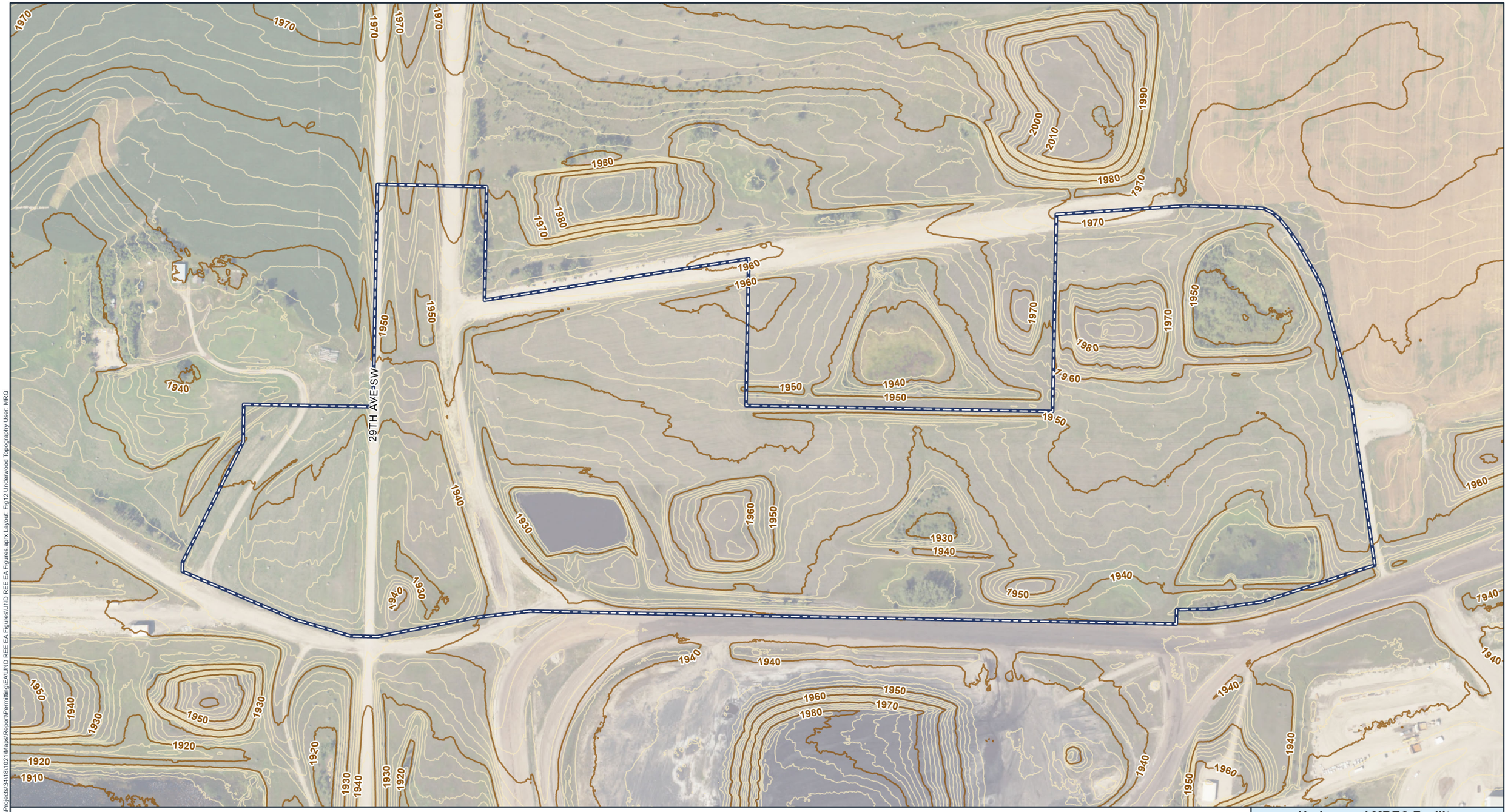

Project Area

10-foot Contour

2-foot Contour

Elevation Data Source: ND Dept. of Water Resources, NRCS, James River Basin QL2 Collect, 2021. Available online at https://lidar.dwr.nd.gov/

Imagery Source: USDA NAIP (2023)

0 300 600

Feet

Underwood MREC Facility
Topography
University of North Dakota
Rare Earth Element
Demonstration Facilities
McLean County, North Dakota
FIGURE 12

BARR

C1013F
Argiustolls
loamy, mineland,
0 to 35 percent
slopes

C1013F
Argiustolls
loamy, mineland,
0 to 35 percent
slopes

C1013F
Argiustolls
loamy, mineland,
0 to 35 percent
slopes

C1012F
Urban land,
industrial-Ustorthents
complex, 0 to 25
percent slopes

C1017A
Williams-Bowbells-Haplustolls
complex, 0 to 3 pe:cent slopes

C1017B
Williams-Bowbells-Haplustolls
complex, 3 to 6 percent slopes

C1017A
Williams-Bowbells-Haplustolls
complex, 0 to 3 percent slopes

C1012F
Urban land,
industrial-Ustorthents
complex, 0 to 25
percent slopes

C1012F
Urban land,
industrial-Ustorthents
complex, 0 to 25
percent slopes

29TH AVE SW

Project Area

Farmland Classification

Farmland of statewide importance

Not prime farmland

Soil Data Source: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database. Available online at https://sdmdataaccess.sc.egov.usda.gov. Accessed 5/21/2024.

Imagery Source: USDA NAIP (2023)

0 400 800
Feet

Underwood MREC Facility
Prime Farmland
University of North Dakota
Rare Earth Element
Demonstration Facilities
McLean County, North Dakota
FIGURE 13

BARR

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Project Area

Not prime farmland

Farmland Classification

All areas are prime farmland

Farmland of statewide importance

Soil Data Source: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database. Available online at https://sdmdataaccess.sc.egov.usda.gov. Accessed 5/21/2024.

Imagery Source: USDA NAIP (2023)

0 300 600

Feet

Center MREC Facility
Prime Farmland
University of North Dakota
Rare Earth Element
Demonstration Facilities
Oliver County, North Dakota
FIGURE 14

BARR

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Appendices

Appendix A

Greenhouse Gas Calculations

Project Area	Project Phase	Mobile Sources CO_2e[1] (metric tons)	Stationary Sources CO_2e[1] (metric tons/yr)	Mobile Sources CO_2e[1] (metric tons/yr)	Land Use Change CO_2e[1] (metric tons/yr)	Transportation CO_2e[1] (metric tons/yr)	Electrical Consumption CO_2e[1] (metric tons/yr)	Total Construction CO_2e[1] (metric tons)	Total Operations CO_2e[1] (metric tons/yr)
All Facilities	Construction	8,376	-	-	-	-	-	8,376	-
MREC Facilities	Operations	-	199	7,174	944	20,523	3,504	-	32,145
RESS&R Facility	Operations	-	-	400	-	-	255	-	655
Total	**--**	**8,376**	**199**	**7,574**	**944**	**20,523**	**3,759**	**8,376**	**32,800**

[1] CO_2e calculated by equation A-1 of 40 CFR 98.2, which states the total CO_2e is equal to the GWP for each pollutant multiplied by the potential pollutant emissions.

Project Area	Fuel Combustion CO_2e[1] (metric tons)
All Facilities	8,376

[1] CO_2e calculated by equation A-1 of 40 CFR 98.2, which states the total CO_2e is equal to the GWP for each pollutant multiplied by the potential pollutant emissions.

Project Area	Stationary Fuel Combustion CO_2e[1] (metric tons/yr)	Mobile Fuel Combustion CO_2e[1] (metric tons/yr)	Land Use Change CO_2e[1] (metric tons/yr)	Truck Traffic CO_2e[1] (metric tons/yr)	Electrical Consumption CO_2e[1] (metric tons/yr)	Total CO_2e[1] (metric tons/yr)
MREC Facilities	199	7,174	944	20,523	3,504	32,145
RESS&R Facility	-	400	-	-	255	655
Total	**199**	**7,574**	**944**	**20,523**	**3,759**	**32,800**

[1] CO_2e calculated by equation A-1 of 40 CFR 98.2, which states the total CO_2e is equal to the GWP for each pollutant multiplied by the potential pollutant emissions.

Unit	Amount	Unit
ton	2000	lbs
ton	0.907185	metric tons
ton	907.185	kg
ton	907185	grams
lb	0.453592	kg
lb	453.592	grams
MWh	1000	kWh
hectare	2.47105	acres
1 MJ	0.372506136	hp-h
US gallon (diesel)[1]	144.945	MJ
US gallon (diesel)	53.9929019	hp-h
US gallon (gasoline)[1]	126.833	MJ
US gallon (gasoline)	47.24606261	hp-h

[1] US Energy Information Administration, 2024. https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

Greenhouse Gas Name	CAS Number	Chemical Formula	Global Warming Potential (100-yr.)[1]
Carbon dioxide	124–38–9	CO_2	1
Methane	74–82–8	CH_4	28
Nitrous oxide	10024–97–2	N_2O	265

[1] Global Warming Potentials from 40 CFR 98.2.

Activity[1]	Equipment Type[1]	Fuel Type[2]	Number of Units[1]	Operating Time[1] (hours)	Estimated Horsepower [3]	CO_2 Emission Factor[4] (kg/gal)	CH_4 Emission Factor[5] (g/gal)	N_2O Emission Factor[5] (g/gal)	CO_2 Emission Factor[6] (lb/hr)	CH_4 Emission Factor[6] (lb/hr)	N_2O Emission Factor[6] (lb/hr)	CO_2 (metric tons)	CH_4 (metric tons)	N_2O (metric tons)	CO_2e[7] (metric tons)
Site Prep	D9 Dozer	Diesel Equipment	2	1,920	225	10.21	1.01	0.94	93.73	0.00927	0.00863	179.96	1.78E-05	1.66E-05	179.97
Site Prep	988 Loader	Diesel Equipment	2	1,920	197	10.21	1.01	0.94	82.29	0.00814	0.00758	158.01	1.56E-05	1.45E-05	158.01
Site Prep	Backhoe	Diesel Equipment	2	1,920	131	10.21	1.01	0.94	54.61	0.00540	0.00503	104.86	1.04E-05	9.65E-06	104.86
Site Prep	Larger Grader	Diesel Equipment	2	1,920	200	10.21	1.01	0.94	83.38	0.00825	0.00768	160.09	1.58E-05	1.47E-05	160.09
Site Prep	Compactor	Diesel Equipment	2	1,920	75	10.21	1.01	0.94	31.10	0.00308	0.00286	59.71	5.91E-06	5.50E-06	59.71
Site Prep	Off Road Haul Trucks	Diesel Off-Road Trucks	2	1,920	375	10.21	0.91	0.56	156.33	0.01393	0.00857	300.16	2.68E-05	1.65E-05	300.17
Construction	Off Road Fork Lift	Diesel Equipment	4	9,600	74	10.21	1.01	0.94	30.85	0.00305	0.00284	296.16	2.93E-05	2.73E-05	296.17
Construction	4x4 Side-by-Sides	Gasoline (4 stroke) - Recreational	6	4,800	110	8.78	2.72	1.48	39.44	0.01222	0.00665	189.29	5.86E-05	3.19E-05	189.30
Construction	Site Pickup Trucks	Gasoline (4 stroke)	6	23,040	310	8.78	2.85	1.47	111.14	0.03607	0.01861	2,560.57	8.31E-04	4.29E-04	2,560.71
Construction	Boom Truck	Diesel Off-Road Trucks	4	6,400	200	10.21	0.91	0.56	83.38	0.00743	0.00457	533.62	4.76E-05	2.93E-05	533.63
Construction	Water Truck for Road	Diesel Off-Road Trucks	1	2,400	1025	10.21	0.91	0.56	427.31	0.03809	0.02344	1,025.55	9.14E-05	5.62E-05	1,025.57
Construction	50 Ton Crane	Diesel Equipment	4	12,800	300	10.21	1.01	0.94	125.07	0.01237	0.01151	1,600.87	1.58E-04	1.47E-04	1,600.91
Construction	150 ton Crane	Diesel Equipment	3	6,000	300	10.21	1.01	0.94	125.07	0.01237	0.01151	750.41	7.42E-05	6.91E-05	750.43
Construction	JLG Lift	Diesel Equipment	8	9,600	84	10.21	1.01	0.94	35.02	0.00346	0.00322	336.18	3.33E-05	3.10E-05	336.19
Construction	Manlifts	Diesel Equipment	4	4,800	60	10.21	1.01	0.94	25.01	0.00247	0.00230	120.06	1.19E-05	1.11E-05	120.07
TOTAL	--	--	--	--	--	--	--	--	--	--	--	**8,375.50**	**1.43E-03**	**9.09E-04**	**8,375.78**

[1] Equipment type, number of units, and operating time are estimated.

[2] Fuel type assumed based on equipment type.

[3] Horsepower estimates based on information below for each equipment type.

Equipment Type	Estimated Horsepower	Estimated Horsepower Reference
D9 Dozer	225	https://www.cat.com/en_US/products/new/equipment/dozers.html
988 Loader	197	https://www.deere.com/en/loaders/wheel-loaders/mid-size-wheel-loaders/
Backhoe	131	https://www.cat.com/en_US/products/new/equipment/backhoe-loaders/center-pivot-backhoe-loaders/15970234.html
Larger Grader	200	https://www.cat.com/en_US/products/new/equipment/motor-graders/motor-graders/18552913.html
Compactor	75	https://www.cat.com/en_US/products/new/equipment/compactors/vibratory-soil-compactors/117620.html
Off Road Haul Trucks	375	https://www.cat.com/en_US/products/new/equipment/articulated-trucks/three-axle-articulated-trucks/15969812.html
Off Road Fork Lift	74	https://www.jcb.com/en-us/products/rough-terrain-forklifts/930
4x4 Side-by-Sides	110	https://www.polaris.com/en-us/off-road/ranger/models/ranger-xd-1500/?model=ranger-xd-1500-premium&option=3-SEAT&trim=turbo-silver
Site Pickup Trucks	310	https://www.gmc.com/trucks/sierra/1500
Boom Truck	200	https://cranemarket.com/specification-40461
Water Truck for Road	1025	https://www.cat.com/en_US/products/new/equipment/off-highway-trucks/water-trucks.html#!
50 Ton Crane	300	https://freecranespecs.com/Terex-T-340%284%29.pdf
150 ton Crane	300	https://freecranespecs.com/Terex-T-340%284%29.pdf
JLG Lift	84	https://www.jlg.com/en/equipment/engine-powered-boom-lifts/articulating/600-series/600aj-articulating-boom-lift
Manlifts	60	https://www.constructionequipment.com/manlift

[4] CO_2 emissions calculated using the EPA CCCL emission factors for mobile combustion, Table 2: Mobile Combustion CO_2, 2024. https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf

Fuel Type	CO_2 Emission Factor (kg/gal)
Diesel Fuel	10.21
Motor Gasoline	8.78

[5] CH_4 and N_2O emissions calculated using the EPA CCCL emission factors for construction/mining equipment, Table 5: Mobile Combustion CH_4 and N_2O for Non-Road Vehicles, 2024. https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf

Vehicle Type	Fuel Type	CH4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)
Construction/Mining Equipment	Gasoline (4 stroke)	2.85	1.47
Construction/Mining Equipment	Diesel Equipment	1.01	0.94
Construction/Mining Equipment	Diesel Off-Road Trucks	0.91	0.56
Recreational Equipment	Gasoline (4 stroke) - Recreati	2.72	1.48

[6] Emission factors converted to lb/hr using conversion rates of 53.993 hp-hr/gal for diesel and 47.246 hp-hr/gal for gasoline.

[7] CO_2e calculated by equation A-1 of 40 CFR 98.2, which states the total CO_2e is equal to the GWP for each pollutant multiplied by the potential pollutant emissions.

Project Area	Activity/ Description[1]	Equipment Type[1]	Fuel Type[2]	Number of Units[1]	Total Operating Time[1] (hours/yr)	Estimated Horsepower [3]	CO_2 Emission Factor[4] (kg/gal)	CH_4 Emission Factor[5] (g/gal)	N_2O Emission Factor[5] (g/gal)	CO_2 Emission Factor[6] (lb/hr)	CH_4 Emission Factor[6] (lb/hr)	N_2O Emission Factor[6] (lb/hr)	CO_2 (metric tons/yr)	CH_4 (metric tons/yr)	N_2O (metric tons/yr)	CO_2e[7] (metric tons/yr)
Underwood Facility	Pile Shaping	Dozer	Diesel Equipment	2	12960	225	10.21	1.01	0.94	107.11	0.01060	0.00986	1,388.21	1.37E-04	1.28E-04	1,388.24
Underwood Facility	Pile Reclaim	Frond End Loader	Diesel Equipment	4	25920	197	10.21	1.01	0.94	94.05	0.00930	0.00866	2,437.68	2.41E-04	2.24E-04	2,437.75
Center Facility	Pile Shaping	Dozer	Diesel Equipment	2	12960	225	10.21	1.01	0.94	93.73	0.00927	0.00863	1,214.74	1.20E-04	1.12E-04	1,214.77
Center Facility	Pile Reclaim	Frond End Loader	Diesel Equipment	4	25920	197	10.21	1.01	0.94	82.29	0.00814	0.00758	2,133.07	2.11E-04	1.96E-04	2,133.13
RESS&R Facility	Receiving	Forklift	Diesel Equipment	1	6480	74	10.21	1.01	0.94	30.85	0.00305	0.00284	199.91	1.98E-05	1.84E-05	199.91
RESS&R Facility	Plant Equipment	Forklift	Diesel Equipment	1	6480	74	10.21	1.01	0.94	30.85	0.00305	0.00284	199.91	1.98E-05	1.84E-05	199.91
TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	**7,573.52**	**0.00**	**6.97E-04**	**7573.72**

[1] Activity, equipment type, number of units, and operating hours assumed.

[2] Fuel type assumed based on equipment type.

[3] Horsepower estimates based on information below for each equipment type.

Equipment Type	Estimated Horsepower	Estimated Horsepower Reference
Dozer	225	https://www.cat.com/en_US/products/new/equipment/dozers.html
Front End Loader	197	https://www.deere.com/en/loaders/wheel-loaders/mid-size-wheel-loaders/
Forklift	74	https://www.jcb.com/en-us/products/rough-terrain-forklifts/930

[4] CO_2 emissions calculated using the EPA CCCL emission factors for mobile combustion, Table 2: Mobile Combustion CO_2, 2024. https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf

Fuel Type	CO_2 Emission Factor (kg/gal)
Diesel Fuel	10.21

[5] CH_4 and N_2O emissions calculated using the EPA CCCL emission factors for construction/mining equipment, Table 5: Mobile Combustion CH_4 and N_2O for Non-Road Vehicles, 2024. https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf

Vehicle Type	Fuel Type	CH4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)
Construction/Mining Equipment	Diesel Equipment	1.01	0.94

[6] Emission factors converted to lb/hr using conversion rates of 53.993 hp-hr/gal for diesel fuel.

[7] CO_2e calculated by equation A-1 of 40 CFR 98.2, which states the total CO_2e is equal to the GWP for each pollutant multiplied by the potential pollutant emissions.

Project Area	Source[1]	Fuel Type[1]	Fuel Consumption[1] (scf)	CO_2 Emission Factor[2] (kg/scf)	CH_4 Emission Factor[2] (g/scf)	N_2O Emission Factor[2] (g/scf)	CO_2 (metric tons/yr)	CH_4 (metric tons/yr)	N_2O (metric tons/yr)	CO_2e[3] (metric tons/yr)
MREC Facilities	Kilns	Natural Gas	3,650,000	0.05444	0.00103	0.00010	198.71	3.76E-03	3.65E-04	198.91

[1] Fuel consumption based on tabulated typicals for natural gas kilns.
[2] Table 1: Stationary Combustion. Emission Factors for Greenhouse Gas Inventories, EPA CCCL, 2024. https://www.epa.gov/climateleadership/ghg-emission-factors-hub
[3] CO2e calculated by equation A-1 of 40 CFR 98.2, which states the total CO2e is equal to the GWP for each pollutant multiplied by the potential pollutant emissions.

Project Area	Land Use Change	Area of Land Use Change[1] (acres)	2022 Net CO_2 Flux for Converted Land Type[2] (M metric tons CO_2e)	2022 Total US Land Use Change from Forest Land[3] (thousands of hectares)	CO_2e Emission Factor (metric tons CO_2e/acre)	CO_2e[4] (metric tons/yr)
Underwood Facility	Forest Land to Settlement	-	58.6	440	53.90	0.00
Underwood Facility	Cropland to Settlement	0.59	2.9	1,228	0.96	0.56
Underwood Facility	Wetland to Settlement	3.96	0.1	14	2.89	11.45
Underwood Facility	Grassland to Settlement	73.54	7.5	1,648	1.84	135.44
Center Facility	Forest Land to Settlement	12.67	58.6	440	53.90	682.87
Center Facility	Cropland to Settlement	-	2.9	1,228	0.96	0.00
Center Facility	Wetland to Settlement	5.11	0.1	14	2.89	14.77
Center Facility	Grassland to Settlement	53.79	7.5	1,648	1.84	99.07
Total	--	**149.66**	--	--	--	**944.16**

[1] Land use areas obtained from the National Land Cover Database for project area.
[2] Net CO_2 flux tables for converted land types. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2022.
https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022
[3] Table 6-5: Land Use and Land-Use Change for the U.S. Managed Land Base for All 50 States, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2022.
https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022
[4] CO_2e calculated by equation A-1 of 40 CFR 98.2, which states the total CO_2e is equal to the GWP for each pollutant multiplied by the potential pollutant emissions.

Project Area	Vehicle Type	Load Weight[1] (lbs)	Trips Traveled[2] (trips/week)	Distance Traveled[3] (miles/trip)	Total Distance Traveled (miles/year)	Total Annual Ton-Miles	CO_2 Emission Factor[4] (kg/ton-mile)	CH_4 Emission Factor[4] (g/ton-mile)	N_2O Emission Factor[4] (g/ton-mile)	CO_2 (metric tons/year)	CH_4 (metric tons/year)	N_2O (metric tons/year)	CO_2e[5] (metric tons/year)
Underwood Facility	Medium- and Heavy-Duty Truck	40,000	728.5	100	3,788,200	75,764,000	0.168	0.0015	0.0047	12,728.35	0.11	0.36	12,825.90
Underwood Facility	Rail	200,000	56	100	291,200	29,120,000	0.022	0.0017	0.0005	640.64	0.05	0.01	645.88
Center Facility	Medium- and Heavy-Duty Truck	40,000	400.5	100	2,082,600	41,652,000	0.168	0.0015	0.0047	6,997.54	0.06	0.20	7,051.16
Center Facility	Rail	200,000	-	100	-	-	0.022	0.0017	0.0005	-	-	-	-
TOTAL	--	--	--	--	--	--	--	--	--	**20,366.53**	**0.23**	**0.57**	**20,522.95**

[1] Load weights assumed.

[2] Estimates include the maximum number of trucks or train cars needed to operate the facility. The Proposed Action requires a combination of either truck or train trips depending on supplier/customer preferences.

[3] Distance traveled assumed.

[4] Table 8: Scope 3 Category 4: Upstream Transportation and Distribution. Emission Factors for Greenhouse Gas Inventories, EPA CCCL, 2024. https://www.epa.gov/climateleadership/ghg-emission-factors-hub

[5] CO_2e calculated by equation A-1 of 40 CFR 98.2, which states the total CO_2e is equal to the GWP for each pollutant multiplied by the potential pollutant emissions.

Project Area	Energy Consumption[1] (kWh/year)	eGRID Subregion	CO_2 Emission Factor[2] (lb/MWh)	CH_4 Emission Factor[2] (lb/MWh)	N_2O Emission Factor[2] (lb/MWh)	CO_2 (metric tons/year)	CH_4 (metric tons/year)	N_2O (metric tons/year)	CO_2e[3] (metric tons/year)
MREC Facilities	8,190,000	MROW	936.5	0.102	0.015	3,479.02	0.38	0.06	3,504.40
RESS&R Facility	595,855	MROW	936.5	0.102	0.015	253.11	0.03	0.00	254.96
TOTAL	**8,785,855**	--	--	--	--	**3,732.14**	**0.41**	**0.06**	**3,759.36**

[1] Electrical consumption is a PreFEED estimate for MREC Facilities. RES Facility electrical consumption assumes 8,760 hours of operation per year and includes polishing stage equipment, treatment plant equipment, and QA/QC equipment.

[2] Table 6, Electricity. Emission Factors for Greenhouse Gas Inventories, EPA CCCL, 2024. https://www.epa.gov/climateleadership/ghg-emission-factors-hub

[3] CO_2e calculated by equation A-1 of 40 CFR 98.2, which states the total CO_2e is equal to the GWP for each pollutant multiplied by the potential pollutant emissions.

Appendix B

Agency and Tribal Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Nebraska Ecological Services Field Office
9325 B South Alda Rd., Ste B
Wood River, NE 68883-9565
Phone: (308) 382-6468 Fax: (308) 384-8835

In Reply Refer To:
Project code: 2024-0055359
Project Name: Rare Earth Salts

February 28, 2024

Federal Nexus: yes
Federal Action Agency (if applicable): Department of Energy

Subject: Record of project representative's no effect determination for 'Rare Earth Salts'

Dear Tyler Conley:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on February 28, 2024, for 'Rare Earth Salts' (here forward, Project). This project has been assigned Project Code 2024-0055359 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project has reached the determination of "No Effect" on the northern long-eared bat. To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A

consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Candidate
- Tricolored Bat *Perimyotis subflavus* Proposed Endangered

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

Based upon your IPaC submission, your project has reached the determination of “No Effect” on the northern long-eared bat. If there are no updates on listed species, no further consultation/ coordination for this project is required with respect to the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the Nebraska Ecological Services Field Office and reference Project Code 2024-0055359 associated with this Project.

Compliance with Nebraska Nongame and Endangered Species Conservation Act Federally listed species protected under the Endangered Species Act are also state-listed under the Nebraska state statute, the Nebraska Nongame and Endangered Species Conservation Act. To determine if the proposed project may affect state-listed species, the Service recommends that the project proponent contact the Nebraska Game and Parks Commission (NGPC) Planning and Program Division located at 2200 North 33rd Street Lincoln, Nebraska 68503-0370. To request an environmental review from the NGPC, visit their Environmental Review website at http://outdoornebraska.gov/environmentalreview/ for instructions.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Rare Earth Salts

2. Description

The following description was provided for the project 'Rare Earth Salts':

> The Project would include development of two mixed rare earth carbonate concentrate (MREC) production demonstration facilities co-located with existing coal mine. Rare Earth Salts would perform the refining and purification processes at their existing facility in Beatrice, Gage County, Nebraska

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@40.320074399999996,-96.75292974794459,14z

DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the Endangered northern long-eared bat (Myotis septentrionalis). Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. The action area does not overlap with an area for which U.S. Fish and Wildlife Service currently has data to support the presumption that the northern long-eared bat is present. Are you aware of other data that indicates that northern long-eared bats (NLEB) are likely to be present in the action area?

   Bat occurrence data may include identification of NLEBs in hibernacula, capture of NLEBs, tracking of NLEBs to roost trees, or confirmed NLEB acoustic detections. Data on captures, roost tree use, and acoustic detections should post-date the year when white-nose syndrome was detected in the relevant state. With this question, we are looking for data that, for some reason, may have not yet been made available to U.S. Fish and Wildlife Service.

   No

3. Does any component of the action involve construction or operation of wind turbines?

   Note: For federal actions, answer ‘yes’ if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

   No

4. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   Yes

5. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

   No

6. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

   Note: This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

   No

7. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

   No

8. Is the lead federal action agency the Federal Energy Regulatory Commission (FERC)?

   No

9. Have you determined that your proposed action will have no effect on the northern long-eared bat? Remember to consider the effects of any activities that would not occur but for the proposed action.

   If you think that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, answer “No” below and continue through the key. If you have determined that the northern long-eared bat does not occur in your project’s action area and/or that your project will have no effects whatsoever on the species despite the potential for it to occur in the action area, you may make a “no effect” determination for the northern long-eared bat.

   Note: Federal agencies (or their designated non-federal representatives) must consult with USFWS on federal agency actions that may affect listed species [50 CFR 402.14(a)]. Consultation is not required for actions that will not affect listed species or critical habitat. Therefore, this determination key will not provide a consistency or verification letter for actions that will not affect listed species. If you believe that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, please answer “No” and continue through the key. Remember that this key addresses only effects to the northern long-eared bat. Consultation with USFWS would be required if your action may affect another listed species or critical habitat. The definition of Effects of the Action can be found here: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

   Yes

PROJECT QUESTIONNAIRE

Will all project activities by completed by April 1, 2024?

No

IPAC USER CONTACT INFORMATION

Agency: Barr Engineering
Name: Tyler Conley
Address: 4300 MarketPointe Drive Suite 200
City: Minneapolis
State: MN
Zip: 55435
Email tconley@barr.com
Phone: 9528423638

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Department of Energy

United States Department of the Interior

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

March 11, 2024

In reply, please refer to:
University of North Dakota Rare Earth Element Demonstration Facilities

Mr. Harry E. Taylor
NEPA Compliance Officer
U.S. Department of Energy
National Energy Technology Laboratory
3610 Collins Ferry Road
Morgantown, WV 26505

Dear Mr. Taylor:

Thank you for your email on March 5, 2024, containing the U.S. Fish & Wildlife Service's (Service) Information for Planning and Consultation (IPaC) determination key results and the project description for the University of North Dakota Rare Earth Elements Demonstration Facilities Project consisting of the development of two mixed rare earth carbonate concentrate production demonstration facilities in McLean and Oliver Counties, North Dakota. The facilities would be co-located with existing coal mines; Falkirk Mining Company in McLean County and BNI Coal in Oliver County. The Department of Energy (DOE) has requested the Service's concurrence with their effects determinations for the Project.

The DOE has requested the Service's concurrence with the determination that the Project "may affect, but is not likely to adversely affect" the endangered whooping crane (*Grus americana*) and the threatened piping plover (*Charadrius melodus*) for the McLean County facility, as well as the endangered northern long-eared bat (*Myotis septentrionalis*), the threatened rufa red knot (*Calidris conutus rufus*) and the piping plover (*Charadrius melodus*) for the Oliver County facility. In accordance with section 7(c) of the Endangered Species Act (ESA), as amended, 16 U.S.C. 1531 et seq., the Service concurs with your determinations. The Service's concurrence is based on your delineation of the area likely to be affected by the proposed action and your answers to the IPaC determination key.

The DOE has also determined that there will be "no effect" to the threatened Dakota skipper (*Hesperia dacotae*) and rufa red knot (*Calidris conutus rufus*) for the McLean County facility, as well as the whooping crane (*Grus americana*) and the Dakota skipper (*Hesperia dacotae*) for the Oliver County facility. There is no requirement under the implementing regulations of the Act (50 CFR Part 402) for action agencies to receive the Service's concurrence with "no effect"

determinations, therefore the responsibility for "no effect" determinations remains with the federal action agency. We recommend the federal action agency document the "no effect" determinations and retain the documentation in the decisional record for this federal action.

The proposed Project actions should be re-analyzed if any of the following occur:

1. New information reveals effects of the action that may affect listed species in a manner or to an extent not previously considered.
2. The identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation.
3. A new species is listed or critical habitat is designated that may be affected by this Project.

The Service appreciates the opportunity to work with the DOE to ensure the conservation of federal listed species as part of our joint responsibilities under ESA to conserve threatened and endangered species and their habitats. If you have any additional questions or concerns, please contact Seth Jones at (701) 355-8508 or via email at seth_jones@fws.gov or contact me at (720) 793-6797 or luke_toso@fws.gov.

Sincerely,

LUKE TOSO

Digitally signed by LUKE TOSO
Date: 2024.03.11 13:26:32 -05'00'

Luke Toso
North Dakota Ecological Services Supervisor

Appendix C

Social Cost of Carbon Calculations

Appendix D Social Cost of Carbon Dioxide Calculator

Base Year: 2028 (The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1: 2028 (First year of emissions)

Year of emissions	CO_2 emissions (metric tons)[1]	Per ton SC-CO_2 Value (2020$/metric ton CO_2)[2,3]				Present Value (in Base Year) of Estimated SC-CO_2 by Emissions Year (2020$)[4]			
		Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
2028	31871	$18	$60	$87	$180	$585,978	$1,900,397	$2,768,592	$5,726,912
2029	31871	$19	$61	$88	$183	$572,887	$1,878,093	$2,741,674	$5,668,717
2030	31871	$19	$62	$89	$187	$559,742	$1,855,475	$2,714,421	$5,609,084
2031	31871	$20	$63	$91	$191	$549,166	$1,834,798	$2,688,554	$5,557,216
2032	31871	$21	$64	$92	$194	$538,302	$1,813,752	$2,662,334	$5,503,639
2033	31871	$21	$65	$94	$198	$527,252	$1,792,375	$2,635,794	$5,448,468
2034	31871	$22	$66	$95	$202	$516,010	$1,770,705	$2,608,992	$5,391,816
2035	31871	$22	$67	$96	$206	$504,666	$1,748,777	$2,581,903	$5,333,868
2036	31871	$23	$69	$98	$210	$493,210	$1,726,624	$2,554,583	$5,274,721
2037	31871	$23	$70	$99	$213	$481,722	$1,704,278	$2,527,059	$5,214,471
2038	31871	$24	$71	$100	$217	$470,190	$1,681,768	$2,499,384	$5,153,279
2039	31871	$25	$72	$102	$221	$458,682	$1,659,124	$2,471,531	$5,091,205
2040	31871	$25	$73	$103	$225	$447,204	$1,636,373	$2,443,550	$5,028,398
2041	31871	$26	$74	$104	$228	$436,827	$1,613,583	$2,414,839	$4,957,898
2042	31871	$26	$75	$106	$232	$426,425	$1,590,732	$2,386,075	$4,887,219
2043	31871	$27	$77	$107	$235	$416,022	$1,567,843	$2,357,256	$4,816,471
2044	31871	$28	$78	$108	$239	$405,643	$1,544,938	$2,328,445	$4,745,699
2045	31871	$28	$79	$110	$242	$395,310	$1,522,019	$2,299,636	$4,674,963
2046	31871	$29	$80	$111	$246	$385,054	$1,499,142	$2,270,848	$4,604,303
2047	31871	$30	$81	$112	$249	$374,866	$1,476,307	$2,242,096	$4,533,811
2048	31871	$30	$82	$114	$253	$364,774	$1,453,530	$2,213,377	$4,463,520

Present Value (in Base Year) of Estimated SC-CO_2 for all CO_2 emissions, 2020$)

Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
$9,909,932	$35,270,634	$52,410,943	$107,685,677

1 Annual GHG Estimates from Air Resource Specialist

2 *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

3 Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

4 The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions.These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

Appendix D Social Cost of Carbon Methane Calculator

Base Year: 2028 (The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1: 2028 (First year of emissions)

Year of emissions	CH_4 emissions (metric tons)[1]	Per ton SC-CH_4 Value (2020$/metric ton CH_4)[2,3]				Present Value (in Base Year) of Estimated SC-CH_4 by Emissions Year (2020$)[4]			
		Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
2028	0.6366	$884	$1,861	$2,397	$4,934	$562	$1,184	$1,526	$3,141
2029	0.6366	$911	$1,908	$2,452	$5,062	$552	$1,179	$1,523	$3,129
2030	0.6366	$938	$1,954	$2,508	$5,190	$542	$1,173	$1,519	$3,115
2031	0.6366	$972	$2,010	$2,572	$5,344	$535	$1,171	$1,520	$3,114
2032	0.6366	$1,007	$2,065	$2,635	$5,498	$527	$1,168	$1,520	$3,110
2033	0.6366	$1,041	$2,121	$2,699	$5,652	$519	$1,165	$1,519	$3,104
2034	0.6366	$1,075	$2,176	$2,763	$5,806	$511	$1,160	$1,517	$3,095
2035	0.6366	$1,110	$2,231	$2,827	$5,959	$502	$1,155	$1,514	$3,085
2036	0.6366	$1,144	$2,287	$2,891	$6,113	$493	$1,149	$1,511	$3,072
2037	0.6366	$1,179	$2,342	$2,955	$6,267	$484	$1,143	$1,506	$3,058
2038	0.6366	$1,213	$2,397	$3,019	$6,421	$474	$1,136	$1,501	$3,042
2039	0.6366	$1,247	$2,453	$3,083	$6,574	$464	$1,128	$1,496	$3,024
2040	0.6366	$1,282	$2,508	$3,147	$6,728	$454	$1,120	$1,489	$3,004
2041	0.6366	$1,319	$2,564	$3,210	$6,873	$445	$1,112	$1,482	$2,979
2042	0.6366	$1,357	$2,620	$3,273	$7,018	$436	$1,103	$1,474	$2,954
2043	0.6366	$1,394	$2,676	$3,336	$7,162	$427	$1,093	$1,466	$2,927
2044	0.6366	$1,432	$2,732	$3,399	$7,307	$418	$1,084	$1,457	$2,899
2045	0.6366	$1,469	$2,788	$3,462	$7,452	$408	$1,074	$1,448	$2,870
2046	0.6366	$1,507	$2,844	$3,524	$7,596	$399	$1,063	$1,439	$2,841
2047	0.6366	$1,544	$2,900	$3,587	$7,741	$389	$1,053	$1,429	$2,810
2048	0.6366	$1,582	$2,955	$3,650	$7,886	$380	$1,042	$1,418	$2,780

Present Value (in Base Year) of Estimated SC-CH_4 for all CH_4 emissions, 2020$)

Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
$9,922	$23,654	$31,276	$63,151

1 Annual GHG Estimates from Air Resource Specialist
2 *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990*. Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.
3 Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)
4 The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions.These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

Appendix D Social Cost of Nitrous Oxide Calculator

Base Year: 2028 (The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1: 2028 (First year of emissions)

Year of emissions	CH_4 emissions (metric tons)[1]	Per ton SC- N_2O Value (2020$/metric ton N_2O)[2,3]				Present Value (in Base Year) of Estimated SC- N_2O by Emissions Year (2020$)[4]			
		Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
2028	0.6273	$7,395	$21,902	$31,585	$57,918	$4,639	$13,738	$19,812	$36,329
2029	0.6273	$7,597	$22,339	$32,141	$59,125	$4,538	$13,604	$19,669	$36,007
2030	0.6273	$7,799	$22,776	$32,698	$60,333	$4,437	$13,466	$19,522	$35,672
2031	0.6273	$8,047	$23,268	$33,309	$61,692	$4,360	$13,356	$19,402	$35,413
2032	0.6273	$8,295	$23,760	$33,921	$63,051	$4,280	$13,242	$19,276	$35,139
2033	0.6273	$8,542	$24,252	$34,532	$64,410	$4,198	$13,122	$19,145	$34,851
2034	0.6273	$8,790	$24,744	$35,144	$65,770	$4,114	$12,998	$19,009	$34,550
2035	0.6273	$9,038	$25,236	$35,755	$67,129	$4,029	$12,871	$18,868	$34,237
2036	0.6273	$9,285	$25,728	$36,366	$68,488	$3,942	$12,739	$18,722	$33,913
2037	0.6273	$9,533	$26,219	$36,978	$69,847	$3,855	$12,605	$18,573	$33,578
2038	0.6273	$9,781	$26,711	$37,589	$71,206	$3,766	$12,467	$18,419	$33,235
2039	0.6273	$10,029	$27,203	$38,201	$72,565	$3,678	$12,327	$18,262	$32,882
2040	0.6273	$10,276	$27,695	$38,812	$73,924	$3,589	$12,184	$18,102	$32,523
2041	0.6273	$10,567	$28,225	$39,456	$75,349	$3,515	$12,056	$17,953	$32,184
2042	0.6273	$10,857	$28,754	$40,100	$76,773	$3,439	$11,924	$17,802	$31,837
2043	0.6273	$11,147	$29,283	$40,745	$78,197	$3,363	$11,790	$17,646	$31,483
2044	0.6273	$11,437	$29,813	$41,389	$79,621	$3,287	$11,653	$17,488	$31,123
2045	0.6273	$11,727	$30,342	$42,033	$81,045	$3,209	$11,515	$17,327	$30,757
2046	0.6273	$12,018	$30,872	$42,677	$82,470	$3,132	$11,375	$17,164	$30,386
2047	0.6273	$12,308	$31,401	$43,321	$83,894	$3,055	$11,233	$16,998	$30,010
2048	0.6273	$12,598	$31,930	$43,965	$85,318	$2,978	$11,089	$16,830	$29,631

Present Value (in Base Year) of Estimated SC- N_2O for all N_2O emissions, 2020$)

Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
$79,406	$261,354	$385,987	$695,737

1 Annual GHG Estimates from Air Resource Specialist
2 *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990*. Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.
3 Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)
4 The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

Appendix D

Permits and Approvals

Appendix D MREC Facilities Permits and Approvals

Permit/Approval	Agency or Office	Federal/State	Status Of Permit
Aquifer Exemption Request & Approval for Class I injection	EPA	Federal	Pending submittal
Air Quality Permit to Construct	ND DEQ	State	Pending submittal
Construction Stormwater General NDPES Permit (NDR11-0000)	ND DEQ	State	Pending submittal
Industrial Stormwater General Permit (NDR05-0000)	ND DEQ	State	Pending submittal
Class I (Underground Injection Control Program) Injection	ND DEQ	State	Pending submittal
Solid Waste Management Facility Permit or Inert Waste Disposal Variance	ND DEQ	State	Pending submittal
Surface Water Impoundment Permit	ND Department of Water Resources	State	Pending submittal
Water Appropriation Permit	ND Department of Water Resources	State	Pending submittal