Pinyon Environmental, Inc.
Corporate Headquarters
3222 South Vance Street, Suite 200, Lakewood, CO 80227
T: 303.980.5200 F: 303.980.0089
www.pinyon-env.com

April 29, 2022

Air Permitting and Monitoring Branch
US EPA, Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Subject: Crusoe Energy Systems Inc. Permit Application for True Minor Source – Charging Eagle 21-25 Pad Dunn County, North Dakota

On behalf of Crusoe Energy Systems Inc., (Crusoe), please find enclosed a true minor source permit application for a maximum of three (3) 2,500 hp Waukesha 9394GSI generator engines to be located on the Fort Berthold Indian Reservation at the RimRock Oil & Gas (RimRock) Charging Eagle 21-25 Pad in Dunn County, North Dakota. The engines will be used to power small data centers and will be fueled by gas from the Charging Eagle 21-25 Pad that would otherwise be flared. Each engine is built with a non-selective catalyst reduction (NSCR) device to meet the requested emissions limits.

Should you have any questions or comments about the application, please contact Kaitlin Meszaros by email at meszaros@pinyon-env.com or by phone at 631-245-0308.

Sincerely,

PINYON ENVIRONMENTAL, INC.,

Kaitlin A Meszaros
Air Quality Specialist

Cc: Ken Parker, Crusoe Energy Systems, Inc.

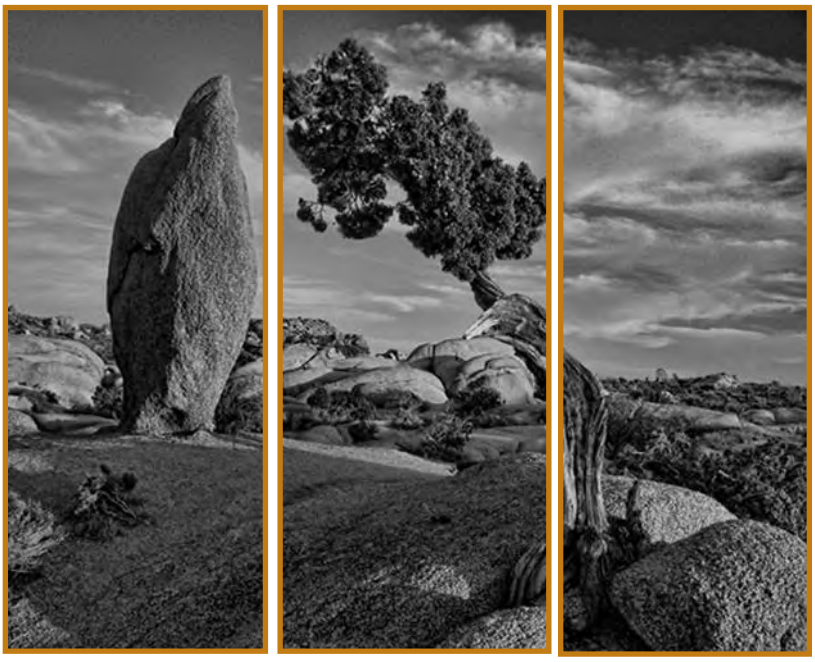
Pinyon Environmental, Inc.
Corporate Headquarters
3222 South Vance Street, Suite 200, Lakewood, CO 80227
T: 303.980.5200 F: 303.980.0089
www.pinyon-env.com

April 29, 2022

Air Quality Permit Application for True Minor Source on Tribal Lands

Crusoe Energy Systems Inc.
Charging Eagle 21-25 Pad
Dunn County, North Dakota

Pinyon Project No.:
I19-1347-01



April 29, 2022

Air Quality Permit Application for True Minor Source on Tribal Lands

Crusoe Energy Systems Inc.
Charging Eagle 21-25 Pad
Dunn County, North Dakota

Pinyon Project No.:
I19-1347-01

Prepared by:

Kaitlin Meszaros

Reviewed by:

Dustin Collins

Table of Contents

EPA Registration Form

EPA Form No. 5900-248
EPA ICR No. 1230.XX
OMB Control No. 2060-0003
Approval expires 4/30/2020

	United States Environmental Protection Agency **Program** **Address** **Phone** **Fax** **Web address**	***Reviewing Authority*** ***Program*** ***Address*** ***Phone*** ***Fax*** ***Web address***

FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN COUNTRY

Application for New Construction
(Form NEW)

Please check all that apply to show how you are using this form:

☒ **Proposed Construction of a New Source**
☐ **Proposed Construction of New Equipment at an Existing Source**
☐ **Proposed Modification of an Existing Source**
☐ **Other – Please Explain**

Please submit information to the following two entities:

Air Permitting and Monitoring Branch US EPA, Region 8 1595 Wynkoop Street Denver, CO 80202-1129 303-312-6312	The Tribal Environmental Contact for the specific reservation: If you need assistance in identifying the appropriate Tribal Environmental Contact and address, please contact your reviewing authority.

A. GENERAL SOURCE INFORMATION

1. (a) **Company Name** (Who owns this facility?) Crusoe Energy Systems Inc. (b) **Operator Name** Crusoe Energy Systems Inc.	2. **Source Name** Charging Eagle 21-25 Pad
3. Type of Operation Oil & Gas Support Services	4. Portable Source? ☐ Yes ☒ No 5. Temporary Source? ☐ Yes ☒ No
6. NAICS Code 213112	7. SIC Code 1389
8. Physical Address (home base for portable sources) From Twin Buttes, ND, travel on BIA Route 22 for 6.1 miles. Turn right onto access road and site entrance is in 1 miles on the right.	

9. Reservation* Fort Berthold Indian Reservation	10. County* Dunn	11a. Latitude* 47.52800	11b. Longitude* -102.34527
12a. Quarter Quarter Section* NE1/4 NW1/4	12b. Section* 25	12c. Township* 147N	12d. Range* 92W

*Provide all proposed locations of operation for portable sources

B. PREVIOUS PERMIT ACTIONS (Provide information in this format for each permit that has been issued to this source. Provide as an attachment if additional space is necessary)

Source Name on the Permit N/A
Permit Number (xx-xxx-xxxxx-xxxx.xx) N/A
Date of the Permit Action N/A

Source Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

Source Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

Source Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

Source Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

C. CONTACT INFORMATION

Company Contact Ken Parker	Title Vice President, Facilities Engineering and Operations
Mailing Address 1641 California St Suite 400, Denver, CO 80202	
Email Address ken@crusoeenergy.com	
Telephone Number 720-495-3656	Facsimile Number
Operator Contact (If different from company contact.)	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number
Source Contact Ken Parker	Title Vice President, Facilities Engineering and Operations
Mailing Address 1641 California St Suite 400, Denver, CO 80202	
Email Address ken@crusoeenergy.com	
Telephone Number 720-495-3656	Facsimile Number
Compliance Contact (If different from company contact.)	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number

D. ATTACHMENTS

Include all of the following information (see the attached instructions)

*Please do not send Part 71 Operating Permit Application Forms in lieu of the check list below.

☐ **FORM SYNMIN -** New Source Review Synthetic Minor Limit Request Form, only if synthetic minor limits are being requested.

X Narrative description of the proposed production processes. This description should follow the flow of the process flow diagram to be submitted with this application.

X Process flow chart identifying all proposed processing, combustion, handling, storage, and emission control equipment.

X A list and descriptions of all proposed emission units and air pollution-generating activities.

X Type and quantity of fuels, including sulfur content of fuels, proposed to be used on a daily, annual and maximum hourly basis.

X Type and quantity of raw materials used or final product produced proposed to be used on a daily, annual and maximum hourly basis.

X Proposed operating schedule, including number of hours per day, number of days per week and number of weeks per year.

X A list and description of all proposed emission controls, control efficiencies, emission limits, and monitoring for each emission unit and air pollution generating activity.

X Criteria Pollutant Emissions - Estimates of Current Actual Emissions, Current Allowable Emissions, Post- Change Uncontrolled Emissions, and Post-Change Allowable Emissions for the following air pollutants: particulate matter, PM_{10}, $PM_{2.5}$, sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

These estimates are to be made for each emission unit, emission generating activity, and the project/source in total.

X Modeling – Air Quality Impact Analysis (AQIA)

X ESA (Endangered Species Act)

X NHPA (National Historic Preservation Act)

E. TABLE OF ESTIMATED EMISSIONS

The following tables provide the total emissions in tons/year for all pollutants from the calculations required in Section D of this form, as appropriate for the use specified at the top of the form.

E(i) – Proposed New Source

Pollutant	Potential Emissions (tpy)	Proposed Allowable Emissions (tpy)	
PM	4.98	4.98	PM - Particulate Matter PM_{10} - Particulate Matter less than 10 microns in size $PM_{2.5}$ - Particulate Matter less than 2.5 microns in size SO_2 - Sulfur Dioxides NOx - Nitrogen Oxides CO - Carbon Monoxide VOC - Volatile Organic Compound Pb - Lead and lead compounds Fluorides - Gaseous and particulates H_2SO_4 - Sulfuric Acid Mist H_2S - Hydrogen Sulfide TRS - Total Reduced Sulfur RSC - Reduced Sulfur Compounds
PM_{10}	4.98	4.98	
$PM_{2.5}$	4.98	4.98	
SO_2	1.04	1.04	
NO_x	10.86	10.86	
CO	21.73	21.73	
VOC	0.72	0.72	
Pb	<0.1	<0.1	
Fluorides	<0.1	<0.1	
H_2SO_4	<0.1	<0.1	
H_2S	<0.1	<0.1	
TRS	<0.1	<0.1	
RSC	<0.1	<0.1	

Emissions calculations must include fugitive emissions if the source is one the following listed sources, pursuant to CAA Section 302(j):

(a) Coal cleaning plants (with thermal dryers);
(b) Kraft pulp mills;
(c) Portland cement plants;
(d) Primary zinc smelters;
(e) Iron and steel mills;
(f) Primary aluminum ore reduction plants;
(g) Primary copper smelters;
(h) Municipal incinerators capable of charging more than 250 tons of refuse per day;
(i) Hydrofluoric, sulfuric, or nitric acid plants;
(j) Petroleum refineries;
(k) Lime plants;
(l) Phosphate rock processing plants;
(m) Coke oven batteries;
(n) Sulfur recovery plants;
(o) Carbon black plants (furnace process);
(p) Primary lead smelters;
(q) Fuel conversion plants;
(r) Sintering plants;
(s) Secondary metal production plants;
(t) Chemical process plants
(u) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input;
(v) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;
(w) Taconite ore processing plants;
(x) Glass fiber processing plants;
(y) Charcoal production plants;
(z) Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, and
(aa) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.

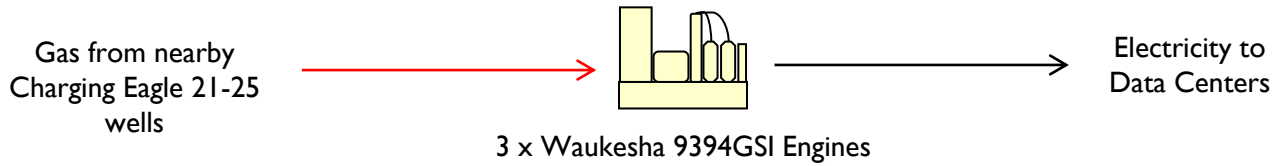
Process Description

Crusoe Energy Systems (Crusoe) plans to install and operate a maximum of three (3) 2,500 hp Waukesha 9394GSI generator engines at the RimRock Oil & Gas (RimRock) Charging Eagle 21-25 Pad. The purpose of the engines is to take gas from the production facility that would otherwise be flared to use as fuel in order to power small data centers. Each engine is built with a non-selective catalyst reduction (NSCR) device. The Crusoe facility is nested within the larger RimRock Charging Eagle 21-25 Pad.

The sources under ownership and operatorship of Crusoe shall not be aggregated with the production facility sources on the same site location as they will be owned and operated by a separate company. Crusoe will not have environmental control over the other company's emissions sources and the other company will not have environmental control over Crusoe's emissions sources. A redacted version of the Gas Purchase Agreement is included as an attachment to this application.

An ambient air boundary has been created 10 feet from Crusoe's equipment on all sides, as noted in the Facility Plot Plan. This designated area will be graveled to demonstrate the extent of the Crusoe designated area.

Process Flow Diagram

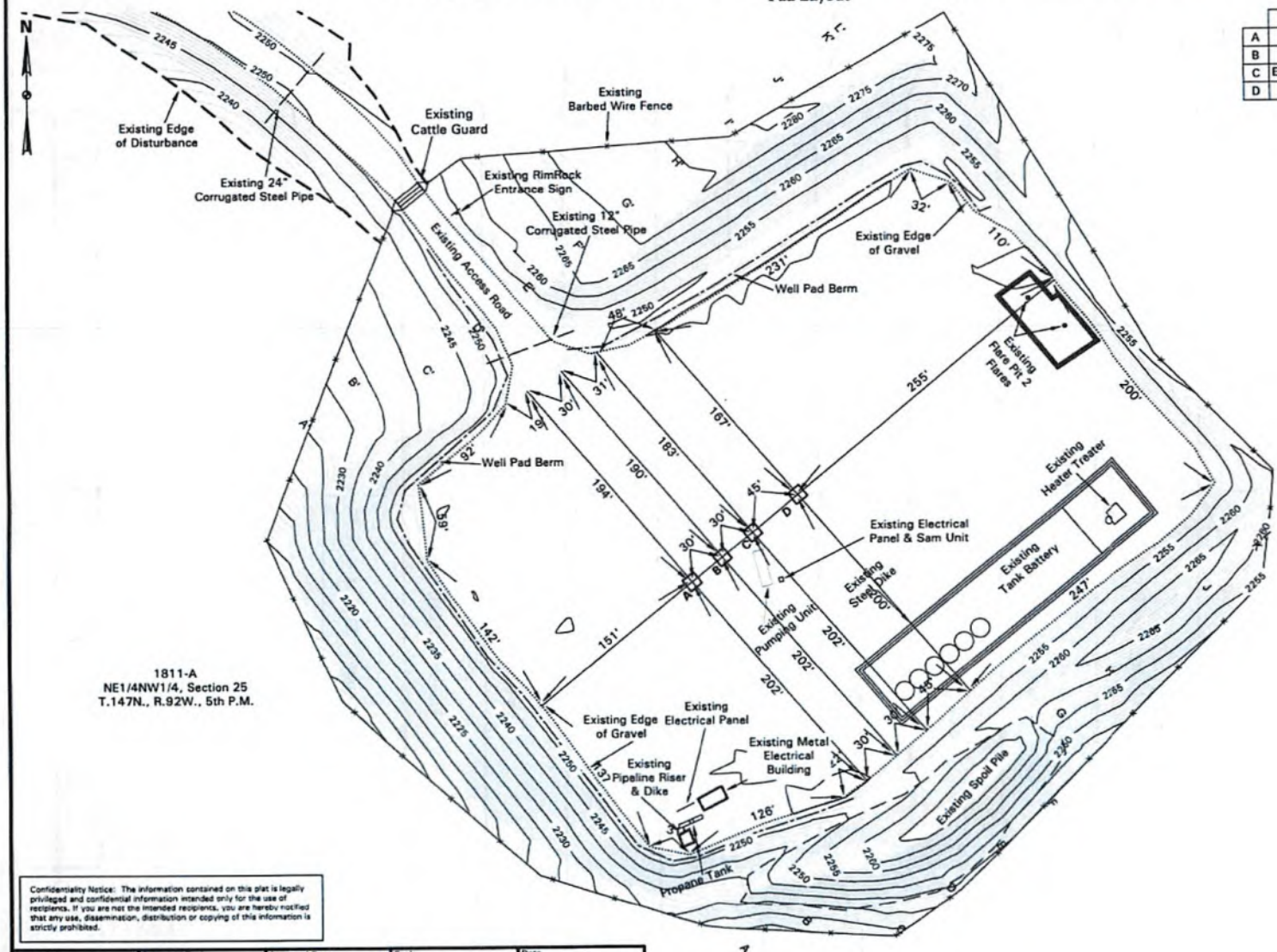


Gas
Electricity

Process Flow Diagram
Crusoe Energy Systems Inc.
Charging Eagle 21-25 Pad
Dunn County, North Dakota

Site Location Map and Plot Plan

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Pad Layout

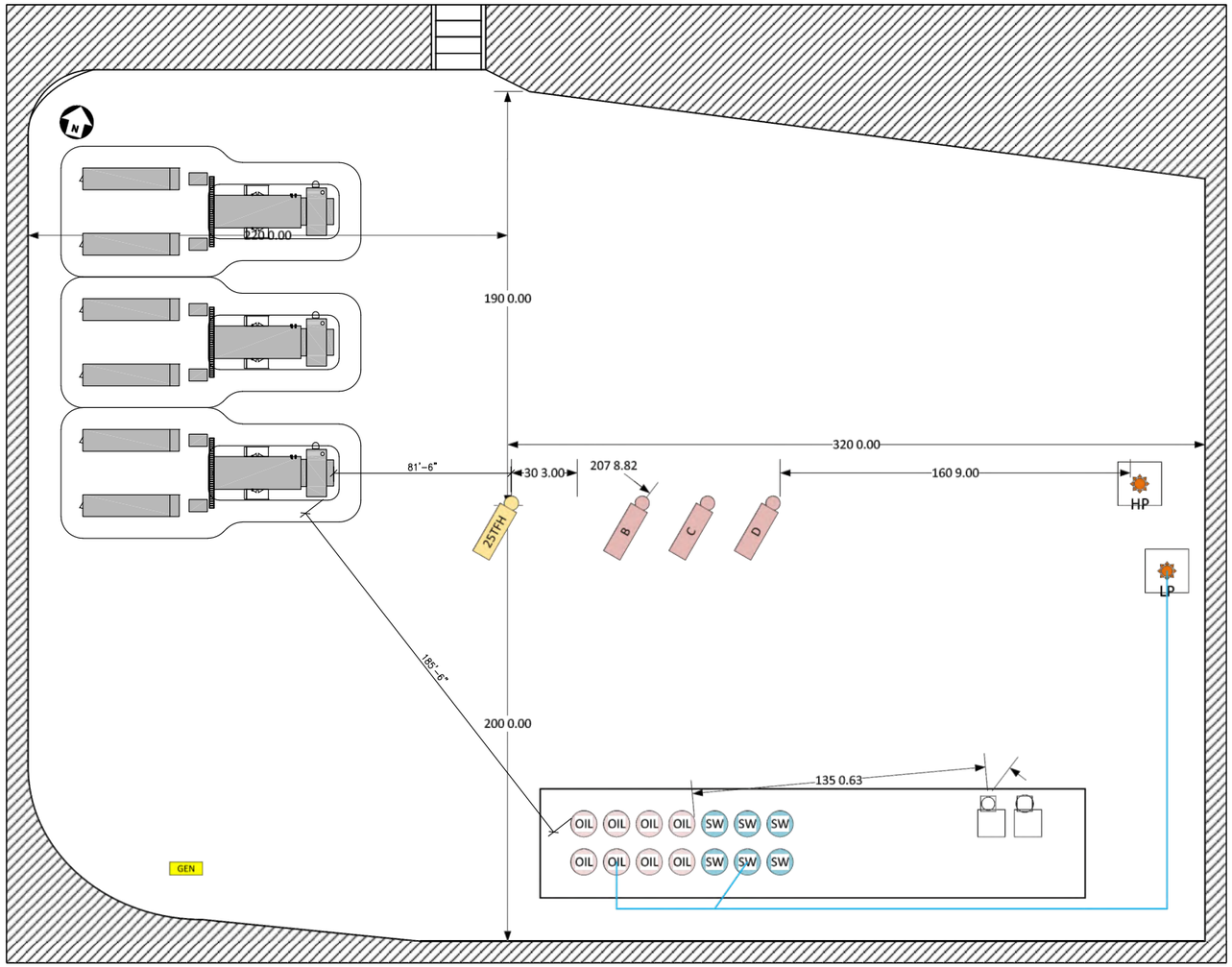


	Well Name	Elevation	Cut/Fill
A	Charging Eagle 21-25TFH	2250.3'	-
B	Charging Eagle 21-25H	2250.4'	-
C	Exist. Charging Eagle 21-25-2TFH	2250.2'	-
D	Charging Eagle 21-25-2H	2250.4'	-

I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 02-20-21
NORTH DAKOTA

Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	Nick Jensen	M. Washko	1" = 80'	9/11/2018
Field Book	Material	Revised	Project No.	Drawing No.
OW 324A	Pad Layout	11/25/2020	1807-01478 1807-01928,01929	8



REFERENCE DRAWINGS	No	REVISIONS	BY	CHKD	PM	DATE
	B	RE-ISSUED FOR APPROVAL	CDL	CDL	RFD	04/13/22
	A	ISSUED FOR APPROVAL	CDL	CDL	RFD	02/09/22

CRUSOE

CRUSOE ENERGY SYSTEMS, INC
RIM ROCK CHARGING EAGLE 21-25
EQUIPMENT LAYOUT

PROJ. NUMBER	DRAWING NUMBER	SCALE	REVISION
	CHE-21-25-PP-4101	1/32"=1'=0"	B

Proposed Emission Units

ENG01 through ENG03 - Waukesha 9394GSI

A maximum of three (3) four-stroke rich-burn 2,500 horsepower Waukesha 9394GSI generator engines will be located at the Charging Eagle 21-25 Pad. Each engine is subject to the testing, recordkeeping, and reporting requirements of 40 CFR 60, Subpart JJJJ and 40 CFR 63, Subpart ZZZZ. The purpose of the engines is to take gas from the production facility that would otherwise be flared to use as fuel in order to power small data centers.

Each engine's catalyst will have an inlet exhaust temperature between 750 degrees Fahrenheit and 1,250 degrees Fahrenheit. The pressure drop across the catalyst will remain within the range of -2 inches of water and 2 inches of water.

Fuel Type & Quantity: Each engine will have a field gas consumption rate of 165.6 million cubic feet per year (MMscf/yr), 0.45 million cubic feet per day (MMscf/d), or 18,900 cubic feet per hour (scf/hr). This totals a facility-wide gas consumption rate of 496.7 MMscf/yr, 1.36 MMscf/d, or 56,700 scf/hr. The estimated heating value of the field gas is 1,208 British thermal units per standard cubic foot (Btu/scf). The percent sulfur of the fuel is assumed to be a maximum of 0.0025% or 25 parts per million (ppm).

Raw Materials & Final Products: No raw materials will be used, or final products created for the engine.

Operating Schedule: The engine will have a normal operating schedule of 24 hours per day, 7 days per week, 52 weeks per year for a total of 8,760 hours per year.

Emission Controls & Factors: Each engine has been built with a NSRC device. The emission factors used to calculate actual emissions of the engine are provided in AP-42 Chapter 3.2, Table 3.2-3, and the following manufacturer specifications:

- NOx: 0.15 g/hp-hr
- CO: 0.30 g/hp-hr
- VOC: 0.010 g/hp-hr
- Formaldehyde: 0.001 g/hp-hr

Emission Calculations

Engine Emissions

Source Information

Emission Unit ID:	ENG01 through ENG03	
Engine Make/Model	Waukesha 9394 GSI	
Service	Power Generation	
Controls - Y or N / Type	Y	NSRC/AFRC
Number of Operational Units	3	engines
Horsepower Rating[1]	2,500	horsepower
Fuel Consumption (BSFC)[1]	7,814	Btu/(hp-hr)
Heat Rating[2]	19.54	MMBtu/hr
Fuel Consumption[2]	165.6	MMscf/yr
Fuel Consumption[2]	18,900	scf/hr
Fuel Consumption[1]	315	scf/min
Fuel Heating Value[3]	1,208	Btu/scf
Operating Hours	8,760	hrs/yr

Pollutant	Emission Factor		Per Engine Emissions		Total Engine Emissions		Source of Emissions Factors
	lb/MMBtu	g/hp-hr	lb/hr	ton/yr	lb/hr	ton/yr	
NOx	-	0.15	0.83	3.62	2.48	10.86	Manufacturer Specifications
CO	-	0.30	1.65	7.24	4.96	21.73	Manufacturer Specifications
VOC	-	0.01	0.055	0.24	0.17	0.72	Manufacturer Specifications
SO_2	4.06E-03	-	0.079	0.35	0.24	1.04	Converted for a gas with maximum H_2S of 25 ppmv
PM_{10}	1.94E-02	-	0.38	1.66	1.14	4.98	AP-42, Chapter 3.2, Table 3.2-3
$PM_{2.5}$	1.94E-02	-	0.38	1.66	1.14	4.98	AP-42, Chapter 3.2, Table 3.2-3
1,1,2,2-Tetrachloroethane	2.53E-05	-	4.94E-04	2.16E-03	1.48E-03	6.49E-03	AP-42, Chapter 3.2, Table 3.2-3
1,3-Butadiene	6.63E-04	-	1.30E-02	5.67E-02	3.89E-02	1.70E-01	AP-42, Chapter 3.2, Table 3.2-3
Acetaldehyde	2.79E-03	-	5.45E-02	2.39E-01	1.64E-01	7.16E-01	AP-42, Chapter 3.2, Table 3.2-3
Acrolein	2.63E-03	-	5.14E-02	2.25E-01	1.54E-01	6.75E-01	AP-42, Chapter 3.2, Table 3.2-3
Benzene	1.58E-03	-	3.09E-02	1.35E-01	9.26E-02	4.06E-01	AP-42, Chapter 3.2, Table 3.2-3
Ethylbenzene	2.48E-05	-	4.84E-04	2.12E-03	1.45E-03	6.37E-03	AP-42, Chapter 3.2, Table 3.2-3
Formaldehyde	-	0.001	5.51E-03	2.41E-02	1.65E-02	7.24E-02	Manufacturer Specifications
Methanol	3.06E-03	-	5.98E-02	2.62E-01	1.79E-01	7.85E-01	AP-42, Chapter 3.2, Table 3.2-3
Methylene Chloride	4.12E-05	-	8.05E-04	3.53E-03	2.41E-03	1.06E-02	AP-42, Chapter 3.2, Table 3.2-3
PAH	1.41E-04	-	2.75E-03	1.21E-02	8.26E-03	3.62E-02	AP-42, Chapter 3.2, Table 3.2-3
Toluene	5.58E-04	-	1.09E-02	4.77E-02	3.27E-02	1.43E-01	AP-42, Chapter 3.2, Table 3.2-3
Xylenes	1.95E-04	-	3.81E-03	1.67E-02	1.14E-02	5.01E-02	AP-42, Chapter 3.2, Table 3.2-3
Other HAPs[4]	2.10E-04	-	4.10E-03	1.79E-02	1.23E-02	5.38E-02	AP-42, Chapter 3.2, Table 3.2-3
Total HAPs	1.19E-02		0.24	1.04	0.71	3.13	

Notes:

1. Manufacturer specifications.

2. Calculated values.

3. Estimated heating value of the fuel gas.

4. Other HAPs include those HAPs listed in AP-42 below the detection thresholds.

Air Quality Impact Analysis

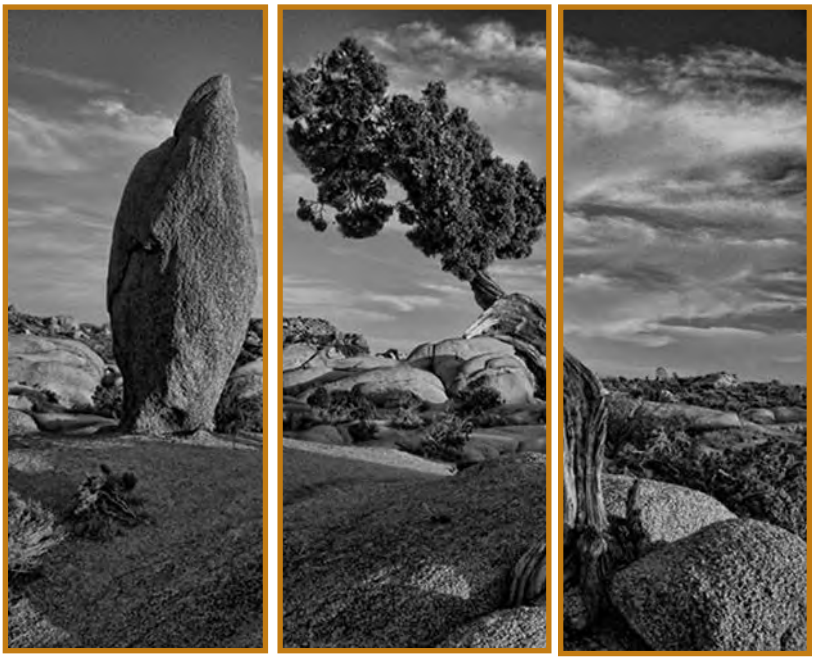
Pinyon Environmental, Inc.
Corporate Headquarters
3222 South Vance Street, Suite 200, Lakewood, CO 80227
T: 303.980.5200 F: 303.980.0089
www.pinyon-env.com

April 29, 2022

Air Quality Impact Analysis

Crusoe Energy Systems Inc.
Charging Eagle 21-25 Pad
Dunn County, North Dakota

Pinyon Project No.:
1/19-1347-01



1. Current Environment

Crusoe Energy Systems Inc. has prepared a true minor source air permit application for a maximum of three (3) Waukesha 9394 GSI generators to be located on the Fort Berthold Indian Reservation (FBIR) at the RimRock Oil & Gas (RimRock) Charging Eagle 21-25 Pad (the Facility) in Dunn County, North Dakota. The purpose of the generators is to take gas from the wells that would otherwise be flared to use as fuel in to power small data centers. Each generator is built with a non-selective catalyst reduction (NSCR) device. Since the engines will yield emissions of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) and these were determined to be pollutants of concern by the U.S. Environmental Protection Agency (EPA), modeling was performed to demonstrate compliance with the 1-hour and annual nitrogen dioxide (NO_2), 1-hour and 8-hour CO, 1-hour SO_2 as well as 24-hour and annual $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS).

1.1 National Ambient Air Quality Standards

The Clean Air Act of 1970 and its amendments led to the U.S. Environmental Protection Agency (EPA) establishing National Ambient Air Quality Standards (NAAQS) for criteria air pollutants: carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ground level ozone (O_3), particulate matter less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$), and particulate matter with a diameter less than 2.5 microns ($PM_{2.5}$). Multiple revisions to the NAAQS have occurred over time and the current NAAQS are provided in Table 1-1. There were previous standards for 24-hour SO_2 and annual SO_2 that are no longer in effect.

The generators are a contributor of NO_2, CO, $PM_{2.5}$, SO_2 and O_3 precursors, so only these criteria pollutants will be discussed in detail in subsequent sections. Currently all counties in North Dakota, including the Project location, are in attainment with NAAQS. Since ozone is a regional pollutant, it is not evaluated as part of the NAAQS screening process. Ozone and secondary $PM_{2.5}$ are discussed in the results section of this report through Modeled Emission Rates for Precursors (MERPs).

Table 1-1 National Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard	Form of Standard
Carbon Monoxide	8 hours	10,000 µg/m^3 (9 ppm)	Not to be exceeded more than once per year
	1 hour	40,000 µg/m^3 (35 ppm)	
Lead	Rolling three-month average	0.15 µg/m^3	Not to be exceeded
Nitrogen Dioxide	1 hour	188 µg/m^3 (100 ppb)	98th percentile of 1-hour daily maximum, averaged over 3 years
	Annual	100 µg/m^3 (53 ppb)	Annual mean
Ozone	8 hours	140 µg/m^3 (0.070 ppm)	Annual 4th highest 8-hour daily maximum, averaged over 3 years
Particulate Matter < 2.5µm ($PM_{2.5}$)	Annual (primary)	12 µg/m^3	Annual mean, averaged over 3 years

Pollutant	Averaging Time	Primary Standard	Form of Standard
	Annual (secondary)	15 µg/m^3	Annual mean, averaged over 3 years
	24 hours (primary and secondary)	35 µg/m^3	98th percentile, averaged over 3 years
Particulate Matter < 10µm (PM_{10})	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide	1 hour	75 ppb (196 ug/m^3)	99th percentile of 1-hour daily maximum, averaged over 3 years
	3 hour (secondary)	0.5 ppm (1,309 ug/m^3)	Not to be exceeded more than once per year

Source: EPA 2016
ppm parts per million
ppb parts per billion
µm microns
µg/m^3 micrograms per cubic meter

1.2 Background Concentrations

The facility is located within the Fort Berthold Indian Reservation in Dunn County, North Dakota. Upon review of EPA's AirData Air Quality Monitors database, the two nearest air quality monitors nearest to the Crusoe project area are Lake Ilo (38-025-0004) and 6493 First Street SW (38-057-0124). There are no nearby air quality monitoring data for CO, and therefore no CO values are included in the table below. The background values used in the cumulative analysis (discussed in Section 2), are an average of the Lake Ilo and First Street SW monitored values in the form of the standard (shown in Table 1-1) from 2018 to 2020 including exceptional events data, to be conservative (https://www.epa.gov/outdoor-air-quality-data/monitor-values-report). 2021 annual data is not finalized until May of 2022 and therefore was not included.

Table 1-2 Background Concentrations for Cumulative Analysis

Pollutant	Averaging Time	Lake Ilo			First Street SW			Background Concentration
		2018	2019	2020	2018	2019	2020	
NO_2	1 hour	12 ppb	17 ppb	10 ppb	15 ppb	16 ppb	18 ppb	14.7 ppb (27.6 µg/m^3)
	Annual	1.99 ppb	2.42 ppb	1.86 ppb	1.95 ppb	1.75 ppb	1.84 ppb	2.0 ppb (3.7 µg/m^3)
O_3	8 hours	59 ppb	63 ppb	54 ppb	NA	NA	NA	59 ppb
$PM_{2.5}$	24 hours	20 µg/m^3	11 µg/m^3	10 µg/m^3	NA	NA	NA	13.7 µg/m^3
	Annual	5.0 µg/m^3	4.1 µg/m^3	3.6 µg/m^3	NA	NA	NA	4.1 µg/m^3
SO_2	1 hour	7 ppb	6 ppb	5 ppb	51 ppb	20 ppb	24 ppb	18.8 ppb (49.3 µg/m^3)

2. Model Selection Justification and Settings

To demonstrate compliance with ambient air quality standards, the most recent version of the AERSCREEN air dispersion model (version no. 21112) was chosen to assess the potential air quality impacts of NO_2, CO, SO_2, and $PM_{2.5}$ from the Facility. AERSCREEN is the USEPA approved screening tool that analyzes one source and is based on AERMOD that produces worst-case 1-hour concentrations. AERSCREEN does not utilize hourly meteorological data but does use default meteorological data sets based on land type and average weather through the use of MAKEMET (version no. 21112).

Since this is a screening of the Facility's impacts conservative inputs were used as described in the following sections to demonstrate no exceedances of NAAQS are anticipated.

2.1 Terrain Options

AERSCREEN, as a screening tool, does not necessarily require location-specific or representative terrain data. Due to the relatively flat nature of the site, the terrain heights were not included with a source elevation of 0 meters in a rural setting. Because the majority of the land surrounding the Facility is not developed and has a low population density, rural dispersion was chosen. As described further in the AERMET processing, the surrounding location is considered grassland.

2.2 Meteorology

No onsite meteorological data were available for the Facility. AERSCREEN does not require any meteorological data and instead uses MAKEMET to generate basic meteorological parameters based on surface characteristics, wind speed, and temperature. Based on the site location, known data, and default parameters within AERSCREEN, the following was used for each of the AERSCREEN runs. Note that the worst-case meteorology wind speed, wind direction, and temperature were used making the modeling of emission sources conservative.

- Minimum Temperature: - 10 degrees Fahrenheit (default)
- Maximum Temperature: 100 degrees Fahrenheit (default)
- Minimum Wind Speed: 0.5 meters per second (default)
- Anemometer Height: 10 meters (default)
- AERMET seasonal tables: option 2
- Dominant Surface Profile: Grassland (6)
- Dominant Climate Profile: Average Moisture (1)
- Non-adjusted (default)

2.3 Receptors

Since AERSCREEN models only one source at a time, a receptor grid is generated by AERSCREEN based on the minimum distance to ambient air, set receptor spacing, and radius length of a receptor grid. Receptors were set as along and off of the fenceline to estimate worst-case impacts surrounding the source. Based on

known data and default parameters within AERSCREEN, the following was used for each of the AERSCREEN runs.

- Distance to Ambient Air: 1 meter (default)
- Maximum Distance to probe: 5,000 meters (default)
- Receptor spacing: 25 meters (default)
- Discrete receptors: none
- Flagpole receptors: none

2.4 Source Location

For a cumulative analysis, nearby sources not owned or operated by Crusoe are also modeled. Tables 2-1 and 2-2 list each modeled source under Crusoe ownership and operatorship and each modeled source under RimRock ownership and operatorship. The nearby RimRock sources include those that will be included in the RimRock Charging Eagle 21-25 FIP registration application. The modeled distances to ambient air were assumed to be 1 meter (3.3 feet). Each of the sources is more than 1 meter from ambient air making this assumption conservative. Figure 1 provides a graphic representation of the sources and ambient air boundaries.

Table 2-1 Modeled Crusoe Sources

Source	Description
Generators (ENG01 through ENG03)	Three (3) 2,500 horsepower Waukesha 9394GSI generators[1]

1 Stack parameters across ENG01 through ENG03 are identical, so the units are modeled as a merged stack.

Table 2-2 Modeled RimRock Sources

Source	Description
Rimrock Heater Treaters	Three (3) 0.5 MMBtu/hr heater treaters[1]
RimRock Tank Flare	One (1) flare for control of storage tank emissions
RimRock Gas Flare	One (1) flare for control of stranded gas
RimRock Microturbines	Seven (7) 333 kW microturbines[1]
RimRock Compressor	One (1) 400 horsepower Caterpillar G3408 compressor engine

1 Stack parameters across the heater treaters and turbines are identical, so each of the grouped units are modeled as a merged stack.

Two approaches to determining cumulative model results against the NAAQS were taken: (1) assume that all of the sources originate at the same central point where dispersion plumes overlap completely and (2) evaluate the maximum 1st high through 8th high results (see Section 2.5) of each individual source additively regardless of location (i.e., one sources' maximum 1st high at 200 meters added to another sources' maximum 1st high at

1 meter). Both approaches are conservative in that they do not account for realistic conditions such as the space between sources and gaps that would occur between individual source dispersion plumes.

2.5 Standards

Based on how AERSCREEN operates, and the NAAQS shown in Table 1-1, the form of the standard is not considered in the model output. Instead, the maximum potential 1-hour concentration is modeled and, if applicable, persistence factors are applied to the maximum 1-hour result for longer averaging times. Based on AERSCREEN guidance, the maximum 1-hour result is multiplied by 1 for 3-hour standards, multiplied by 0.9 for 8-hour standards, multiplied by 0.6 for 24-hour standards, and multiplied by 0.1 for annual standards. The results summary in the OUT file for AERSCREEN applies these persistence factors when presenting the scaled longer average time period results.

Because the form of the standard for 1-hour NO_2 and 24-hour $PM_{2.5}$ are both 98th percentile, or the highest 8th high, and averaged over 3 years, utilizing the maximum 1-hour value result to determine concerns with the NAAQS is a conservative approach. Similarly, the form of the standard for 1-hour SO_2 is the 99th percentile or the highest 4th high, and averaged over 3 years resulting in the maximum 1-hour value result to determine concerns with the NAAQS is a conservative approach. The form of the standard for the 1-hour and 8-hour CO NAAQS is not to be exceeded more than once per year, or the highest 2nd high. Therefore, comparing the highest 1st high to the NAAQS is also conservative. As discussed further in the results sections, the 2nd through 8th maximum values of the 1-hour NO_2 and 24-hour $PM_{2.5}$ cumulative model results and the 2nd through 4th maximum values of the 1-hour SO_2 cumulative model results are tabulated to demonstrate the model results more accurately in the form of the standard.

3. Emission Sources and Modeled Emission Rates

Detailed emission calculations for the three (3) Crusoe generator engines are provided in the permit application. A summary of the modeled emission rates for the proposed Crusoe sources are summarized in Tables 3-1 and 3-2. Since the generators have identical stack parameters and emissions rates, a merged stack was modeled assuming all emissions from one stack. For the cumulative analysis, nearby sources not owned or operated by Crusoe are also modeled. The modeled emissions rates for the RimRock sources that have the potential to emit the same pollutants are summarized in Tables 3-3 and 3-4. Note, CO and SO_2 emissions from RimRock sources are not included in Table 3-4 as a cumulative analysis was not required (see Sections 4 and 6).

To estimate NO_2 concentrations, the ozone limiting method (OLM) was used in AERSCREEN (Option 2). With OLM, the background ozone concentration from Table 1-2 was used in conjunction with in-stack ratios for each emission unit type (e.g., reciprocating engine, turbine, heater, flare, etc.). The in-stack ratios were retrieved from the most recent version of the EPA NO_2 In-Stack Ratio (ISR) database released in October of 2020. Non-zero values were not included when determining the average ISR used in the AERSCREEN model. The ISR are included in Tables 3-1 through 3-4 below. The "No Chemistry" option was used for all CO, SO_2, and $PM_{2.5}$ model runs.

Table 3-1 NO_2 Modeled Emission Rates of Crusoe Sources

Source	NOx Emissions (lb/hr)	Emission Unit Classification	NO_2/NOx In-Stack Ratio
Generators (ENG01 – ENG03)	2.48	Reciprocating IC engine	0.17

Table 3-2 CO, SO_2, and $PM_{2.5}$ Modeled Emission Rates of Crusoe Sources

Source	CO Emissions (lb/hr)	SO_2 Emissions (lb/hr)	$PM_{2.5}$ Emissions (lb/hr)
Generators (ENG01 – ENG03)	4.96	0.24	1.14

Table 3-3 NO_2 Modeled Emission Rates of RimRock Sources

Source	NOx Emissions (lb/hr)	Emission Unit Classification	NO_2/NOx In-Stack Ratio
Heater Treaters	0.17	Boiler/Heater	0.1
Tank Flare	0.42	Flare	0.5
Gas Flare	0.59	Flare	0.5
Microturbines	0.86	Turbine – natural gas	0.14
Compressor	0.88	Reciprocating IC engine	0.17

Table 3-4 $PM_{2.5}$ Modeled Emission Rates of RimRock Sources

Source	$PM_{2.5}$ Emissions (lb/hr)
Heater Treaters	0.014
Tank Flare	--
Gas Flare	--
Microturbines	0.16
Compressor	0.061

[1] There are no potential $PM_{2.5}$ emissions from the RimRock Tank Flare and Gas Flare

3.1 Source Parameters

The modeled stack parameters are summarized in Tables 3-5 and 3-6. All stack flows and temperatures were determined from manufacturer specifications of the specific make/model equipment or default values, where appropriate. These parameters will be installed and operational upon Crusoe's installation and operation of their equipment.

Table 3-5 Stack Parameters for Crusoe Sources

Source	Source Type	Stack Height (ft)	Stack Diameter (in)	Stack Flow Rate (acfm)	Stack Temp (°F)
Generators (ENG01 – ENG03)	Point	25	13	10,544	1,084

Table 3-6. Stack Parameters for RimRock Sources

Source	Source Type	Stack Height (ft)	Stack Diameter (in)	Stack Flow Rate (acfm)	Stack Temp (°F)	Heat Release Rate (cal/s)
Heater Treaters	Point	23	24	3,770[2]	1,100	NA
Tank Flare	Flare	14	See footnote 1	See footnote 1	See footnote 1	276,417.1 (3.95 MMBtu/hr)
Gas Flare	Flare	11	See footnote 1	See footnote 1	See footnote 1	458,362.5 (6.55 MMBtu/hr)
Microturbines	Point	13	12	3,990	507	NA
Compressor	Point	14	8	1,613	931	NA

[1] Flare heat release rates determined from reported waste gas flow rates and heating values in FIP registration. Flare default parameters of 20 m/s effective exhaust velocity, 0.55 heat loss fraction, and 1273 K for effective exit temperature were used.

[2] Exhaust flow for heater based on similar sources (20 feet per second).

3.2 Building Downwash and Fumigation

Per EPA guidance, building downwash and fumigation were not included in the AERSCREEN runs.

4. CO AERSCREEN Modeling Results

CO was modeled only for the Crusoe sources to first determine if a cumulative analysis is required. Should a new source by itself demonstrate modeled impacts below the pollutant's significant impact level (SIL), then a cumulative analysis is not required. CO's 1-hour SIL is 2,000 µg/m^3 and 8-hour SIL is 500 µg/m^3 (40 CFR Part 51.165 (b)(2)). Below are the 1-hour and 8-hour model results of Crusoe's generators.

Table 4-1 AERSCREEN Model Results of 1st high 1-hour CO

Source	1st High 1-hour CO	Distance (meters)
Crusoe Generators	55.16	96

Table 4-2 AERSCREEN Model Results of 1st high 8-hour CO

Source	1st High 8-hour CO	Distance (meters)
Crusoe Generators	49.64	96

Since both highest 1st high results of the Crusoe generators model below the SIL for the respective averaging times, the Charging Eagle 21-25 project is not expected to cause or contribute to a violation of the NAAQS and no further analysis is required.

5. NO_2 AERSCREEN Model Results

NO_2 was modeled for each source to determine the maximum 1-hour result using the OLM method for NOx to NO_2 conversion in AERSCREEN. The results of the AERSCREEN models of each individual source are in Table 5-1 for 1st high through 8th high 1-hour NO_2 regardless of impact location, Table 5-2 for the 1-hour NO_2 model results assuming the same origin point, Table 5-4 for maximum annual NO_2, and Table 5-5 for the annual NO_2 model results assuming the same origin point. As described in Section 2.5, a persistence factor of 0.1 was applied to 1-hour results to determine annual impacts.

Table 5-1 AERSCREEN Model Results of 1st high through 8th high 1-Hour NO_2

Source	1st High 1-hour NO_2	2nd High 1-hour NO_2	3rd High 1-hour NO_2	4th High 1-hour NO_2	5th High 1-hour NO_2	6th High 1-hour NO_2	7th High 1-hour NO_2	8th High 1-hour NO_2
RimRock Heaters	3.85	3.56	3.56	3.09	2.68	2.49	2.20	1.91
RimRock Tank Flare	8.51	8.17	7.49	7.07	5.97	5.52	5.02	4.43
RimRock Gas Flare	11.32	11.25	10.70	9.07	7.73	7.18	6.59	5.86
RimRock Microturbines	41.07	40.88	33.70	32.10	28.02	22.51	20.64	18.95
RimRock Compressor	48.55	47.62	38.26	30.67	30.54	27.33	24.58	21.76
Crusoe Generators	24.82	24.73	23.34	22.14	20.01	17.72	15.91	15.38
Background	27.60	27.60	27.60	27.60	27.60	27.60	27.60	27.60
Total	165.7	163.8	144.65	131.74	122.6	110.4	102.5	95.9

Table 5-2 AERSCREEN Model Results of Maximum 1-Hour NO_2 from Same Origin Point

Source	1 m from Source	25 m from Source	50 m from Source	75 m from Source	100 m from Source	125 m from Source	150 m from Source	175 m from Source
RimRock Heaters	0.05	0.66	3.56	3.56	3.09	2.68	2.49	2.20
RimRock Tank Flare	0.15	1.26	7.49	8.17	7.07	5.97	5.52	5.02
RimRock Gas Flare	0.23	1.70	11.25	10.70	9.07	7.73	7.18	6.59
RimRock Microturbines	0.51	33.70	40.88	32.10	28.02	22.51	20.64	18.95
RimRock Compressor	0.49	30.67	47.62	38.26	30.54	27.33	24.58	21.76

Source	1 m from Source	25 m from Source	50 m from Source	75 m from Source	100 m from Source	125 m from Source	150 m from Source	175 m from Source
Crusoe Generators	0.68	3.55	15.91	23.34	24.73	22.14	20.01	17.72
Background	27.60	27.60	27.60	27.60	27.60	27.60	27.60	27.60
Total	29.71	99.14	154.3	143.7	130.1	116.0	108.0	99.84

The distance from each source to its maximum impact is tabulated below. These distances are referenced from the AERSCREEN out files.

Table 5-3 Distance to Maximum Impact

Source	Distance to Maximum Impact (meters)
RimRock Heaters	60
RimRock Tank Flare	64
RimRock Gas Flare	47
RimRock Microturbines	48
RimRock Compressor	45
Crusoe Generators	96

The rankings of the 1st through 8th high (98th percentile) can be found in the model summary tables included with the modeling files included with this report. As depicted in the tables above and the model results, the maximum impact for each source occurs beyond the minimum assumed distance to ambient air (1 meter). In Table 5-1, with the inclusion of background 1-hour NO_2 value, no 1-hour NO_2 values show potential exceedances of the NAAQS. It is important to note that the results in Table 5-1 do not account for location of the 1st high through 8th high and therefore adding them together is conservative as it does not account for the locations of the sources. The 8th highest impact value from each of the sources added together plus background, again regardless of location, demonstrates a value of 95.89 µg/m^3 which is below the NAAQS standard of 188 µg/m^3. Assuming all of the sources originate from the same point and have plumes completely overlapping one another, shows a maximum 1-hour value plus background of 154.3 µg/m^3 at a distance of 50 meters from the source in Table 5-2 which is also below the NAAQS standard of 188 µg/m^3. The individual source AERSCREEN model runs and analyses are submitted with this report.

Table 5-4 AERSCREEN Model Results of 1st high Annual NO_2

Source	1st High Annual NO_2
RimRock Heaters	0.39
RimRock Tank Flare	0.85
RimRock Gas Flare	1.13
RimRock Microturbines	4.11

Source	1st High Annual NO_2
RimRock Compressor	4.86
Crusoe Generators	2.48
Background	3.70
Total	17.51

Table 5-5 AERSCREEN Model Results of Maximum Annual NO_2 from Same Origin Point

Source	1 m from Source	25 m from Source	50 m from Source	75 m from Source	100 m from Source	125 m from Source	150 m from Source	175 m from Source
RimRock Heaters	0.005	0.07	0.36	0.36	0.31	0.27	0.25	0.22
RimRock Tank Flare	0.02	0.13	0.75	0.82	0.71	0.60	0.55	0.50
RimRock Gas Flare	0.02	0.17	1.13	1.07	0.91	0.77	0.72	0.66
RimRock Microturbines	0.05	3.37	4.09	3.21	12.80	2.25	2.06	1.90
RimRock Compressor	0.05	3.07	4.76	3.83	3.05	2.73	2.46	2.18
Crusoe Generators	0.07	0.36	1.59	2.33	2.47	2.21	2.00	1.78
Background	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Total	3.91	10.85	16.37	15.31	13.95	12.54	11.74	10.92

As depicted in the tables above and the model results, the maximum impact for each individual source occurs beyond the minimum assumed distance to ambient air (1 meter). In Table 5-4, with the inclusion of background annual NO_2 value, the cumulative 1st high annual NO_2 value of 17.51 µg/m^3 is below the NAAQS standard of 100 µg/m^3. Assuming all of the sources originate from the same point and have plumes completely overlapping one another, shows a maximum annual value plus background of 16.37 µg/m^3 at a distance of 50 meters from the source in Table 5-5 which is also below the NAAQS standard of 100 µg/m^3. The individual source AERSCREEN model runs and analyses are submitted with this report.

Based on the results in Section 5, possible scenarios where the cumulative impacts between Crusoe sources and RimRock sources result in maximum 1-hour NO_2 impacts less than the NAAQS threshold of 188 µg/m^3 and maximum annual NO_2 impacts less than the NAAQS threshold of 100 µg/m^3. Therefore, there are no NO_2 NAAQS concerns from this Project.

6. SO_2 AERSCREEN Model Results

SO_2 was modeled only for the Crusoe sources to first determine if a cumulative analysis is required. Should a new source by itself demonstrate modeled impacts below the pollutant's SIL, then a cumulative analysis is not required. SO_2's 1-hour SIL is 3 ppb (7.8 µg/m^3) as reasoned in the August 23, 2010 EPA memorandum "Guidance Concerning the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program". Below is the 1-hour model result of Crusoe's generators.

Table 6-1 AERSCREEN Model Results of 1st high 1-hour SO_2

Source	1st High 1-hour SO_2	Distance (meters)
Crusoe Generators	2.67	96

Since the highest 1st high result of the Crusoe generators model is below the SIL, the Charging Eagle 21-25 project is not expected to cause or contribute to a violation of the NAAQS and no further analysis is required.

7. $PM_{2.5}$ AERSCREEN Model Results

$PM_{2.5}$ was modeled for each source to determine the maximum 24-hour result in AERSCREEN. The results of the AERSCREEN models of each individual source are in Table 7-1 for 1st high through 8th high 24-hour $PM_{2.5}$ regardless of impact location, Table 7-2 for the 24-hour $PM_{2.5}$ model results assuming the same origin point, Table 7-4 for maximum annual $PM_{2.5}$, and Table 7-5 for the annual $PM_{2.5}$ model results assuming the same origin point. As described in Section 2.5, a persistence factor of 0.6 was applied to the 1-hour result to determine 24-hour impacts and a persistence factor of 0.1 was applied to the 1-hour results to determine annual impacts.

Table 7-1 AERSCREEN Model Results of 1st high through 8th high 24-Hour $PM_{2.5}$

Source	1st High 24-hour $PM_{2.5}$	2nd High 24-hour $PM_{2.5}$	3rd High 24-hour $PM_{2.5}$	4th High 24-hour $PM_{2.5}$	5th High 24-hour $PM_{2.5}$	6th High 24-hour $PM_{2.5}$	7th High 24-hour $PM_{2.5}$	8th High 24-hour $PM_{2.5}$
RimRock Heaters	0.21	0.20	0.20	0.17	0.15	0.14	0.12	0.10
RimRock Microturbines	5.09	5.07	4.18	3.98	3.47	2.79	2.56	2.35
RimRock Compressor	2.24	2.20	1.77	1.42	1.41	1.26	1.14	1.01
Crusoe Generators	7.60	7.58	7.15	6.79	6.13	5.43	4.87	4.71
Background	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
Total	28.84	28.75	27.00	26.06	24.86	23.32	22.39	21.87

Table 7-2 AERSCREEN Model Results of Maximum 24-hour $PM_{2.5}$ from Same Origin Point

Source	1 m from Source	25 m from Source	50 m from Source	75 m from Source	100 m from Source	125 m from Source	150 m from Source	175 m from Source
RimRock Heaters	0.002	0.04	0.20	0.20	0.17	0.15	0.14	0.12
RimRock Microturbines	0.06	4.18	5.07	3.98	3.47	2.79	2.56	2.35
RimRock Compressor	0.02	1.41	2.20	1.77	1.41	1.26	1.14	1.01
Crusoe Generators	0.21	1.09	4.87	7.15	7.58	6.79	6.13	5.43
Background	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
Total	13.99	20.42	26.04	26.80	26.33	24.69	23.67	22.61

The distance from each source to its maximum impact is tabulated below. These distances are referenced from the AERSCREEN out files.

Table 7-3 Distance to Maximum Impact

Source	Distance to Maximum Impact (meters)
RimRock Heaters	60
RimRock Microturbines	48
RimRock Compressor	45
Crusoe Generators	96

The rankings of the 1st through 8th high (98th percentile) can be found in the model summary tables included with the modeling files included with this report. As depicted in the tables above and the model results, the maximum impact for each source occurs beyond the minimum assumed distance to ambient air (1 meter). In Table 7-1, with the inclusion of background 24-hour $PM_{2.5}$ value, the 1st high through 8th high 24-hour $PM_{2.5}$ values show a cumulative impact below the NAAQS of 35 µg/m^3. It is important to note that the results in Table 7-1 do not account for location of the 1st high through 8th high and therefore adding them together is conservative as it does not account for the locations of the sources. Assuming all of the sources originate from the same point and have plumes completely overlapping one another, shows a maximum 24-hour value plus background of 26.80 µg/m^3 at a distance of 75 meters from the source in Table 7-2 which is also below the NAAQS standard of 35 µg/m^3. The individual source AERSCREEN model runs and analyses are submitted with this report.

Table 7-4 AERSCREEN Model Results of 1st high Annual $PM_{2.5}$

Source	1st High Annual $PM_{2.5}$
RimRock Heaters	0.04
RimRock Microturbines	0.85
RimRock Compressor	0.37
Crusoe Generators	1.27
Background	4.1
Total	6.6

Table 7-5 AERSCREEN Model Results of Maximum Annual $PM_{2.5}$ from Same Origin Point

Source	1 m from Source	25 m from Source	50 m from Source	75 m from Source	100 m from Source	125 m from Source	150 m from Source	175 m from Source
RimRock Heaters	0.0003	0.007	0.03	0.03	0.03	0.03	0.02	0.02
RimRock Microturbines	0.01	0.70	0.85	0.66	0.58	0.47	0.43	0.39
RimRock Compressor	0.003	0.24	0.37	0.30	0.24	0.21	0.19	0.17

Source	1 m from Source	25 m from Source	50 m from Source	75 m from Source	100 m from Source	125 m from Source	150 m from Source	175 m from Source
Crusoe Generators	0.04	0.18	0.81	1.19	1.26	1.13	1.02	0.91
Background	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Total	4.1	5.2	6.2	6.3	6.2	5.9	5.8	5.6

As depicted in the tables above and the model results, the maximum impact for each individual source occurs beyond the minimum assumed distance to ambient air (1 meter). In Table 7-4, with the inclusion of background annual $PM_{2.5}$ value, the cumulative 1st high annual $PM_{2.5}$ value of 6.6 µg/m^3 is below the NAAQS standard of 12 µg/m^3. Assuming all of the sources originate from the same point and have plumes completely overlapping one another, shows a maximum annual value plus background of 6.3 µg/m^3 at a distance of 75 meters from the source in Table 7-5 which is also below the NAAQS standard of 12 µg/m^3. The individual source AERSCREEN model runs and analyses are submitted with this report.

Based on the results in Section 7, possible scenarios where the cumulative impacts between Crusoe sources and RimRock sources result in maximum 24-hour $PM_{2.5}$ impacts less than the NAAQS threshold of 35 µg/m^3 and maximum annual $PM_{2.5}$ impacts less than the NAAQS threshold of 12 µg/m^3. Therefore, there are no $PM_{2.5}$ NAAQS concerns from this Project.

8. Ozone

Ozone is a regionally significant pollutant that is formed by chemical reactions in the atmosphere from the precursors of NOx and VOC. This Project is located in an area that is in attainment with the current ozone NAAQS and not in concern of exceeding the NAAQS. Additionally, the operation of the Crusoe Charging Eagle 21-25 units would lower NOx and VOC emissions compared to the business-as-usual case (i.e., flaring of gas).

Per recent April 2019 guidance, EPA released procedures for a Tier 1 demonstration for ozone and $PM_{2.5}$ under the PSD program called MERPs. This guidance has also been known to be used for minor sources as well, such as Crusoe's Charging Eagle 21-25 Project. The MERP guidance provides otherwise photochemically modeled impacts for secondary pollutants such as ozone and secondary $PM_{2.5}$ based on emissions rates to determine whether a project may have negative impacts on these pollutants. The following analysis was completed for the Crusoe Charging Eagle 21-25 Project based on the Tier 1 demonstration guidelines in Section 4.1.1.

The Project is not located in an area with complex terrain, proximity to very large NOx or VOC sources, or unusual meteorology. Based on the location in North Dakota, the results from the lowest 8-hour O_3 from NOx and lowest 8-hour O_3 from VOC of the Rockies/Plains can be used:

8-hour O_3 from NOx: 184 ton/yr

8-hour O_3 from VOC: 1,067 ton/yr

The Project has estimated emissions of the same pollutants of the following:

NOx: 10.86 ton/yr

VOC: 0.72 ton/yr

The MERP calculation is as follows:

(10.86 ton/yr NOx from Project / 184 ton/yr NOx 8-hr daily maximum O_3 MERP) + (0.72 ton/yr VOC from Project / 1,067 ton/yr VOC 8-hr daily maximum O_3 MERP) = 0.0984+ 0.001 = **0.060 = 6%**

A value less than 100% indicates that the O_3 SIL would not be exceeded when considering the combined impacts of the precursors. Therefore, the Crusoe Charging Eagle 21-25 Project is not expected to exceed the 8-hour O_3 SIL.

8.1 Secondary $PM_{2.5}$

Secondary $PM_{2.5}$ is also a regionally significant pollutant that is formed by chemical reactions in the atmosphere from the precursors of a combination of SO_2, NOx, VOCs, and ammonia. This Project is located in an area that is in attainment with the current secondary $PM_{2.5}$ NAAQS and not in concern of exceeding the NAAQS. Additionally, the operation of Crusoe Charging Eagle 21-25 units would lower NOx and VOC emissions compared to the business-as-usual case (i.e., flaring of gas) and has minimal SO_2 emissions due to being fueled by sweet gas (i.e., low hydrogen sulfide content) and no ammonia content.

Per recent April 2019 guidance, EPA released procedures for a Tier 1 demonstration for ozone and $PM_{2.5}$ under the PSD program called MERPs. This guidance has also been known to be used for minor sources as well, such as Crusoe's Charging Eagle 21-25 Pad Project. The MERP guidance provides otherwise photochemically modeled impacts for secondary pollutants such as ozone and secondary $PM_{2.5}$ based on emissions rates to

determine whether a project may have negative impacts on these pollutants. The follow analysis was completed for the Crusoe Charging Eagle 21-25 Project based on the Tier 1 demonstration guidelines in Section 4.1.1.

The Project is not located in an area with complex terrain, proximity to very large NOx, SO_2, or VOC sources, or unusual meteorology. Based on the location in North Dakota, the results from the lowest 8-hour O_3 from NOx and lowest 8-hour O_3 from VOC of the Rockies/Plains can be used:

Daily $PM_{2.5}$ from NOx: 1,740 ton/yr

Daily $PM_{2.5}$ from SO_2: 251 ton/yr

The Project has estimated emissions of the same pollutants of the following:

NOx: 10.86 ton/yr

SO_2: 1.04 ton/yr

Because there are direct daily and annual $PM_{2.5}$ impacts from the Crusoe Charging Eagle 21-25 Project, and those direct daily and annual $PM_{2.5}$ impacts were modeled higher than the SIL, a cumulative analysis is required. The hypothetical representative source used in the MERP guidance for cumulative analyses with direct $PM_{2.5}$ impacts was used based on location (Rockies region and elevated source). Conservatively, the 1st high daily $PM_{2.5}$ modeled concentration was used for the annual $PM_{2.5}$ analysis, though it is likely impacts are lower.

Daily

Source nitrate = 10.86 ton/yr x (0.047 µg/m^3 / 1,000 ton/yr) = 0.00051 µg/m^3

Source sulfate = 1.04 ton/yr x (0.094 µg/m^3 / 500 ton/yr) = 0.00020 µg/m^3

Crusoe Charging Eagle 21-25 Pad cumulative maximum direct daily $PM_{2.5}$ = 15.1 µg/m^3

Background daily $PM_{2.5}$ = 13.7 µg/m^3

Source nitrate + source sulfate + Crusoe Charging Eagle 21-25 Pad maximum direct daily $PM_{2.5}$ + Background daily $PM_{2.5}$ = 0.00051 + 0.00020 + 15.1 + 13.7 = **28.8 µg/m^3**

Annual

Source nitrate = 10.86 ton/yr x (0.047 µg/m^3 / 1,000 ton/yr) = 0.00051 µg/m^3

Source sulfate = 1.04 ton/yr x (0.094 µg/m^3 / 500 ton/yr) = 0.00020 µg/m^3

Crusoe Charging Eagle 21-25 Pad cumulative maximum direct annual $PM_{2.5}$ = 2.5 µg/m^3

Background annual $PM_{2.5}$ = 4.1 µg/m^3

Source nitrate + source sulfate + Crusoe Charging Eagle 21-25 maximum direct annual $PM_{2.5}$ + Background annual $PM_{2.5}$ = 0.00051 + 0.00020 + 2.5 + 4.1 = **6.6 µg/m^3**

The sum total of the four inputs above yields an estimate secondary $PM_{2.5}$ daily maximum impact less than the NAAQS value of 35 µg/m^3 and secondary $PM_{2.5}$ annual maximum impact less than the NAAQS value of 15 µg/m^3. Therefore, the Crusoe Charging Eagle 21-25 Pad Project is not expected to exceed the 24-hour nor annual secondary $PM_{2.5}$ NAAQS.

9. Conclusion

The modeling exercise for the Project was conducted with AERSCREEN to estimate conservative potential cumulative impacts of the Charging Eagle 21-25 Pad location. The results of the conservative AERSCREEN modeling show that the potential impacts of the project are not of concern due to maximum 1-hour, 8-hour, 24-hour, and annual results being less than the NAAQS thresholds. Additionally, since the sources are being utilized to reduce the amount of gas flaring compared to the business-as-usual operation for the site, operation of Crusoe's engines result in a lower-emissions scenario.

10. References

Environmental Protection Agency (EPA), 2010. "Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program". Available at: https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20100823_page_1-hr_so2_naaqs_psd_program.pdf .August 23, 2010.

Environmental Protection Agency (EPA), 2016. "NAAQS Table." Available at: https://www.epa.gov/criteria-air-pollutants/naaqs-table last updated February 10, 2021.

Environmental Protection Agency (EPA), 2020. "Nitrogen Dioxide/Nitrogen Oxide In-Stack Ratio (ISR) Database". Available at: https://www.epa.gov/scram/nitrogen-dioxidenitrogen-oxide-stack-ratio-isr-database last updated October 29, 2020.

Environmental Protection Agency (EPA), 2021. "EPA-454/B-21-005: AERSCREEN User's Guide." April 2021. Available at: https://gaftp.epa.gov/Air/aqmg/SCRAM/models/screening/aerscreen/aerscreen_userguide.pdf

Regulatory Discussion

Subject: Evaluation of Threatened and Endangered Species and Historic Properties for New or Modified Oil and Natural Gas Minor Sources in Indian Country Complying with the Oil and Natural Gas Minor Source Federal Implementation Plan

Background

Crusoe Energy plans to place equipment on the Charging Eagle 21-25 Pad at location 47.52800, -102.34527 in Dunn County, North Dakota in the fall of 2022. The equipment will be placed on the RimRock production pad area. The proposed equipment are located within Section 25, T147N, R92W. Total disturbance will be 5 acres.

Crusoe Energy is using for this analysis the existing RimRock Environmental Assessment (EA) Charging Eagle 21-25 Well Pad Expansion submitted to the United States Bureau of Indian Affairs (Attachment B). The document includes NEPA documentation previously completed by Whiting for the same location, which is required for Bureau of Indian Affairs (BIA)'s compliance with the requirements of the National Environmental Policy Act (NEPA). The attached analysis also includes notice that the Bureau of Indian Affairs (BIA) issued a Finding of No Significant Impact (FONSI) based on the study completed, meaning they agreed with the surveys and conclusions presented.

§49.104 Requirements Regarding Threatened or Endangered Species and Historic Properties

Screening procedures completed by the owner/operator: The owner/operator shall submit to the EPA Regional Office (and to the relevant tribe for the area where the source is located/locating) documentation demonstrating that it has completed the required screening procedures specified for consideration of threatened or endangered species and historic properties and receive written confirmation from the EPA stating that the owner/operator has satisfactorily completed these procedures. The completed screening procedures documentation may be submitted together with the source's required §49.160(c)(1)(iv) Part 1 Registration Form.

Threatened or Endangered Species

Threatened or endangered species as a result of the pad's construction, modification or operation of the new or modified minor source of air pollutants fall under *Criterion B* (EPA, 2015). Federally listed threatened or endangered species or their designated critical habitat(s) are likely to occur within the action area of the source, but the construction and operation of the new minor source is not likely to adversely affect listed threatened or endangered species or critical habitat. The identified threatened or endangered species potentially impacted by this Project include the Northern Long-eared Bat, Piping Plover, Red Knot, Whopping Crane, and Dakota Skipper.

Each of these threatened or endangered species were reviewed and discussed in the EA approved by the BIA with a FONSI. The full EA and FONSI determination are included in Appendix B.

The *Evaluation of Threatened and Endangered Species and Historic Properties for New or Modified Oil and Natural Gas Minor Sources in Indian Country Complying with the Oil and Natural Gas Minor Sources Federal Implementation Plan, Appendix A, Criterion B* (EPA, 2015) requires documenting the following:

- Identify any federally listed species and/or designated critical habitat located with the action area of your source.

    - The Information for Planning and Consultation (IPAC) website through the US Fish and Wildlife Service was utilized to do a screening search of potential threatened and endangered species near the project area. The following are listed in the screening analysis: Northern Long-eared Bat, Piping Plover, Red Knot, Whooping Crane, and Dakota Skipper (see Appendix C).

      The EA details concurrence of the project having no effected on the listed species. The new equipment proposed by Crusoe Energy will not expand any existing disturbance, so additional migratory bird surveys should not be necessary.

      Please note, the impacted area for this project is a much smaller and nested within area within the survey area and analysis referenced above and completed by RimRock and Whiting. The Crusoe Energy proposed equipment will not expand any existing disturbance.

- The distance between your site and the listed species or designated critical habitat (in miles).

    - Zero miles from site for Dakota Skipper and Northern Long Eared Bat habitat.

- Any other information necessary (e.g. a detailed map of the action area and supporting justification) to show that the construction/modification and operation of your new or modified source are not likely to cause any adverse effects to the listed threatened or endangered species or their critical habit.

    - See Appendix B for full scale of RimRock project area within Appendix B and area maps within the True Minor Source application for nested Crusoe facility location within WPX's fenceline.

  The new equipment proposed by Crusoe Energy will not expand any existing disturbance from the production pad. Additionally, air emissions from the production facility are expected to be lower as a result of the Crusoe Energy equipment reducing the current need to flare produced gas. For details and results of the survey references here, please see Attachment C for screening tool results for endangered species, and Attachment B containing survey details and RimRock field result maps for endangered species results and BIA approval of FONSI.

Historic Properties

The effects to historic properties as a result of the construction, modification or operation of the new or modified minor source of air pollutant fall under the following criteria: *"No historic properties affected"* (EPA, 2015).

In summary, a Class III Cultural Resource Inventory was conducted in September 2014 by Juniper for Whiting. No cultural resources were identified. As a result of the field site and no identification of cultural resources, THPO agreed that no cultural resources would be impacted by the project. Since Crusoe's nested facility is within the survey area conducted as part of the analysis in Appendix B, no cultural resources are expected to be impacted by Crusoe.

Environmental Justice

EJSCREEN, a tool created by the US EPA, evaluates potential environmental justice issues for a project. The results of the EJSCREEN screening for a 1-mile radius from the Crusoe project area. The population within a 1-mile radius of the Crusoe project area is fairly low. The EJSCREEN report shows the value of the specific project area and compares that to the state, EPA region, and USA levels. The Crusoe project is expected to be environmentally beneficial as it will reduce flaring of produced gas and air emissions from the production facility are expected to be lower as a result of the Crusoe Energy equipment.

Conclusion and Requests

Pinyon, on behalf of Crusoe Energy, requests review of this submittal be conducted by the EPA Region 8 Office in accordance with the procedure in paragraphs (a)(2)(i) and (ii) of §49.104 (Requirements Regarding Threatened or Endangered Species and Historic Properties) within 30 days of receipt by written notification to Pinyon or Crusoe Energy.

References

EPA, 2015. "Procedures to Address Threatened and Endangered Species and Historic Properties for New or Modified True Minor Oil and Natural Gas Sources in Indian Country Complying with the Oil and Natural Gas Minor Source Federal Implementation Plan". United States Environmental Protection Agency Oil and Natural Gas Minor Source Federal Implementation Plan in Indian Country. United States Environmental Protection Agency. August 13, 2015.

Appendix A – Evaluation Signature Form

Evaluation of Threatened and Endangered Species and Historic Properties for New or Modified Oil and Natural Gas Minor Sources in Indian Country Complying with the Oil and Natural Gas Minor Source Federal Implementation Plan

Section 1: Contact Information

Business Name: Crusoe Energy Systems Inc.	Site Address: 47.528, -102.34527
Send all correspondence regarding this evaluation to (mailing address): Ken Parker 1641 California Street Suite 400 Denver, CO 80202	Contact for this notification: Name: Ken Parker Phone: 720-495-3656 Email: ken@crusoeenergy.com

Section 2: Evaluation of Threatened and Endangered Species and Historic Properties

1. Threatened or Endangered Species

Please indicate under which criterion in Appendix A you satisfy after evaluating the effects on threatened or endangered species as a result of your construction, modification or operation of your new or modified minor source of air pollutants. Be sure to include all documentation identified in Appendix A with this evaluation.

☐ A ☒ B ☐ C ☐ D ☐ E

2. Historic Properties

Please indicate under which criterion in Appendix B you satisfy after evaluating the effects to historic properties as a result of your construction, modification or operation of your new or modified minor source of air pollutants? Be sure to include all documentation identified in Appendix B with this evaluation.

☒ No historic properties affected ☐ No adverse effects ☐ Adverse effects

Section 3: Signature

Name: Ken Parker (Signature) Name: Ken Parker (Print or Type)

Title: Vice President, Facilities Engineering and Operations Date: April 28, 2022

Appendix B – Environmental Assessment Documents

Notice of Availability

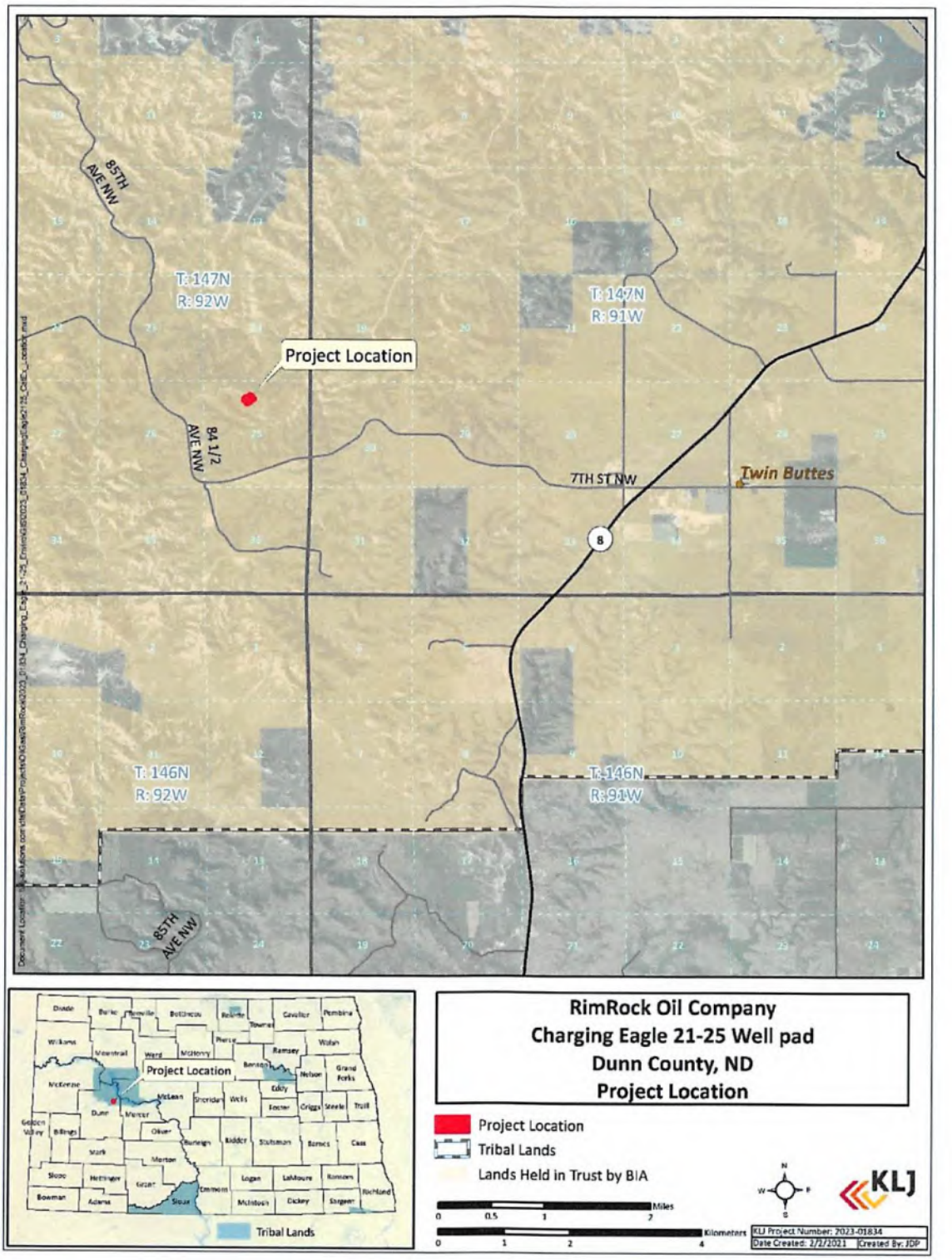
Charging Eagle 21-25 Well Pad Expansion

The Bureau of Indian Affairs (BIA) is planning to issue administrative approvals related to the RimRock Charging Eagle 21-25 Well Pad Expansion. Construction is expected to begin in 2021.

An environmental assessment (EA) determined that proposed activities will not cause significant impacts to the human environment. An environmental impact statement is not required. Contact the Agency Superintendent at 701-627-6570 for more information and/or copies of the EA and the Finding of No Significant Impact (FONSI).

The FONSI is only a finding on environmental impacts – it is not a decision to proceed with an action and *cannot* be appealed.

Location Map



Finding of No Significant Impact

RimRock Oil and Gas
Charging Eagle 21-25 Well Pad Expansion

Addendum to:
Whiting Oil and Gas Corp. December 2015, Environmental Assessment for Drilling of Two Multiple Well Pads, Charging Eagle 14-22 and Charging Eagle 3-25 Well Pads (Seven Oil and Gas Well)
(FONSI December 21, 2015)
Fort Berthold Indian Reservation, Dunn County, North Dakota

The U.S. Bureau of Indian Affairs (BIA) has received a proposal for an addendum to the above referenced Environmental Assessment (EA). The action includes acquisition of additional right-of-way to rectify an existing trespass due to the Charging Eagle 21-25 well pad being constructed larger than originally approved. The project is located in Section 25, Township 147 North, Range 92 West, 5th P.M, Dunn County, North Dakota, on the Fort Berthold Indian Reservation. Associated federal actions by the BIA include determinations of impacts and effects regarding environmental resources for developments on tribal lands.

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

This determination is based on the following factors:

1. Agency and public involvement solicited for the preceding NEPA document was sufficient to ascertain potential environmental concerns associated with the currently proposed project.
2. Protective and prudent measures were designed to minimize impacts to air, water, soil, vegetation, wetlands, wildlife, public safety, water resources, and cultural resources. The remaining potential for impacts was disclosed for both the proposed actions and the No Action alternative.
3. Guidance from the U.S. Fish and Wildlife Service has been fully considered regarding wildlife impacts, particularly in regard to threatened or endangered species. This guidance includes the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", and the Endangered Species Act (16 U.S.C. 1531 et seq.)(ESA).
4. The proposed actions are designed to avoid adverse effects to historic, archaeological, cultural and traditional properties, sites and practices. Compliance with the procedures of the National Historic Preservation Act is complete.
5. Environmental justice was fully considered.
6. Cumulative effects to the environment are either mitigated or minimal.
7. No regulatory requirements have been waived or require compensatory mitigation measures.
8. The proposed projects will improve the socio-economic condition of the affected Native American community.

TIMOTHY LAPOINTE — Digitally signed by TIMOTHY LAPOINTE Date: 2021.03.04 12:10:38 -06'00'

Regional Director

3-4-2021

Date

United States Department of the Interior

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

DEC 2 1 2015

IN REPLY REFER TO:
DESCRM
MC-208

MEMORANDUM

TO: Superintendent, Fort Berthold Agency

FROM: Acting Regional Director, Great Plains Region Danielle J. Daugherty

SUBJECT: Environmental Assessment and Finding of No Significant Impact

In compliance with the regulations of the National Environmental Policy Act (NEPA) of 1969, as amended, an Environmental Assessment (EA) has been completed and a Finding of No Significant Impact (FONSI) has been issued. The EA authorizes administrative approvals the drilling of seven oil and gas wells from the Charging Eagle 14-22 and Charging Eagle 3-25 well pads, located on the Fort Berthold Indian Reservation.

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

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

Attachment

cc: Mark Fox, Chairman, Three Affiliated Tribes (with attachment)
Elgin Crows Breast, Tribal Historic Preservation Officer (with attachment)
Daniel Velder, BLM, Bureau of Land Management (with attachment)
Eric Wortman, EPA (with attachment)
Steve Czeczok, KLJ (with attachment)
Carson Hood/Fred Fox, MHA Energy Dept. (with attachment)
Jonathon Shelman, Corps of Engineers (e-mail)
Jeff Hunt, Office of Indian Energy (e-mail)

Finding of No Significant Impact

Whiting Oil and Gas Corp. (Whiting)

Environmental Assessment for
Drilling of Two Multiple Well Pads, Charging Eagle 14-22 and Charging Eagle 3-25 Well Pads (Seven Oil & Gas Wells)

Fort Berthold Indian Reservation
Dunn County, North Dakota

The U.S. Bureau of Indian Affairs (BIA) has received a proposal to drill seven oil and gas wells located atop two well pads as follows:

- Charging Eagle 14-22-10-12H3, Charging Eagle 14-22-10-12H, and Charging Eagle 14-22-10-12H3A (Charging Eagle 14-22 Site) located in Section 22, T147N, R92W, 5th P.M.

- Charging Eagle 3-25-13-3H3, Charging Eagle 3-25-13-2H3, Charging Eagle 3-25-13-2H3 and Charging Eagle 3-25-13-1H3 (Charging Eagle 3-25 Site) located in Section 25, T147N, R92W, 5th P.M.

Associated federal actions by BIA include determinations of effect regarding environmental resources and positive recommendations to the Bureau of Land Management regarding the Applications for Permit to Drill.

The potential of the proposed action to impact the human environment is analyzed in the following Environmental Assessment (EA), as required by the National Environmental Policy Act. Based on the EA, I have determined that the proposed project will not significantly affect the quality of the human or natural environment. No Environmental Impact Statement is required for any portion of the proposed activities.

This determination is based on the following factors:

1. Agency and public involvement solicited for the preceding NEPA document was sufficient to ascertain potential environmental concerns associated with the currently proposed project.

2. Protective and prudent measures were designed to minimize impacts to air, water, soil, vegetation, wetlands, wildlife, public safety, water resources, and cultural resources. The remaining potential for impacts was disclosed for both the proposed action and the No Action alternatives.

3. Guidance from the U.S. Fish and Wildlife Service has been fully considered regarding wildlife impacts, particularly in regard to threatened or endangered species. This guidance includes the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) (MBTA), the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.) (NEPA), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250) (BGEPA), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", and the Endangered Species Act (16 U.S.C. 1531 et seq.) (ESA).

4. The proposed action is designed to avoid adverse effects to historic, archaeological, cultural and traditional properties, pads and practices. Compliance with the procedures of the National Historic Preservation Act is complete.

5. Environmental justice was fully considered.

6. Cumulative effects to the environment are either mitigated or minimal.

7. No regulatory requirements have been waived or require compensatory mitigation measures.

8. The proposed project will improve the socio-economic condition of the affected Indian community.

Darla J. Daugherty — 12-21-15

Acting Regional Director — Date

Notice of Availability

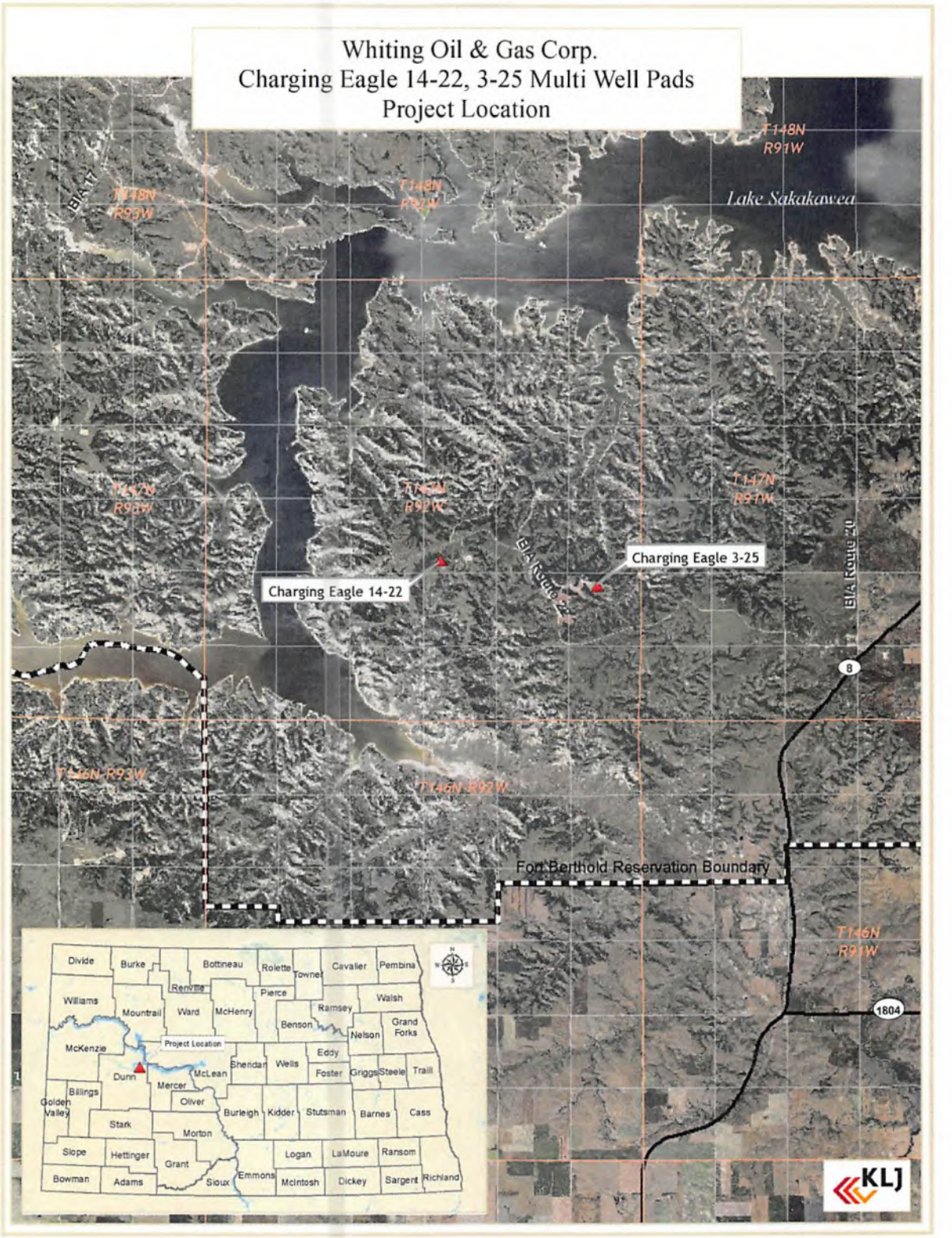
Whiting Oil and Gas Corp.: Drilling of Eleven Oil & Gas Wells on the Tipi V Well Pad & Development of Production Facility Pad 15-13X

The Bureau of Indian Affairs (BIA) is planning to issue administrative approvals related to the Drilling of Two Multiple Well Pads, Charging Eagle 14-22 and Charging Eagle 3-25 Well Pads (Seven Oil & Gas Wells), located on the Berthold Reservation as shown on the attached map. Construction by Whiting Oil is expected to begin in 2016.

An environmental assessment (EA) determined that proposed activities will not cause significant impacts to the human environment. An environmental impact statement is not required. Contact the Agency Superintendent at 701-627-6570 for more information and/or copies of the EA and the Finding of No Significant Impact (FONSI).

The FONSI is only a finding on environmental impacts – it is not a decision to proceed with an action and *cannot* be appealed.

Project locations.



ENVIRONMENTAL ASSESSMENT

United States Bureau of Indian Affairs

Great Plains Regional Office
Aberdeen, South Dakota

Whiting Oil and Gas Corp.

Drilling of Two Multiple Well Pads, Charging Eagle 14-22 and Charging Eagle 3-25 Well Pads
(Seven Oil & Gas Wells)

Fort Berthold Indian Reservation

December 2015

For information contact:

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

ENVIRONMENTAL ASSESSMENT

Addendum

United States Bureau of Indian Affairs

Great Plains Regional Office
Aberdeen, South Dakota

RimRock Oil and Gas

Charging Eagle 21-25 Well Pad Expansion

Addendum to:
Whiting Oil and Gas Corp. December 2015, Environmental Assessment for Drilling of Two Multiple Well Pads, Charging Eagle 14-22 and Charging Eagle 3-25 Well Pads (Seven Oil and Gas Well) (FONSI December 21,2015)

Fort Berthold Indian Reservation

March 2021

For information contact:

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

CONTENTS

FIGURES & TABLE

APPENDIX

I. PURPOSE AND NEED FOR THE PROPOSED ACTION

The RimRock Oil and Gas (RimRock) Charging Eagle 21-25 well pad (formerly Charging Eagle 3-25) was built larger than the area previously approved by the Bureau of Indian Affairs (BIA); therefore, the proposed action requires an after-the-fact authorization for disturbances which occurred outside of the previously approved area.

The purpose of the proposed action is to allow the Three Affiliated Tribes to provide for oil and gas development on the identified land on the Fort Berthold Reservation, while still avoiding environmentally sensitive habitats.

II. AUTHORITIES

Oil and gas exploration and development activities are conducted under authority of the Indian Mineral Leasing Act of 1938 (25 United States Code [USC] 396a, et seq.), the Indian Mineral Development Act of 1982 (25 USC 2101, et seq.), and the Energy Policy Act of 2005 (42 USC 15801, et seq.).

III. LEGAL LAND DESCRIPTION OF PROPOSED ACTION

The proposed action occurs in Dunn County, North Dakota, in the NE¼ of the NW¼ of Section 25, Township 147 North, Range 92 West, 5th P.M. Please refer to ***Figure 1, Project Location Map***.

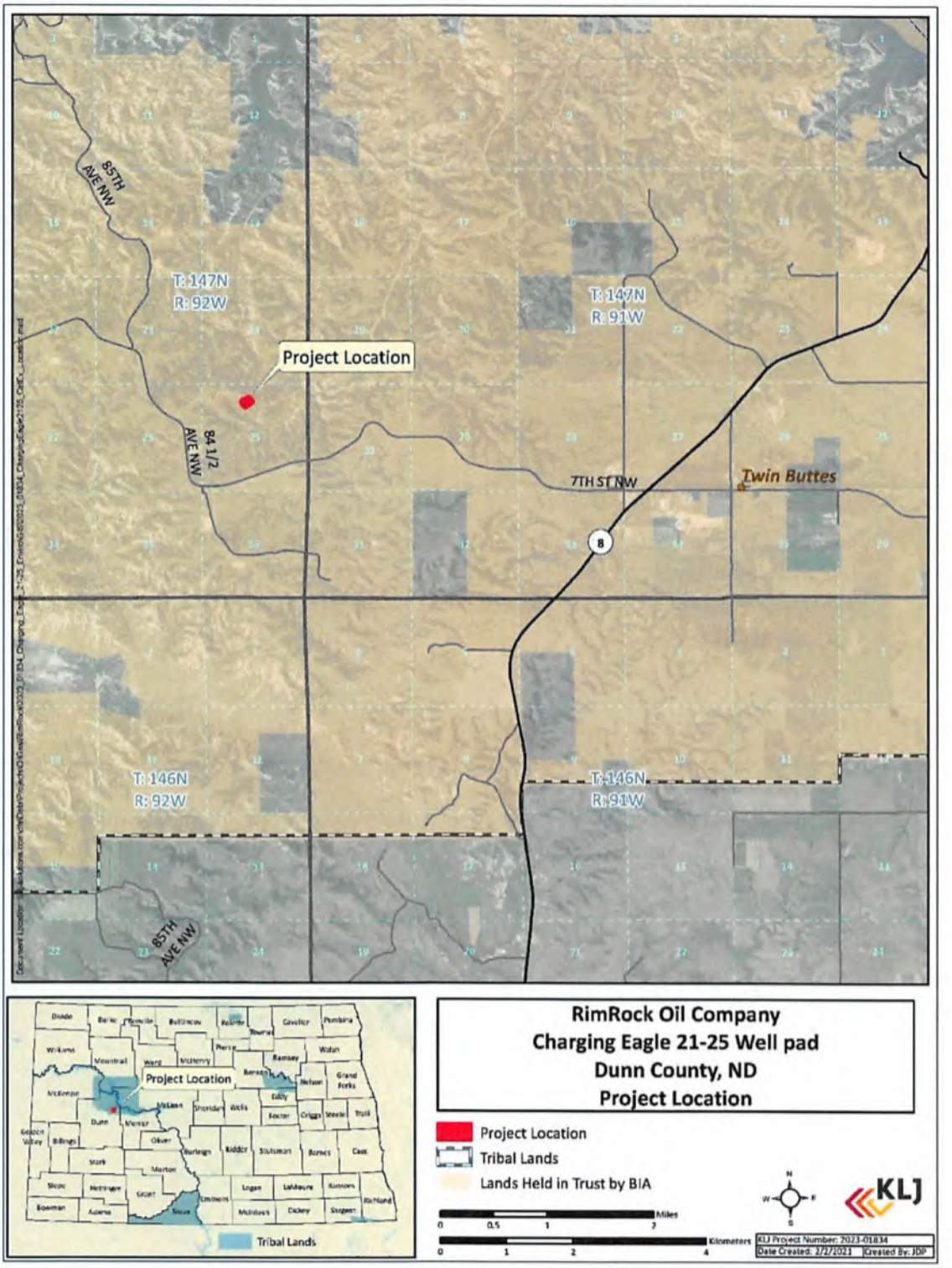


Figure 1, Project Location Map

IV. SCOPE OF WORK FOR PROPOSED ACTION

The Charging Eagle 21-25 well pad and fenced area was built larger than what was previously approved by the BIA due to the topsoil pile being placed in a different location, the pad being slightly shifted and the cattle guard being placed further from the well pad than originally approved. Therefore, the proposed action requires an after-the-fact authorization for disturbances which occurred outside of the previously approved area. The December 2015 Environmental Assessment (EA) approved 6.06 acres for construction of the well pad and 7.71 acres for the fenced location. A grant of ROW for 7.86 acres was issued on February 16, 2017 by BIA for the well pad. The constructed well pad is 8.24 acres with a fenced area of 8.33 acres; 0.62 acres exceeds the amount identified in the previously approved EA. Therefore, a 0.62 acre after-the-fact authorization (fenced area) is required for the additional area disturbed during construction. Please refer to ***Figure 2, Project Overview Map***, for an overview of the well pad layout. The previously approved wells were renamed from Charging Eagle 3-25 nomenclature to Charging Eagle 2-25 through the Bureau of Land Management Sundry Process by the former owner (Whiting Oil and Gas) of the well pad. One well has been drilled and three have yet to be drilled.

The previously approved wells' spacing units, where minerals would be extracted are described in ***Table 1, Spacing Units***. Please refer to ***Figure 3, Spacing Unit Map***, for an overview of the well bore spacing and spacing unit layout. The well name changes are also identified in ***Table 1***.

The existing well pad was built large enough to accommodate the previously approved wells without requiring additional surface disturbance (upon approval of expanded disturbance). Drilling of the previously approved wells would occur entirely within the limits of the existing pad disturbance.

Table 1, Spacing Units

	Previous Well Name	Current Well Name	Status	Spacing Unit	Spacing Unit Acres
Previously Approved Wells	Charging Eagle 3-25-13-4H3	Charging Eagle 21-25TFH	Previously Approved, Not Drilled	Section 13 and 24, T147N, R92W	1,280
	Charging Eagle 3-25-13-3H3	Charging Eagle 21-25H	Previously Approved, Not Drilled	Section 13 and 24, T147N, R92W	1,280
	Charging Eagle 3-25-13-2H3	Charging Eagle 21-25-2TFH	Previously Approved, Drilled	Section 13 and 24, T147N, R92W	1,280
	Charging Eagle 3-25-13-4H3	Charging Eagle 21-25-2H	Previously Approved, Not Drilled	Section 13 and 24, T147N, R92W	1,280

*Note: the location and orientation of the previously approved wells has been modified from the original 2015 Environmental Assessment; however, the wells still occur in the same general area on the well pad surface.

Figure 2, Project Overview

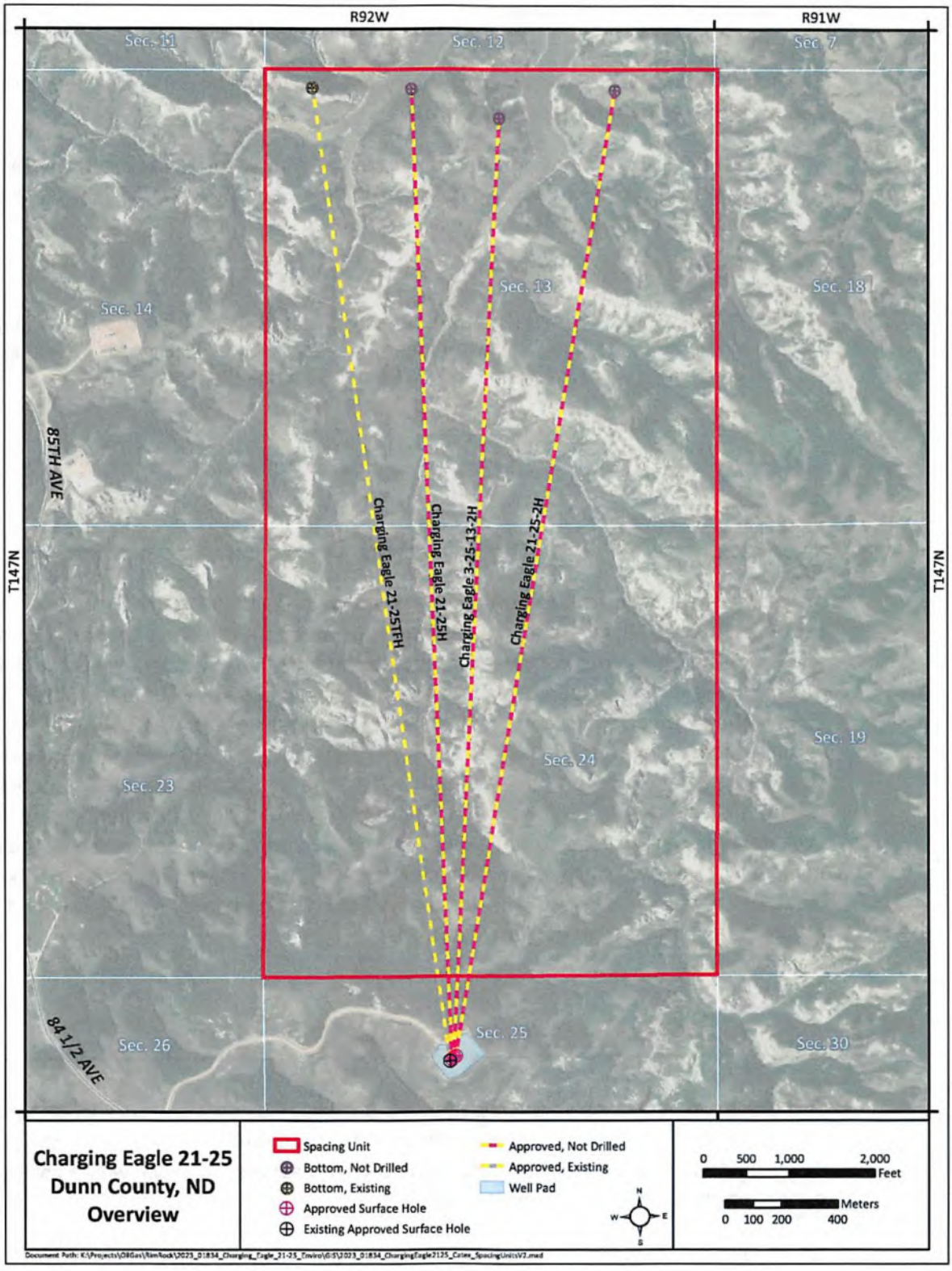


Figure 3 Spacing Unit Map

V. APPLICABLE NEPA DOCUMENTS

The following National Environmental Policy Act (NEPA) documents have been previously approved by the BIA for the proposed project:

- Whiting Oil and Gas Corp. December 2015, Environmental Assessment for Drilling of Two Multiple Well Pads, Charging Eagle 14-22 and Charging Eagle 3-25 Well Pads (Seven Oil and Gas Well)
  - FONSI December 21, 2015
- Programmatic Environmental Assessment (PEA): Bureau of Indian Affairs, May 2017, Mitigated Programmatic Environmental Assessment for Oil and Gas Development on Trust Lands and Minerals on the Fort Berthold Indian Reservation
  - FONSI June 9, 2017

VI. ONSITE MEETINGS

An environmental on-site assessment occurred as part of the original project siting on September 10, 2014. At that time, the BIA Environmental Protection Specialist, Kodiak Oil and Gas (original lease holder), Mandan, Hidatsa, Arikara (MHA) Energy, Juniper Archaeology (Juniper) and KLJ participated in the assessment. Representatives from the Tribal Historic Preservation Office (THPO) were invited but did not participate. The BIA and MHA Energy recommended minor design changes for the Charging Eagle 21-25 well pad location during this September 10th onsite (Charging Eagle 3-25 at the time of the onsite). The location was revisited during the Right-of-Way Onsite with the BLM and the adjustments were deemed acceptable in regards to location, along with the minimization measures Kodiak planned to implement, were positioned to minimize impacts to sensitive wildlife and botanical resources. Note: when the 2015 EA for the well pad was prepared, Whiting Oil and Gas had acquired the project from Kodiak Oil and Gas.

VII. ASSESSMENT OF ENVIRONMENTAL IMPACTS

Environmental impacts were addressed in the December 2015 EA and additional cumulative impacts were addressed in the PEA. Impacts are discussed in the below section if the Proposed Action has changed the original impact assessment. RimRock would adhere to all mitigation measures identified in the 2015 EA.

A. Land Use

Construction of the existing Charging Eagle 21-25 well pad and fenced area disturbed approximately 0.62 acres more than originally approved in the December 2015 EA. The

proposed action converted an additional 0.62 acres of hay land to oil and gas development. Surface disturbance increased by approximately eight percent above the original 7.71 acres of disturbance to the current 8.24 acres. Environmental impacts to land use are expected to be similar type to those identified in the original EA with the magnitude of impacts increasing marginally.

The existing well pad is large enough to accommodate the previously approved wells without requiring additional surface disturbance (upon approval of expanded disturbance).

B. Soils

The current project disturbance area, including the 0.62 additional fenced acres, was included within the original EA soil survey area. A February 2021 review of information available online through the Natural Resource Conservation Service (NRCS) Web Soil Survey found the same soil map units or soil map units similar in characteristics to the soil map units identified in the 2015 EA. The soil map units identified are: Vebar-Cohagen fine sandy loams and Lefor fine sandy loam. Environmental impacts to soil are expected to be similar in intensity and magnitude to the original EA. RimRock would adhere to all mitigation measures identified in the 2015 EA. Please refer to **Figure 4, Soil Map Units** for Charging Eagle 21-25.

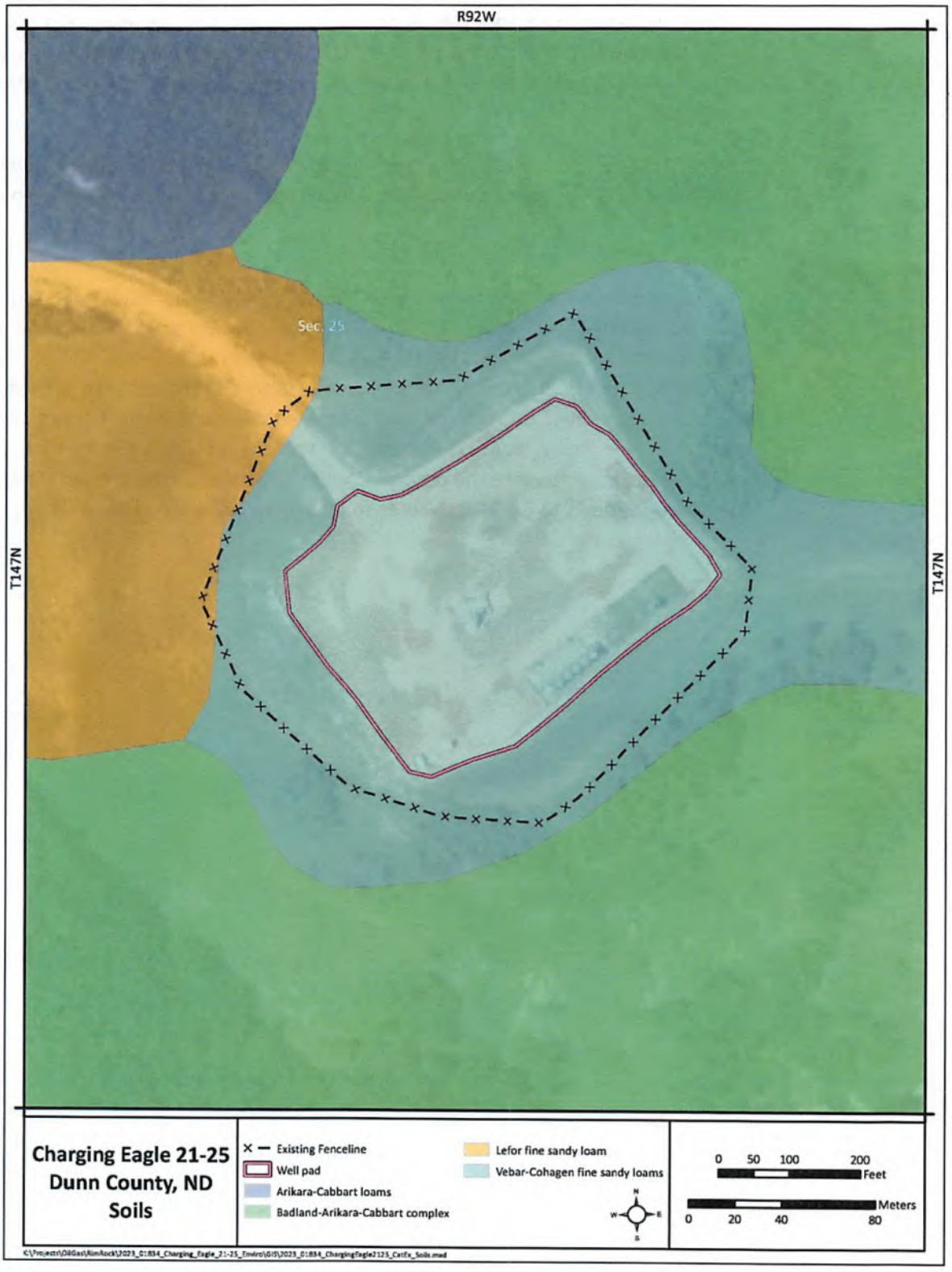


Figure 4 Soil Map Units

C. Ground Water

The proposed action identifies the spacing units as Sections 13 and 24, T147N, R92W. The latest driller log file was downloaded from the North Dakota State Water Commission on February 2, 2021. There are no water wells located in Sections 13 or 24.

D. Air Quality

Air impacts for the exploration and development of oil and gas on the Fort Berthold Reservation were analyzed in the BIA's, May 2017, Mitigated Programmatic Environmental Assessment for Oil and Gas Development on Trust Lands and Minerals on the Fort Berthold Indian Reservation (PEA). The analysis conducted for the PEA identified no significant effects to air quality. The PEA identified and analyzed potential environmental effects of anticipated continuation of oil and natural gas exploration and development on the Fort Berthold Indian Reservation during the period 2016 through 2021. This project would adhere to the commitments in the PEA and the BIA Conditions of Approval included in ***Appendix B***.

E. Endangered, Threatened, Proposed and Candidate Species

At the time the Charging Eagle 21-25 well pad was originally approved, the Endangered Species Act (ESA) provided protection for the interior least tern (endangered; E), whooping crane (E), black-footed ferret (E), pallid sturgeon (E), gray wolf (E), Dakota skipper (threatened; T), rufa red knot (T), northern long eared bat (T), piping plover (T), and designated piping plover critical habitat in Dunn County, North Dakota. In addition, the Sprague's pipit was listed as candidate species. The ESA considers candidate species as having significant value and worth protection; however, no legal requirement existed at that time protecting these species.

In May 2014, the BIA released a Programmatic Biological Assessment Biological Evaluation (BA/BE) that analyzed the anticipated oil and gas development on the Reservation through 2019 and the effects it would have on listed species. The BA/BE received USFWS concurrence in a letter dated June 4, 2014 for determinations that the proposed action "may affect, is not likely to adversely affect," the interior least tern, whooping crane, pallid sturgeon, and piping plover, and would not adversely modify or destroy designated critical habitat for the piping plover. In October 2015, the BIA released a Revised Addendum to the BA/BE. The Revised Addendum addressed species that had been recently added to the list of threatened and endangered species receiving protection under the ESA, including the Dakota skipper, northern long-eared bat, and rufa red knot. Based on this information, the BIA had determined that the proposed action would have "no effect" on the gray wolf, rufa red knot, black-footed ferret, or northern long-eared bat. The USFWS is not required to concur with "no effect" determinations and the responsibility of these determinations remains with the BIA.

The USFWS provided concurrence that the proposed action "may affect, is not likely to adversely affect," the Dakota skipper on December 3, 2015. This concurrence applies only if

the BIA's required Conditions of Approval included in ***Appendix B, BIA Conditions of Approval***, are adhered during construction and operation of a proposed project.

Intensive pedestrian resource surveys of the Charging Eagle 21-25 well pad and access road were conducted on July 22, 2014 as part of the Whiting Oil and Gas December 2015 EA for the Charging Eagle 21-25 well. A study area of more than 20 acres centered on the well pad center point and a 250-foot wide access road corridor were evaluated, which included the 0.62 acres of additional disturbance.

The Charging Eagle 21-25 well pad and access road study area consisted of a planted agricultural hayfield with wooded areas adjacent to the field. Dominant vegetation along the access road consisted of alfalfa (Medicago sativa) and quaking aspen (Populus tremuloides). The well pad consisted primarily of alfalfa (Medicago sativa), smooth brome (Bromus inermus), heath aster (Aster ericoides), yellow sweetclover (Melilotus officinalis), yellow coneflower (Ratibida columnifera) and Maximilian sunflower (*Helianthus maximiliani*). Results of the field botany survey conducted on July 22, 2014 indicated an absence of Dakota skipper preferred forb and nectar species throughout the study area for the well pad, as well as a dominance of planted agricultural species; therefore no impacts to the Dakota skipper were expected to have occurred as a result of the well pad construction.

Wooded draws were observed near the project area. These areas may have provided potential roosting habitat for the NLEB; however, these areas were avoided by well pad construction. In addition, no wetland areas acting as potential rufa red knot habitat were observed.

F. Cultural Resources

A cultural resource inventory of this development project was conducted by personnel of Juniper using an intensive pedestrian methodology (AAO-3253/FB/2014). Approximately 42 acres were inventoried on August 27 and September 10, 2014 by (Maceyko: 2014). No historic properties were located that appeared to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.6) for inclusion on the National Register. As the lead federal agency, and as provided for in 36 CFR 800.5, BIA reached a determination of no historic properties affected for this undertaking based on the findings and recommendation of the Principal Investigator. This determination was communicated to the THPO on January 14, 2015; however, the THPO did not respond within the allotted 30-day comment period.

VIII. PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS AND CUMULATIVE IMPACTS

Cumulative impacts for the exploration and development of oil and gas on the Fort Berthold Reservation were addressed in the BIA's, May 2017, Mitigated PEA for Oil and Gas Development on Trust Lands and Minerals on the Fort Berthold Indian Reservation. The PEA

identified and analyzed potential environmental effects of anticipated continuation of oil and natural gas exploration and development on the Fort Berthold Indian Reservation during the period 2016 through 2021. This project would adhere to the commitments in the PEA where applicable.

IX. NEPA ADEQUACY CRITERIA

This document has identified two previously prepared NEPA documents. These NEPA documents adequately describe the environmental consequences of the newly proposed actions described herein, and meet the following NEPA Adequacy Criteria:

1. The proposed actions are substantially the same actions and at the sites specifically analyzed in the existing NEPA documents.
2. The range of alternatives is reasonable with respect to the current proposed actions in the existing NEPA documents, which appropriately consider and analyze current environmental concerns, interests, and resource values.
3. The existing analysis and conclusions are adequate in the existing NEPA documents. The analysis is still valid in light of new studies and/or resource assessment information.
4. The methodology and analytical approach used in the existing NEPA documents continue to be appropriate for the proposed action.
5. The direct and indirect impacts of the proposed actions are unchanged from those identified in the existing NEPA documents.
6. The cumulative impacts that would result from implementation of the proposed action are unchanged from those analyzed in the existing NEPA documents.
7. A 30-day comment period involving public input and interagency review was used in the development of the existing NEPA documents.

Appendix A

Well Pad Plats

WELL LOCATION PLAT

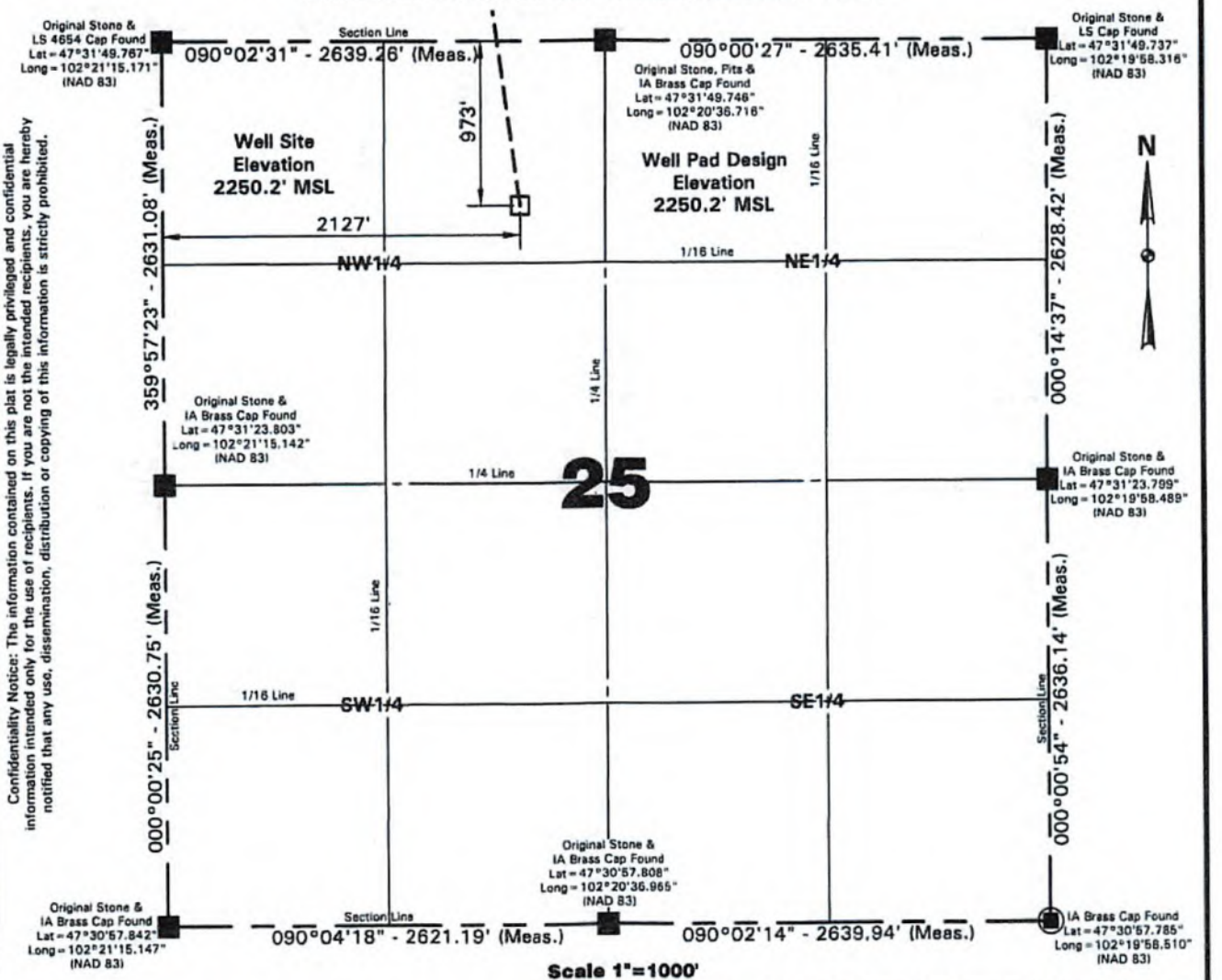
RimRock Oil & Gas

5445 DTC Parkway, Suite 1250, Greenwood Village, CO 80111

Charging Eagle 21-25TFH

973 feet from the north line and 2127 feet from the west line (surface location)
Section 25, T. 147 N., R. 92 W., 5th P.M.
225 feet from the north line and 575 feet from the west line (bottom location)
Section 13, T. 147 N., R. 92 W., 5th P.M.
Dunn County, North Dakota, Surface owner @ well site - 1811-A

NAD 83 Latitude 47°31'40.149"(47.5278193° DD) North; Longitude 102°20'44.172"(102.3456032° DD) West (surface location)
NAD 27 Latitude 47°31'40.123"(47.5278121° DD) North; Longitude 102°20'42.532"(102.3451477° DD) West (surface location)
NAD 83 Latitude 47°33'31.682"(47.5588006° DD) North; Longitude 102°21'06.946"(102.3519295° DD) West (bottom location)
NAD 27 Latitude 47°33'31.655"(47.5587931° DD) North; Longitude 102°21'05.305"(102.3514737° DD) West (bottom location)
[Derived from OPUS Solution NAD-83(CORS96) Converted to NAD-27]



Scale 1"=1000'

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

All corners described on this plat were found in the field as shown hereon. Distances to all others are calculated. The azimuths shown on this plat are grid, based upon **Geodetic North** derived from GPS measurements at the center of the project origin located at SW corner of Section 25. Latitude 47°30'57.842" North; Longitude 102°21'15.147" West. Azimuths represent the calculated value from the central meridian using the forward bearing. The well location shown hereon is not an as-built location.

I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

Nick Jensen — Surveyed By — **5/19/2014** — Date

Revision: 11/16/2020

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 11-18-20
NORTH DAKOTA

Vertical Control Datum Used
North American Vertical Datum 1988 (NAVD 88)
Based on elevation derived from OPUS Solution on GPS "Mosset (iron rebar) Located a distance of 4760.64' on an azimuth of 309°45'04" from the NW corner of Section 25 T.147N., R.92W., 5th P.M. being at 2329.65' Elevation MSL.
Project No. 1807_01928
Book OW-324A Pg. 54-61 Staking

Professional Consulting Engineers and Surveyors
Registered in
North Dakota, South Dakota
Montana, Wyoming & Minnesota
Bus. Phone No. 701-483-1284

677 27th Ave. E.
Dickinson, North Dakota 58601
Certificate of Authorization #C-061

RIMROCK OIL & GAS
KLJ

Nov 18, 2020 - 1:58 PM - K:\Projects\OilGas\RimRock\1807_01928.1\CADD\1807_01928BAS01.dwg

HORIZONTAL SECTION PLAT

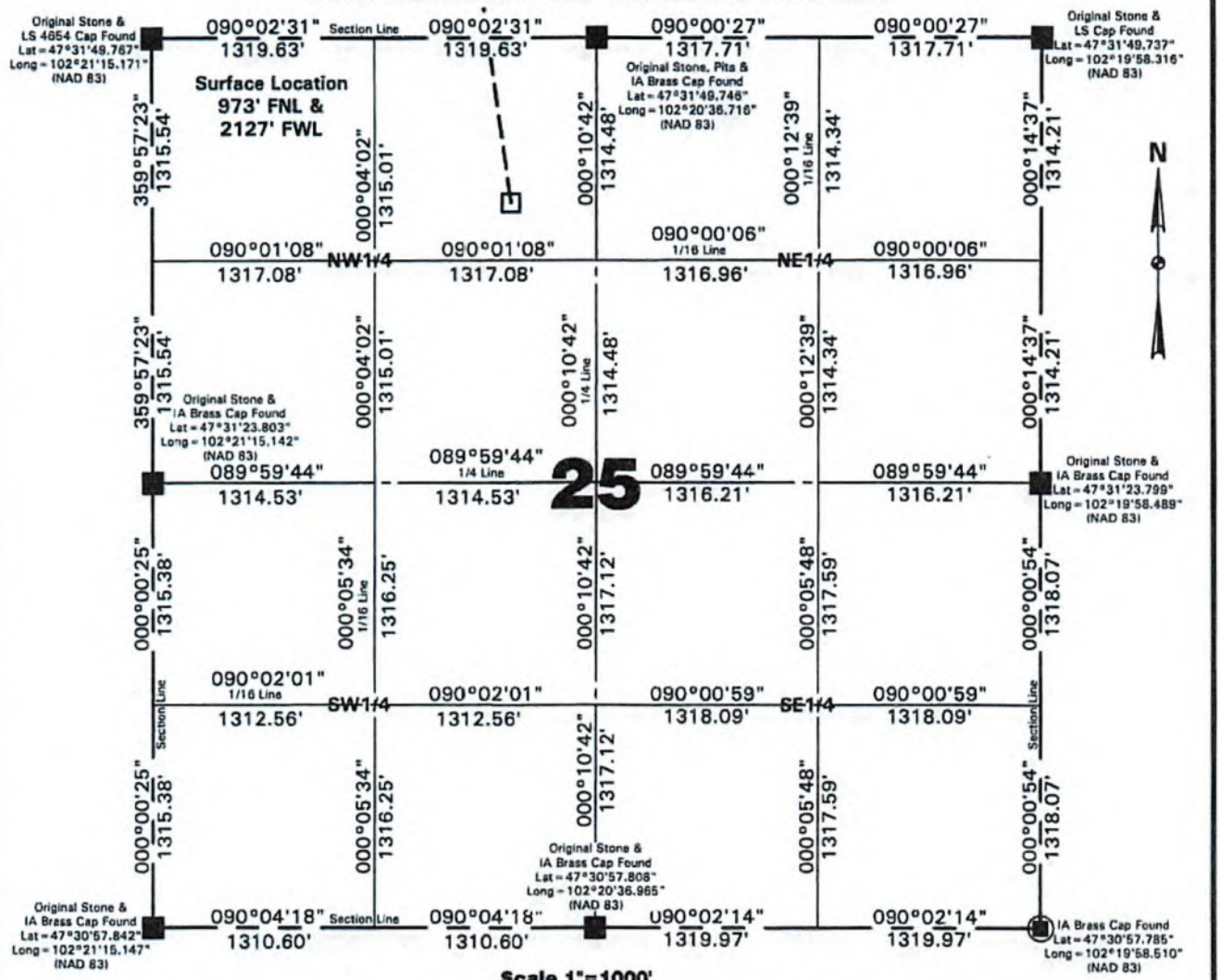
RimRock Oil & Gas

5445 DTC Parkway, Suite 1250, Greenwood Village, CO 80111

Charging Eagle 21-25TFH

973 feet from the north line and 2127 feet from the west line (surface location)
Section 25, T. 147 N., R. 92 W., 5th P.M.
225 feet from the north line and 575 feet from the west line (bottom location)
Section 13, T. 147 N., R. 92 W., 5th P.M.
Dunn County, North Dakota, Surface owner @ well site - 1811-A

NAD 83 Latitude 47°31'40.149"(47.5278193° DD) North; Longitude 102°20'44.172"(102.3456032° DD) West (surface location)
NAD 27 Latitude 47°31'40.123"(47.5278121° DD) North; Longitude 102°20'42.532"(102.3451477° DD) West (surface location)
NAD 83 Latitude 47°33'31.682"(47.5588006° DD) North; Longitude 102°21'06.946"(102.3519295° DD) West (bottom location)
NAD 27 Latitude 47°33'31.655"(47.5587931° DD) North; Longitude 102°21'05.305"(102.3514737° DD) West (bottom location)
[Derived from OPUS Solution NAD-83(CORS96) Converted to NAD-27]



Scale 1"=1000'

I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

Note:
All corners described on this plat were found in the field as shown hereon. Distances to all others are calculated. The azimuths shown on this plat are grid, based upon Geodetic North derived from GPS measurements at the center of the project origin located at SW corner of Section 25, Latitude 47°30'57.842" North; Longitude 102°21'15.147" West. Azimuths represent the calculated value from the central meridian using the forward bearing. The well location shown hereon is not an as-built location.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 11-18-20
NORTH DAKOTA

RIMROCK OIL & GAS
KLJ

Surveyed By	Field Book
N. Jensen	OW-324A
Computed & Drawn By	Project No.
C.H./D.S./A.M.	1807_01928

Revision: 11/16/2020

HORIZONTAL SECTION PLAT

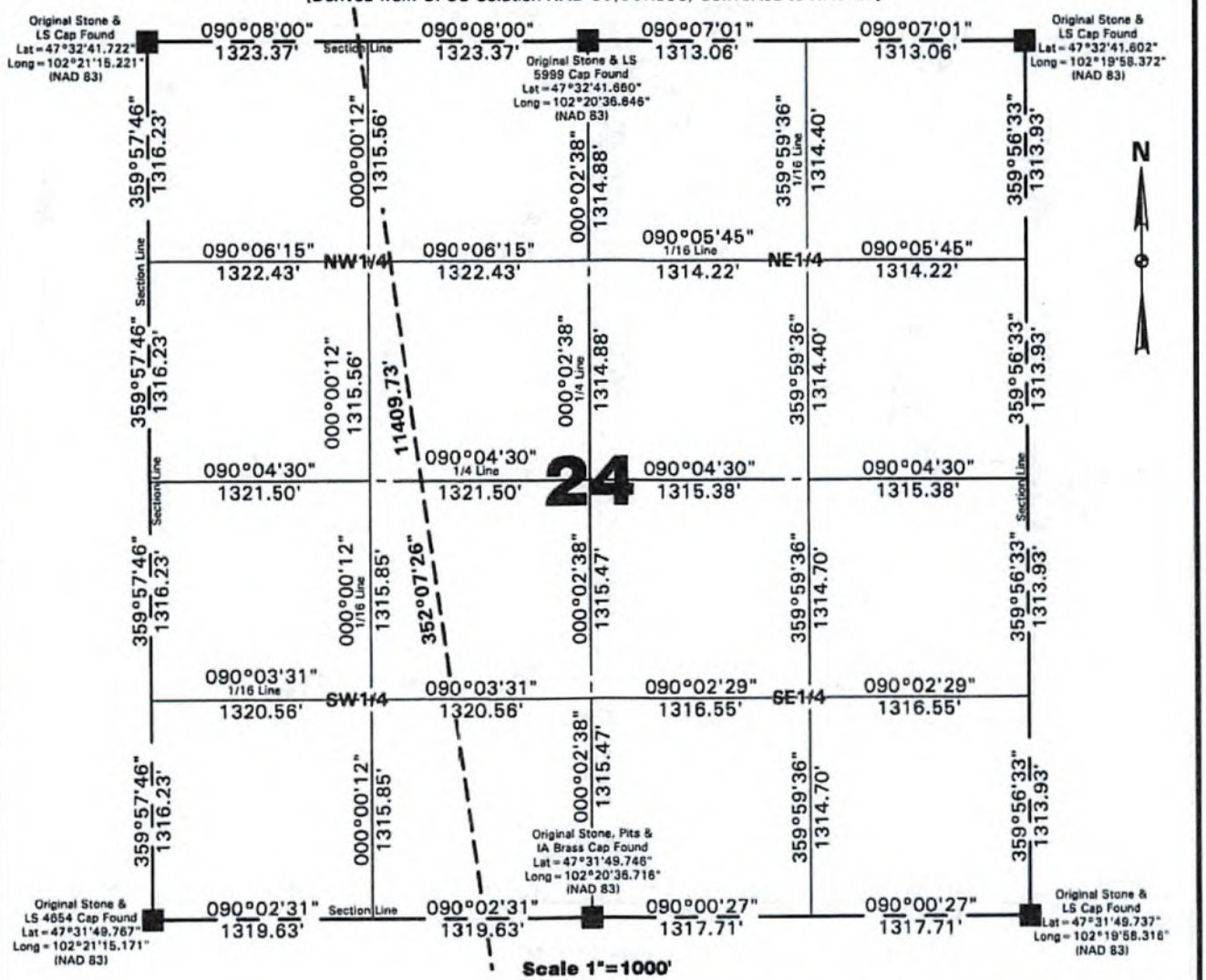
RimRock Oil & Gas

5445 DTC Parkway, Suite 1250, Greenwood Village, CO 80111

Charging Eagle 21-25TFH

973 feet from the north line and 2127 feet from the west line (surface location)
Section 25, T. 147 N., R. 92 W., 5th P.M.
225 feet from the north line and 575 feet from the west line (bottom location)
Section 13, T. 147 N., R. 92 W., 5th P.M.
Dunn County, North Dakota, Surface owner @ well site - 1811-A

NAD 83 Latitude 47°31'40.149"(47.5278193° DD) North; Longitude 102°20'44.172"(102.3456032° DD) West (surface location)
NAD 27 Latitude 47°31'40.123"(47.5278121° DD) North; Longitude 102°20'42.532"(102.3451477° DD) West (surface location)
NAD 83 Latitude 47°33'31.682"(47.5588006° DD) North; Longitude 102°21'06.946"(102.3519295° DD) West (bottom location)
NAD 27 Latitude 47°33'31.655"(47.5587931° DD) North; Longitude 102°21'05.305"(102.3514737° DD) West (bottom location)
[Derived from OPUS Solution NAD-83(CORS96) Converted to NAD-27]



Scale 1"=1000'

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

Note:
All corners described on this plat were found in the field as shown hereon. Distances to all others are calculated. The azimuths shown on this plat are grid, based upon **Geodetic North** derived from GPS measurements at the center of the project origin located at SW corner of Section 25, Latitude 47°30'57.842" North; Longitude 102°21'15.147" West. Azimuths represent the calculated value from the central meridian using the forward bearing. The well location shown hereon is not an as-built location.

I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 11-18-20
NORTH DAKOTA

Surveyed By	Field Book
N. Jensen	OW-324A
Computed & Drawn By	Project No.
C.H./D.S./A.M.	1807_01928

Revision: 11/16/2020

RIMROCK OIL & GAS
KLJ

Nov 18, 2020 - 1:59 PM - K:\Projects\OilGas\RimRock\1807_01928.1\CADD\1807_01928BAS01.dwg

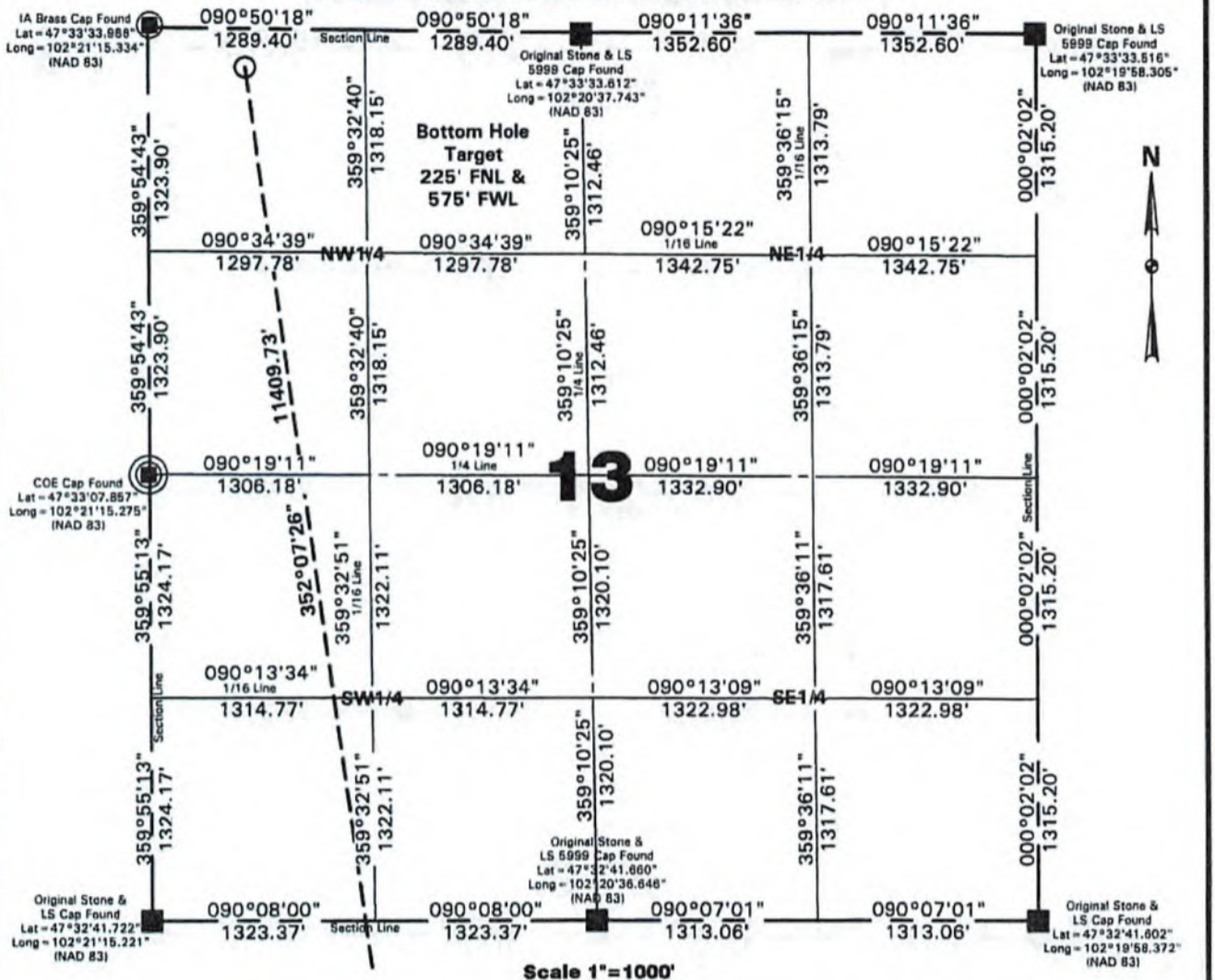
HORIZONTAL SECTION PLAT

RimRock Oil & Gas
5445 DTC Parkway, Suite 1250, Greenwood Village, CO 80111

Charging Eagle 21-25TFH

973 feet from the north line and 2127 feet from the west line (surface location)
Section 25, T. 147 N., R. 92 W., 5th P.M.
225 feet from the north line and 575 feet from the west line (bottom location)
Section 13, T. 147 N., R. 92 W., 5th P.M.
Dunn County, North Dakota, Surface owner @ well site - 1811-A

NAD 83 Latitude 47°31'40.149"(47.5278193° DD) North; Longitude 102°20'44.172"(102.3456032° DD) West (surface location)
NAD 27 Latitude 47°31'40.123"(47.5278121° DD) North; Longitude 102°20'42.532"(102.3451477° DD) West (surface location)
NAD 83 Latitude 47°33'31.682"(47.5588006° DD) North; Longitude 102°21'06.946"(102.3519295° DD) West (bottom location)
NAD 27 Latitude 47°33'31.655"(47.5587931° DD) North; Longitude 102°21'05.305"(102.3514737° DD) West (bottom location)
[Derived from OPUS Solution NAD-83(CORS96) Converted to NAD-27]



Scale 1"=1000'

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

Note:
All corners described on this plat were found in the field as shown hereon. Distances to all others are calculated. The azimuths shown on this plat are grid, based upon Geodetic North derived from GPS measurements at the center of the project origin located at SW corner of Section 25, Latitude 47°30'57.842" North; Longitude 102°21'15.147" West. Azimuths represent the calculated value from the central meridian using the forward bearing. The well location shown hereon is not an as-built location.

I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 11-18-20
NORTH DAKOTA

Surveyed By	Field Book
N. Jensen	OW-324A
Computed & Drawn By	**Project No.**
C.H./D.S./A.M.	1807_01928

Revision: 11/16/2020

RIMROCK OIL & GAS
KLJ

Nov 18, 2020 - 1:59 PM - K:\Projects\OilGas\RimRock\1807_01928.1\CADD\1807_01928BAS01.dwg

BOTTOM HOLE LOCATION PLAT

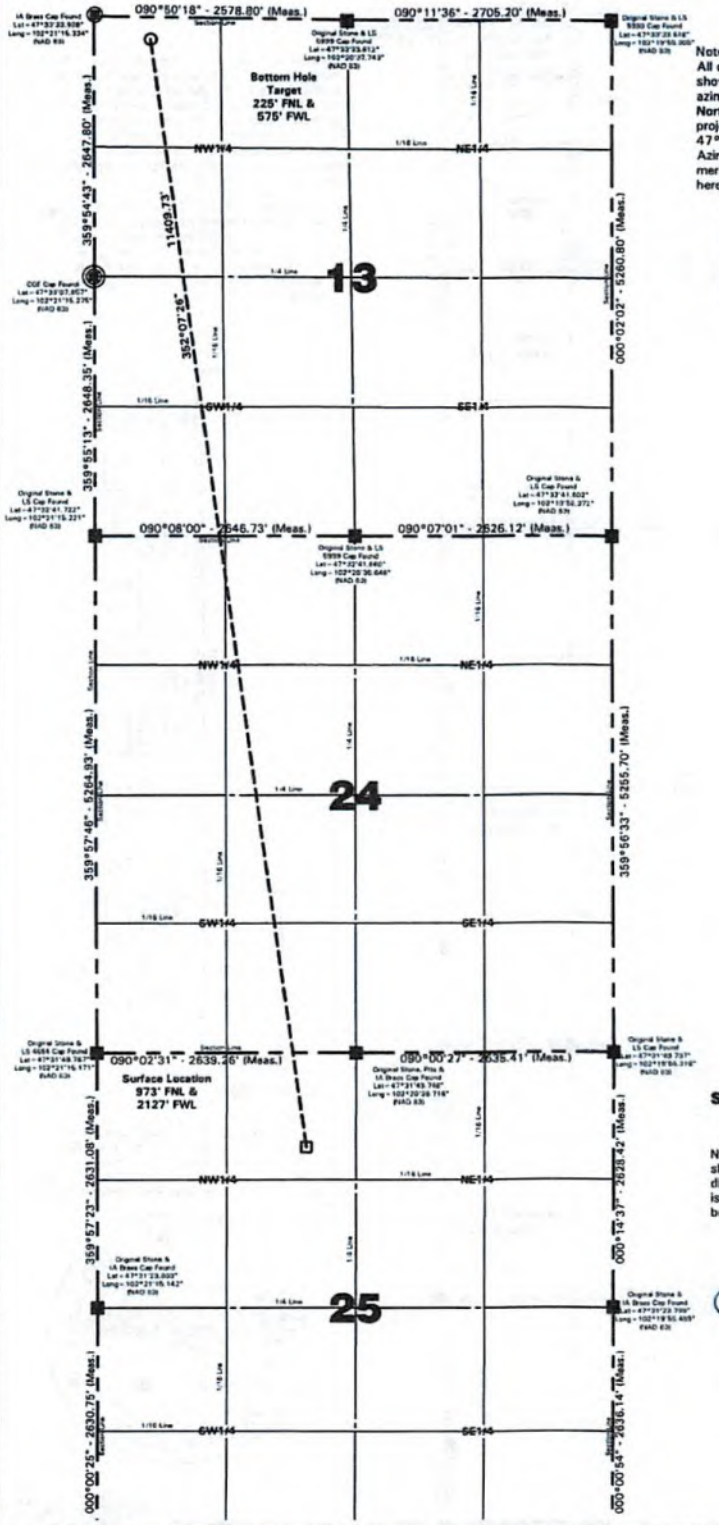
RimRock Oil & Gas

5445 DTC Parkway, Suite 1250, Greenwood Village, CO 80111

Charging Eagle 21-25TFH

973 feet from the north line and 2127 feet from the west line (surface location)
Section 25, T. 147 N., R. 92 W., 5th P.M.
225 feet from the north line and 575 feet from the west line (bottom location)
Section 13, T. 147 N., R. 92 W., 5th P.M.
Dunn County, North Dakota, Surface owner @ well site - 1811-A

NAD 83 Latitude 47°31'40.149"(47.5278193° DD) North; Longitude 102°20'44.172"(102.3456032° DD) West (surface location)
NAD 27 Latitude 47°31'40.123"(47.5278121° DD) North; Longitude 102°20'42.532"(102.3451477° DD) West (surface location)
NAD 83 Latitude 47°33'31.682"(47.5588006° DD) North; Longitude 102°21'06.946"(102.3519295° DD) West (bottom location)
NAD 27 Latitude 47°33'31.655"(47.5587931° DD) North; Longitude 102°21'05.305"(102.3514737° DD) West (bottom location)
[Derived from OPUS Solution NAD-83(CORS96) Converted to NAD-27]



N

Scale 1"=1500'

Note;
All corners described on this plat were found in the field as shown hereon. Distances to all others are calculated. The azimuths shown on this plat are grid, based upon Geodetic North derived from GPS measurements at the center of the project origin located at SW corner of Section 25, Latitude 47°30'57.842" North; Longitude 102°21'15.147" West. Azimuths represent the calculated value from the central meridian using the forward bearing. The well location shown hereon is not an as-built location.

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

I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 11-18-20
NORTH DAKOTA

Computed & Drawn By	Surveyed By	Approved By	Scale	Date
C.H./D.S./A.M.	N. Jensen	M. Washko	1" = 1500'	9/06/2018
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW-324A	B.H.Layout	11/16/2020	1807_01928	5

RIMROCK OIL & GAS KLJ

Nov 18, 2020 - 1:59 PM - K:\Projects\OilGas\RimRock\1807_01928.1\CADD\1807_01928BAS01.dwg

LEASE OWNERSHIP PLAT

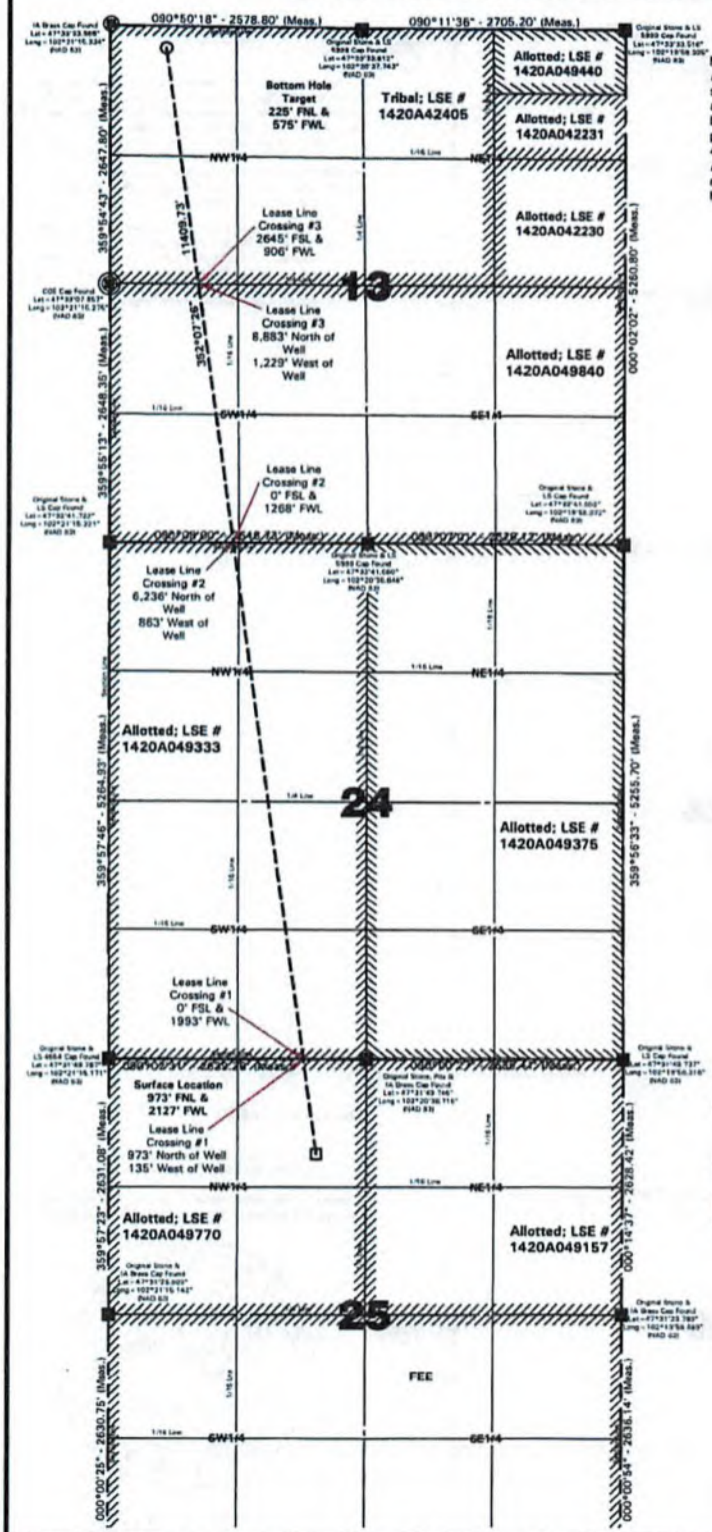
RimRock Oil & Gas

5445 DTC Parkway, Suite 1250, Greenwood Village, CO 80111

Charging Eagle 21-25TFH

973 feet from the north line and 2127 feet from the west line (surface location)
Section 25, T. 147 N., R. 92 W., 5th P.M.
225 feet from the north line and 575 feet from the west line (bottom location)
Section 13, T. 147 N., R. 92 W., 5th P.M.
Dunn County, North Dakota, Surface owner @ well site - 1811-A

NAD 83 Latitude 47°31'40.149"(47.5278193° DD) North; Longitude 102°20'44.172"(102.3456032° DD) West (surface location)
NAD 27 Latitude 47°31'40.123"(47.5278121° DD) North; Longitude 102°20'42.532"(102.3451477° DD) West (surface location)
NAD 83 Latitude 47°33'31.682"(47.5588006° DD) North; Longitude 102°21'06.946"(102.3519295° DD) West (bottom location)
NAD 27 Latitude 47°33'31.655"(47.5587931° DD) North; Longitude 102°21'05.305"(102.3514737° DD) West (bottom location)
[Derived from OPUS Solution NAD-83(CORS96) Converted to NAD-27]



Note:
All corners described on this plat were found in the field as shown hereon. Distances to all others are calculated. The azimuths shown on this plat are grid, based upon Geodetic North derived from GPS measurements at the center of the project origin located at SW corner of Section 25, Latitude 47°30'57.842" North; Longitude 102°21'15.147" West. Azimuths represent the calculated value from the central meridian using the forward bearing. The well location shown hereon is not an as-built location.

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

Lease Line Crossing Data

Location	Latitude, Longitude NAD 83 (Deg-Min-Seconds)	Latitude, Longitude NAD 83 (Decimal Degrees)	Latitude, Longitude NAD 27 (Deg-Min-Seconds)	Latitude, Longitude NAD 27 (Decimal Degrees)
Lease Line Crossing #1	47°31'49.751", 102°20'46.131"	47.5304865, 102.3461476	47°31'49.725", 102°20'44.491"	47.5304793, 102.3456920
Lease Line Crossing #2	47°32'41.693", 102°20'56.735"	47.5449147, 102.3490931	47°32'41.666", 102°20'55.095"	47.5449073, 102.3486374
Lease Line Crossing #3	47°33'07.807", 102°21'02.069"	47.5521686, 102.3505746	47°33'07.780", 102°21'00.428"	47.5521611, 102.3501189

N

Scale 1"=1500'

I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 11-19-20
NORTH DAKOTA

RIMROCK OIL & GAS

Computed & Drawn By	Surveyed By	Approved By	Scale	Date
C.H./D.S./A.M.	N. Jensen	M. Washko	1" = 1500'	9/06/2018
Field Book OW-324A	Material Lease Ownership	Revised 11/16/2020	Project No. 1807_01928	Drawing No. 5.1

KLJ

Nov 16, 2020 - 1:59 PM - K:\Projects\OilGas\RimRock\1807_01928.1\CADD\1807_01928BAS01.dwg

RimRock Oil & Gas
Charging Eagle 21-25TFH, Charging Eagle 21-25H
Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Section 25, T 147 N, R 92 W, 5th P.M.
Dunn County, North Dakota

Charging Eagle 21-25TFH Existing Topo Elevation 2250.3' MSL
Charging Eagle 21-25H Existing Topo Elevation 2250.4' MSL
Existing Charging Eagle 21-25-2TFH Existing Topo Elevation 2250.2' MSL
Charging Eagle 21-25-2H Existing Topo Elevation 2250.4' MSL

As-built Pad Elevation 2250.2' MSL

Excavation	**0 C.Y.**
Embankment	**0 C.Y.**
Plus Shrinkage (+30%)	**0 C.Y.**
	0 C.Y.
Stockpile Topsoil (8")	**0 C.Y.**
Production Rehabilitation	**0 C.Y.**
Road Embankment & Stockpile from Pad	**0 C.Y.**
(1811-A) Disturbed Area From Pad	**8.24 Acres**
(1811-A) Area Inside Barbed Wire Fence	**8.33 Acres**

NOTE:
All cut end slopes are designed at 3:1 slopes &
All fill end slopes are designed at 3:1 slopes

Charging Eagle 21-25TFH Well Site Location	Charging Eagle 21-25H Well Site Location	Existing Charging Eagle 21-25-2TFH Well Site Location	Charging Eagle 21-25-2H Well Site Location
973' FNL	954' FNL	935' FNL	906' FNL
2127' FWL	2150' FWL	2173' FWL	2208' FWL

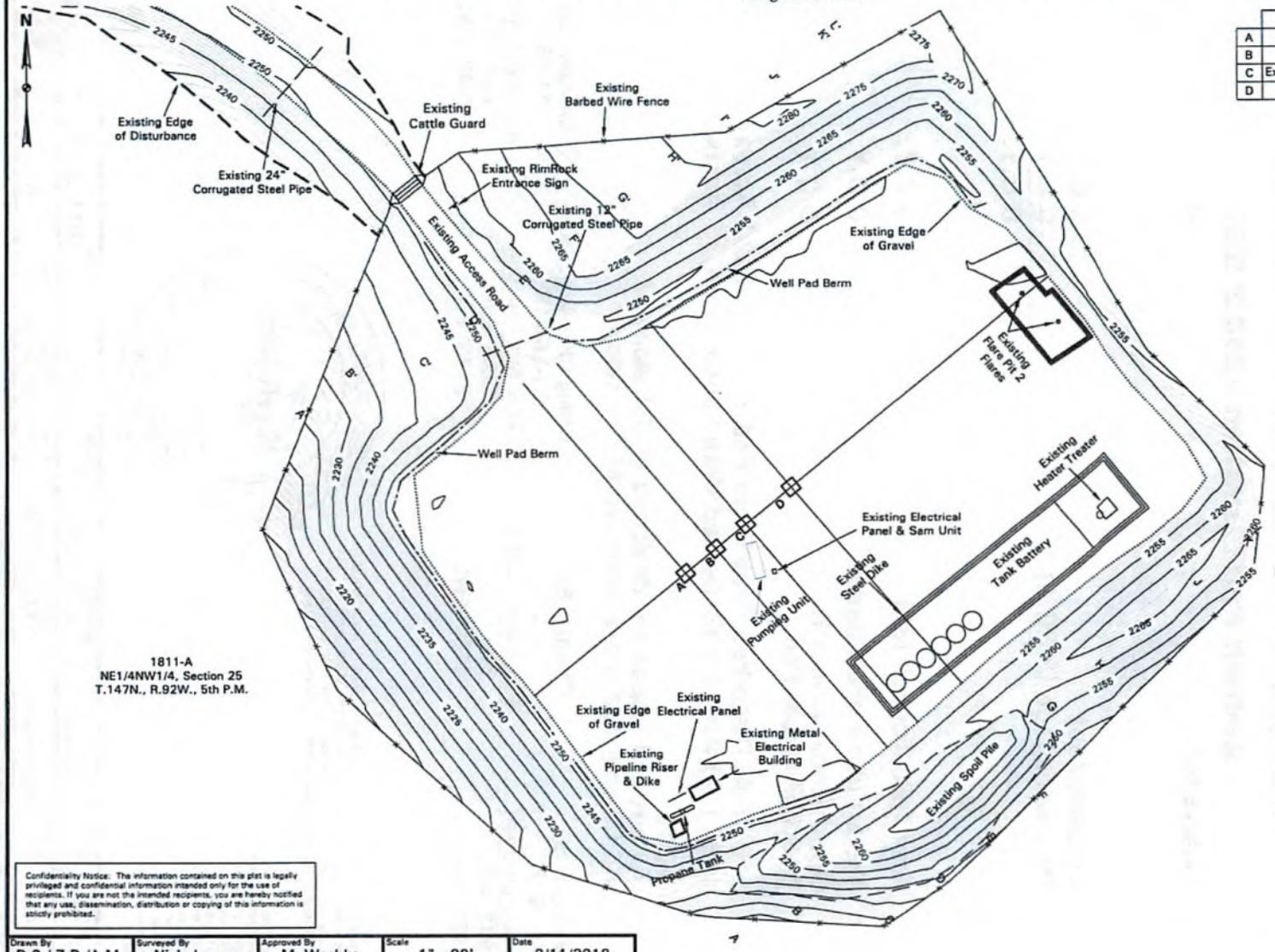
I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 12-01-20
NORTH DAKOTA

Computed & Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	N. Jensen	M. Washko	None	9/11/2018
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW 324A	Quantities	11/25/2020	1807-01478, 1807-01928 & 01929	6

RIMROCK OIL & GAS
KLJ

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Original Ground



	Well Name	Elevation	Cut/Fill
A	Charging Eagle 21-25TFH	2250.3'	-
B	Charging Eagle 21-25H	2250.4'	-
C	Exist. Charging Eagle 21-25-2TFH	2250.2'	-
D	Charging Eagle 21-25-2H	2250.4'	-

1811-A
NE1/4NW1/4, Section 25
T.147N., R.92W., 5th P.M.

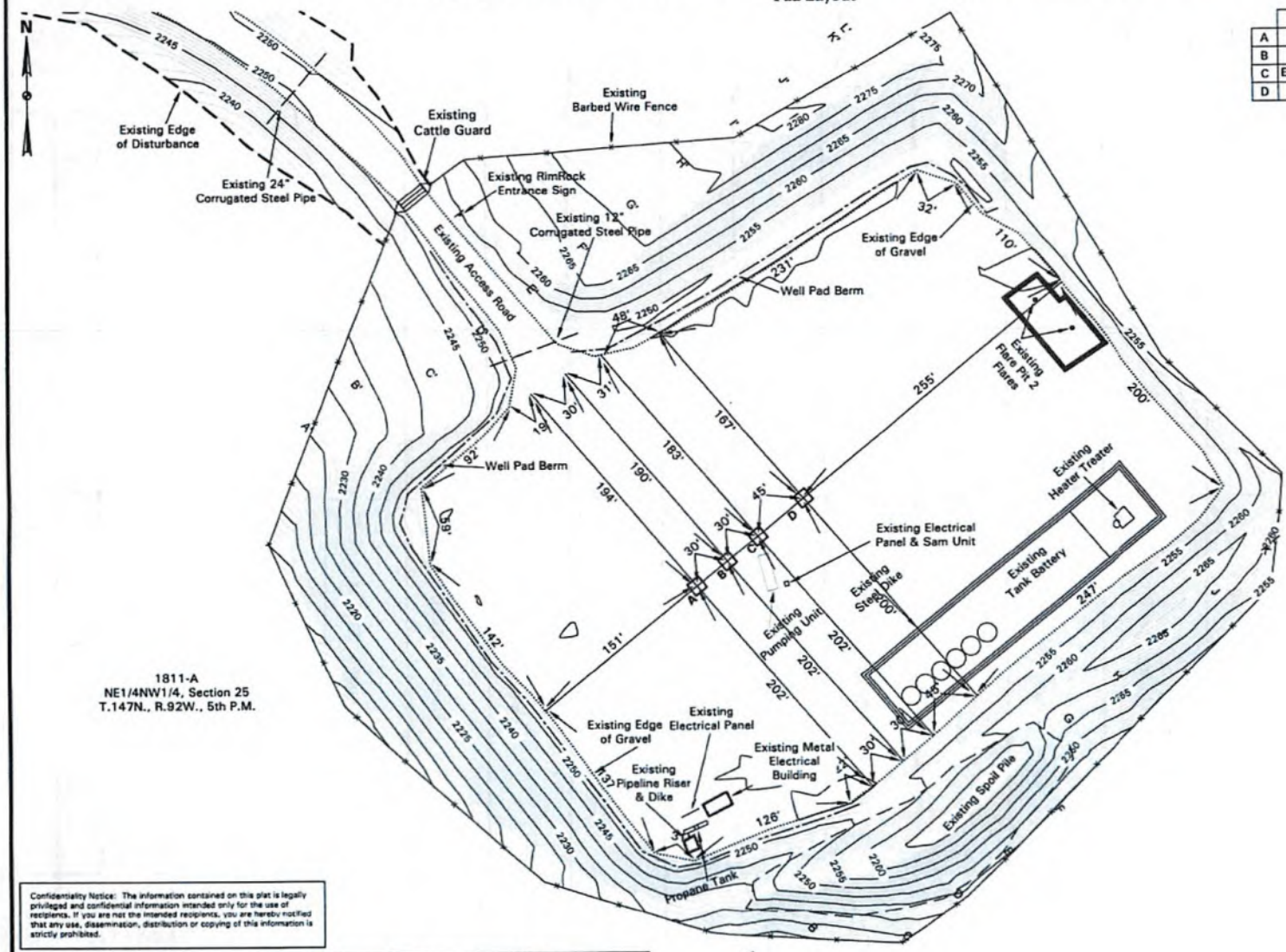
I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 12-02-20
NORTH DAKOTA

Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	Nick Jensen	M. Washko	1" = 80'	9/11/2018
Field Book	Material	Revised	Project No.	Drawing No.
OW 324A	Original Ground	11/25/2020	1807-01478 1807-01928,01929	7

Dec 1, 2020 - 8:56 AM - K:\Projects\OilGas\RimRock\1807_01928.1\CADD\1807_01928BASD2.dwg

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Pad Layout



	Well Name	Elevation	Cut/Fill
A	Charging Eagle 21-25TFH	2250.3'	-
B	Charging Eagle 21-25H	2250.4'	-
C	Exist. Charging Eagle 21-25-2TFH	2250.2'	-
D	Charging Eagle 21-25-2H	2250.4'	-

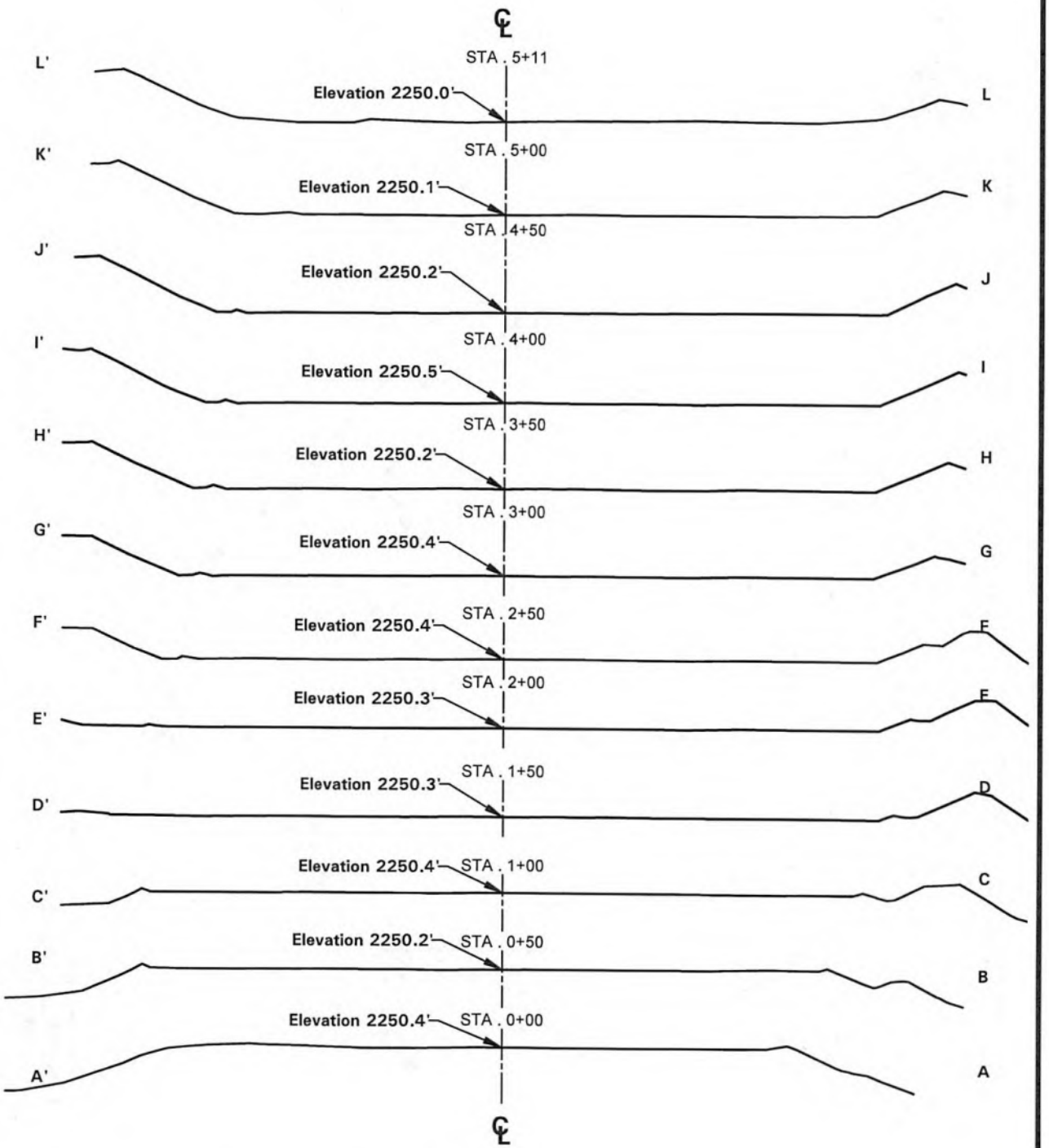
I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 02-20-21
NORTH DAKOTA

Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	Nick Jensen	M. Washko	1" = 80'	9/11/2018
Field Book	Material	Revised	Project No.	Drawing No.
OW 324A	Pad Layout	11/25/2020	1807-01478 1807-01928,01929	8

Dec 1, 2020 - 8:56 AM - K:\Projects\OilGas\RimRock\1807_01929.1\CADD\1807_01928BAS02.dwg

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Cross Sections

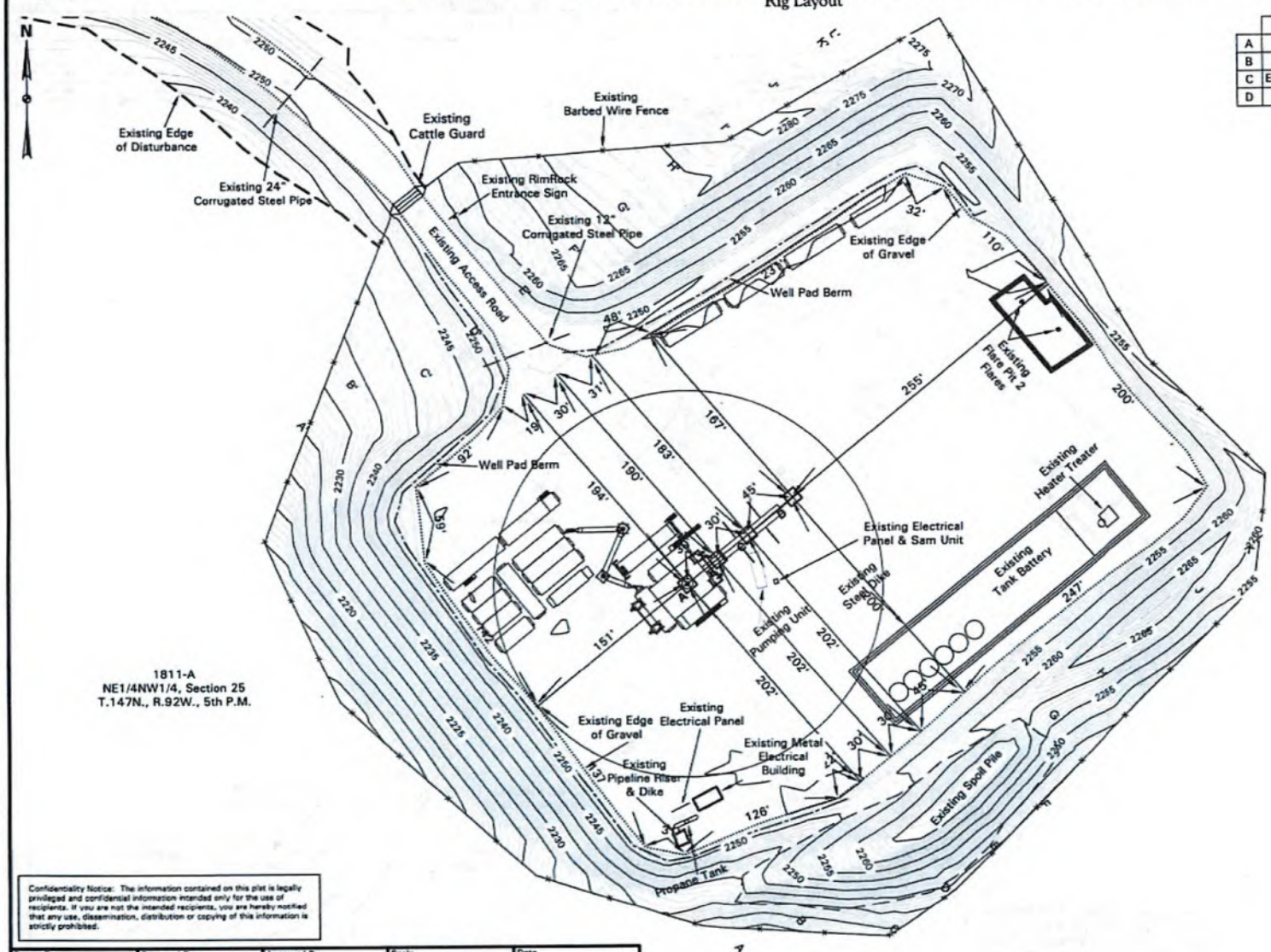


Computed & Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	N. Jensen	M. Washko	1" = 80'	9/11/2018
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW 324A	Cross Sections	11/25/2020	1807-01478 1807-01928,01929	9

RIMROCK OIL & GAS

KLJ

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Rig Layout



	Well Name	Elevation	Cut/Fill
A	Charging Eagle 21-25TFH	2250.3'	-
B	Charging Eagle 21-25H	2250.4'	-
C	Exist. Charging Eagle 21-25-2TFH	2250.2'	-
D	Charging Eagle 21-25-2H	2250.4'	-

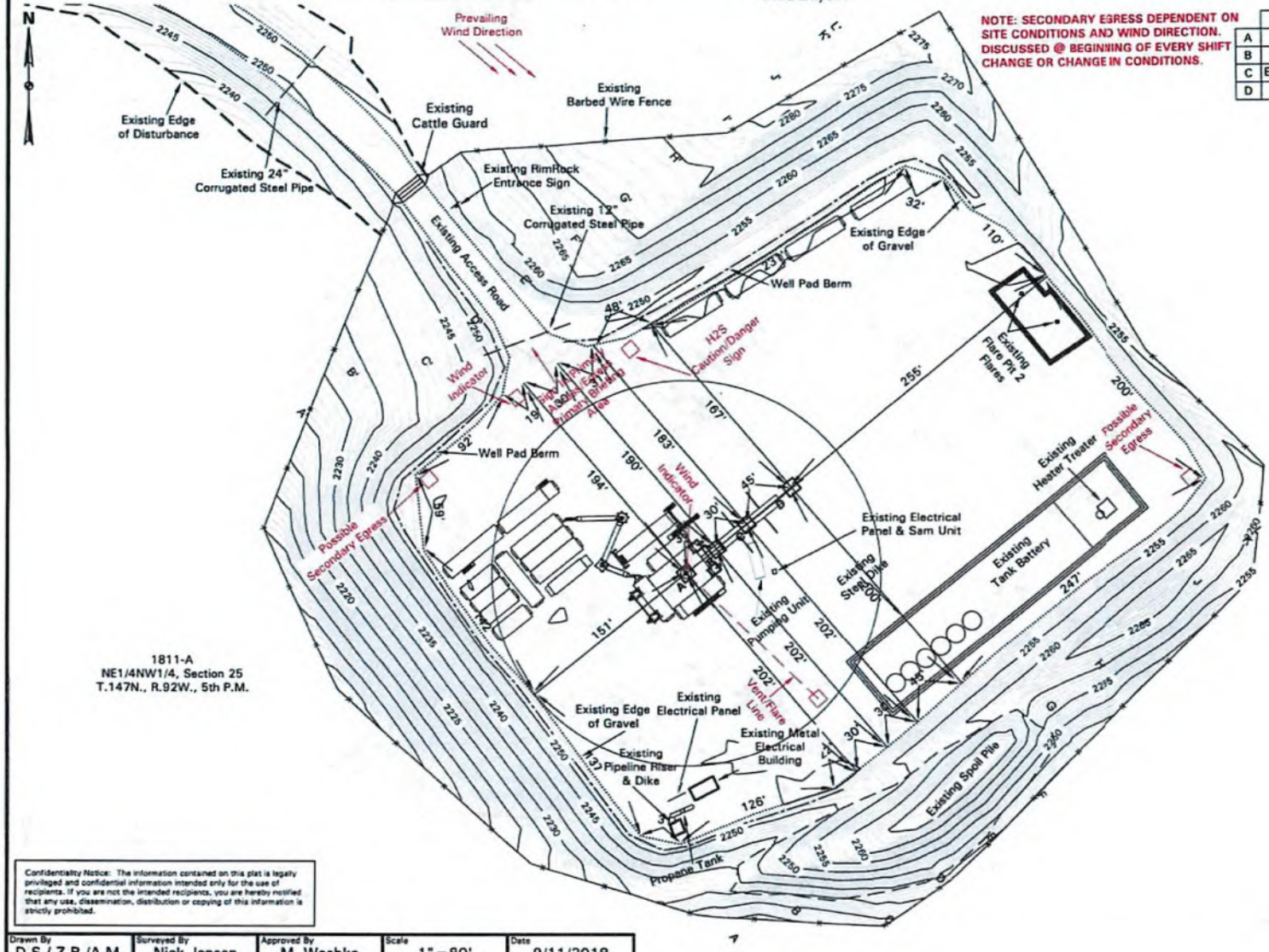
I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 12-20-20
NORTH DAKOTA

Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	Nick Jensen	M. Washko	1" = 80'	9/11/2018
Field Book	Material	Revised	Project No.	Drawing No.
OW 324A	Rig Layout	11/25/2020	1807-01478 1807-01928,01929	10

Dec 1, 2020 - 9:03 AM - K:\Projects\OilGas\RimRock\1807_01928.1\CADD\1807_01928BASD2.dwg

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
H2S Layout



NOTE: SECONDARY EGRESS DEPENDENT ON SITE CONDITIONS AND WIND DIRECTION. DISCUSSED @ BEGINNING OF EVERY SHIFT CHANGE OR CHANGE IN CONDITIONS.

	Well Name	Elevation	Cut/Fill
A	Charging Eagle 21-25TFH	2250.3'	-
B	Charging Eagle 21-25H	2250.4'	-
C	Exist. Charging Eagle 21-25-2TFH	2250.2'	-
D	Charging Eagle 21-25-2H	2250.4'	-

1811-A
NE1/4NW1/4, Section 25
T.147N., R.92W., 5th P.M.

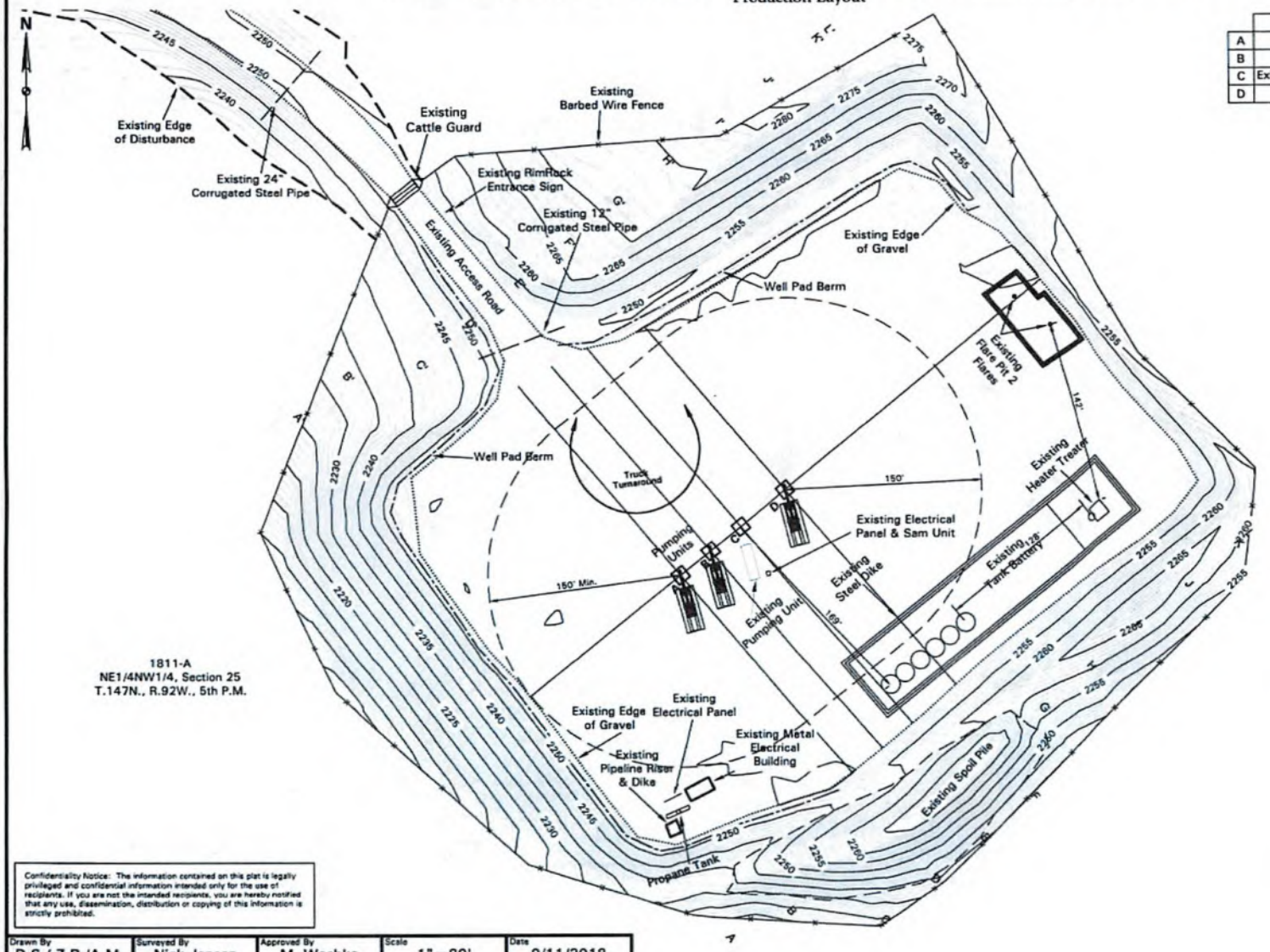
I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 12-20-18
NORTH DAKOTA

Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	Nick Jensen	M. Washko	1" = 80'	9/11/2018
Field Book	Material	Revised	Project No.	Drawing No.
OW 324A	H2S Layout	11/25/2020	1807-01478 1807-01928,01929	11

Dec 1, 2020 - 9:03 AM - K:\Projects\OilGas\RimRock\1807_01928.1\CADD\1807_01928BAS02.dwg

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Production Layout



	Well Name	Elevation	Cut/Fill
A	Charging Eagle 21-25TFH	2250.3'	-
B	Charging Eagle 21-25H	2250.4'	-
C	Exist. Charging Eagle 21-25-2TFH	2250.2'	-
D	Charging Eagle 21-25-2H	2250.4'	-

1811-A
NE1/4NW1/4, Section 25
T.147N., R.92W., 5th P.M.

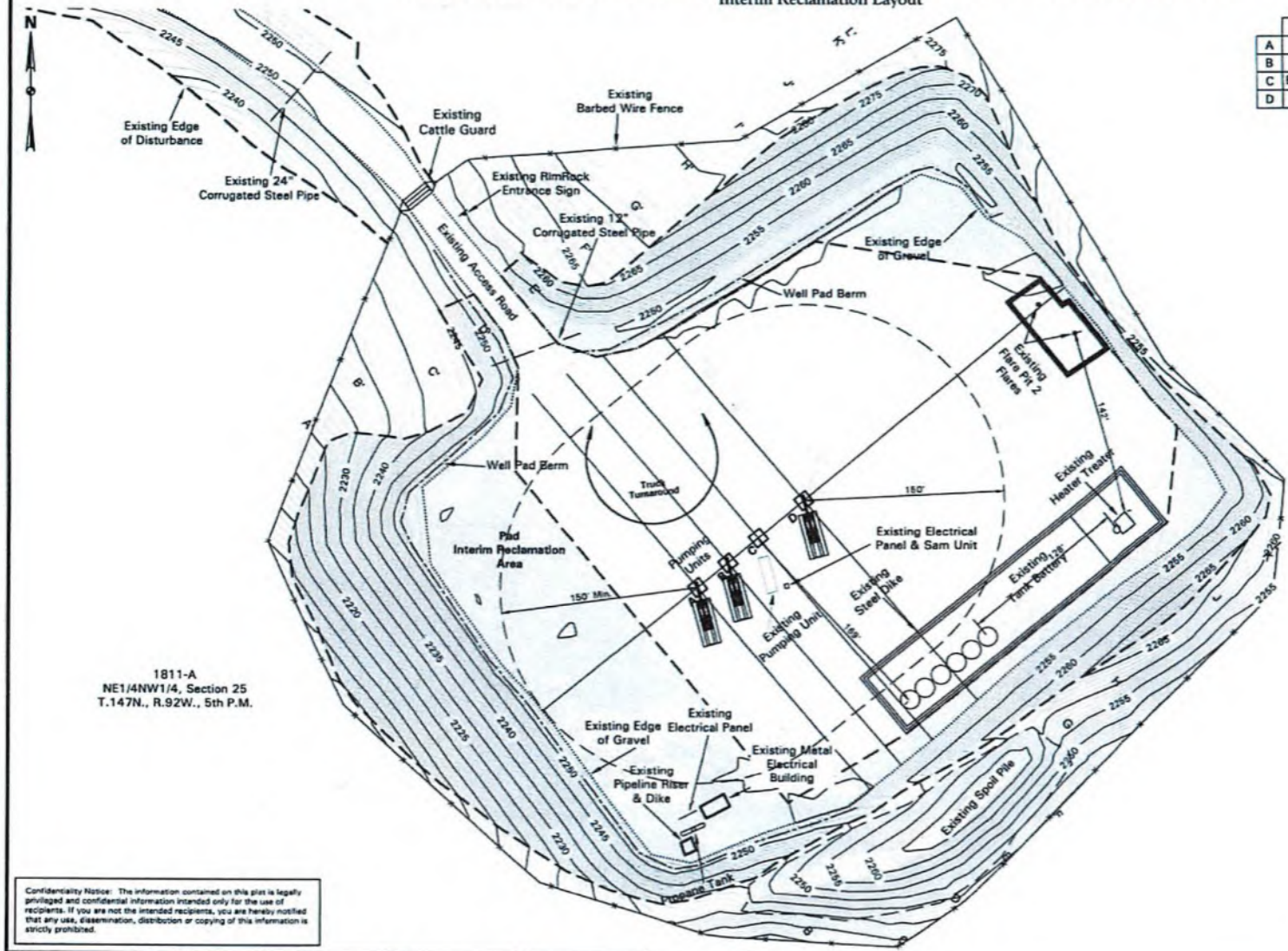
I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 12-20-21
NORTH DAKOTA

Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	Nick Jensen	M. Washko	1" = 80'	9/11/2018
Field Book	Material	Revised	Project No.	Drawing No.
OW 324A	Prod Layout	11/25/2020	1807-01478 1807-01928,01929	12

Dec 1, 2020 - 8:57 AM - K:\Projects\OilGas\RimRock\1807_01929.1\CADD\1807_01929BASD2.dwg

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Interim Reclamation Layout



	Well Name	Elevation	Cut/Fill
A	Charging Eagle 21-25TFH	2250.3'	-
B	Charging Eagle 21-25H	2250.4'	-
C	Exist. Charging Eagle 21-25-2TFH	2250.2'	-
D	Charging Eagle 21-25-2H	2250.4'	-

Interim Reclamation Area	
Reclaimed Area	3.32 Acres
Production Pad Area	4.92 Acres
Total Disturbed Area	8.33 Acres

1811-A
NE1/4NW1/4, Section 25
T.147N., R.92W., 5th P.M.

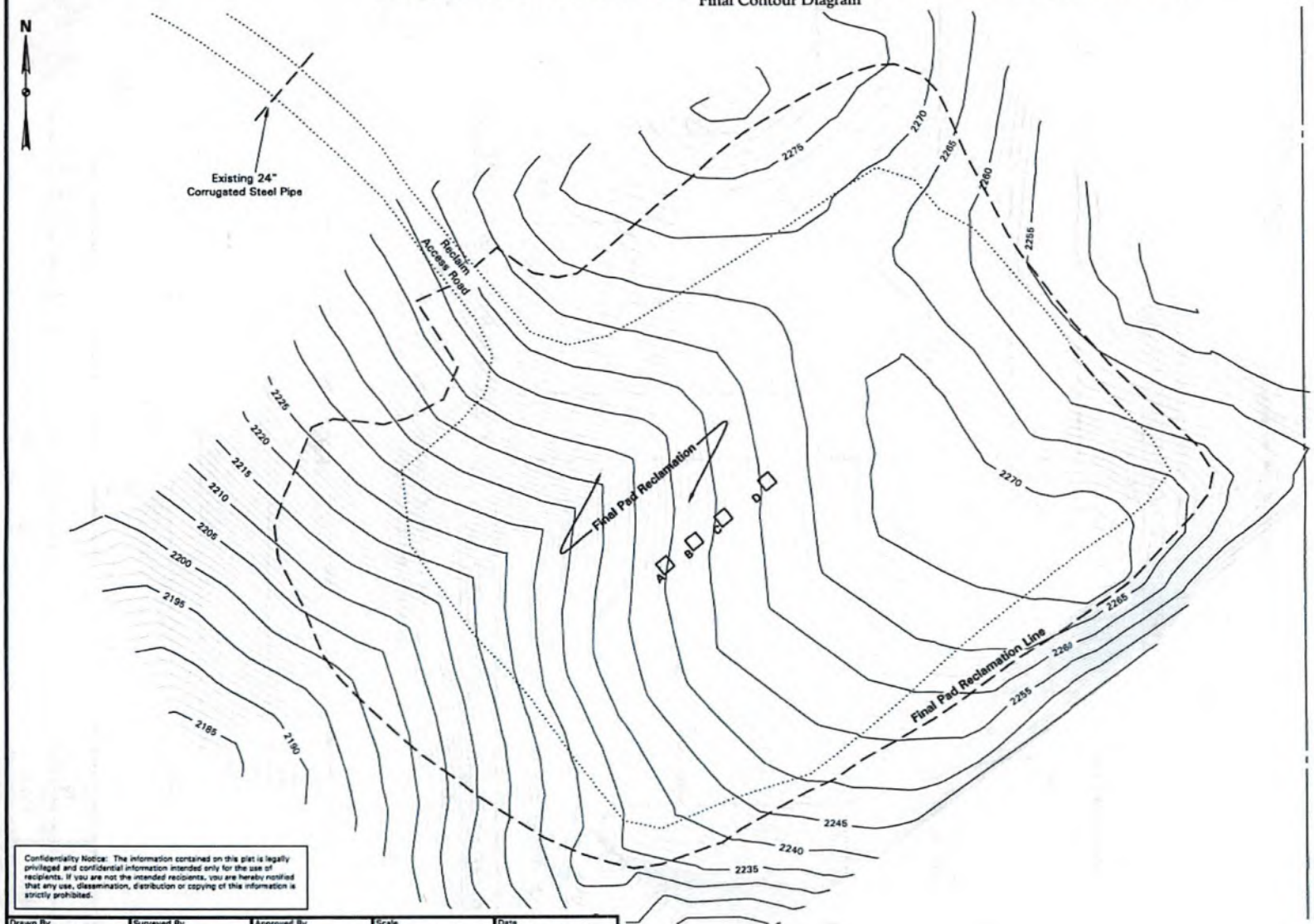
I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET E. WASHKO
LS - 8346
DATE 02-20-21
NORTH DAKOTA

Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	Nick Jensen	M. Washko	1" = 80'	9/11/2018
Field Book	Material	Revised	Project No.	Drawing No.
OW 324A	Interim Layout	11/25/2020	1807-01478 1807-01928,01929	13

Dec 1, 2020 - 8:58 AM - K:\Projects\OilGas\RimRock\1807_01928.1\CADD\1807_019289ASD2.dwg

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Final Contour Diagram



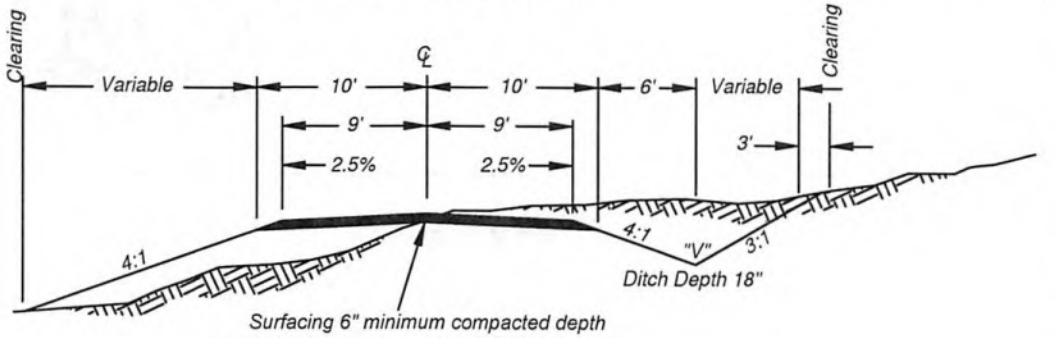
I, Margaret Washko, Professional Land Surveyor, N.D. No. 8346, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

REGISTERED PROFESSIONAL LAND SURVEYOR
MARGARET B. WASHKO
LS - 8346
DATE 12-20-21
NORTH DAKOTA

Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	Nick Jensen	M. Washko	1" = 80'	9/11/2018
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW 324A	Contour Layout	11/25/2020	1807-01478 1807-01928,01929	14

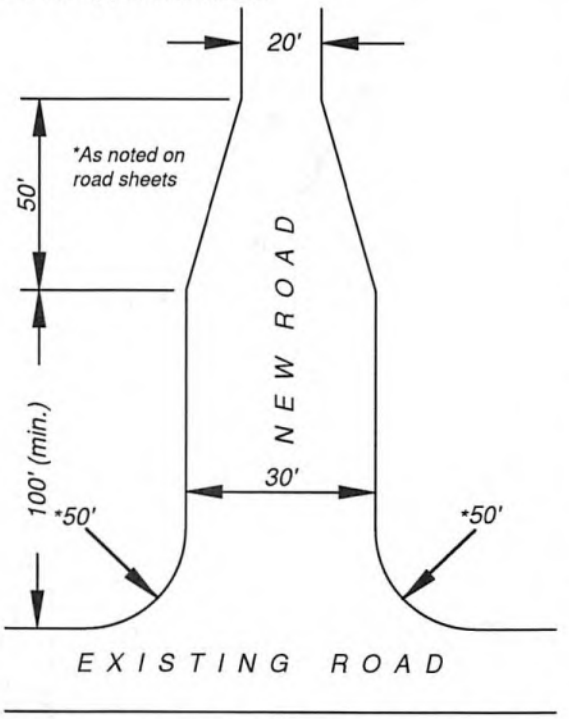
Dec 1, 2020 - 8:58 AM - K:\Projects\OilGas\RimRock\1807_01929.1\CADD\1807_01929RAS02.dwg

Charging Eagle 21-25TFH, Charging Eagle 21-25H, Existing Charging Eagle 21-25-2TFH & Charging Eagle 21-25-2H
Roadway Typical Sections

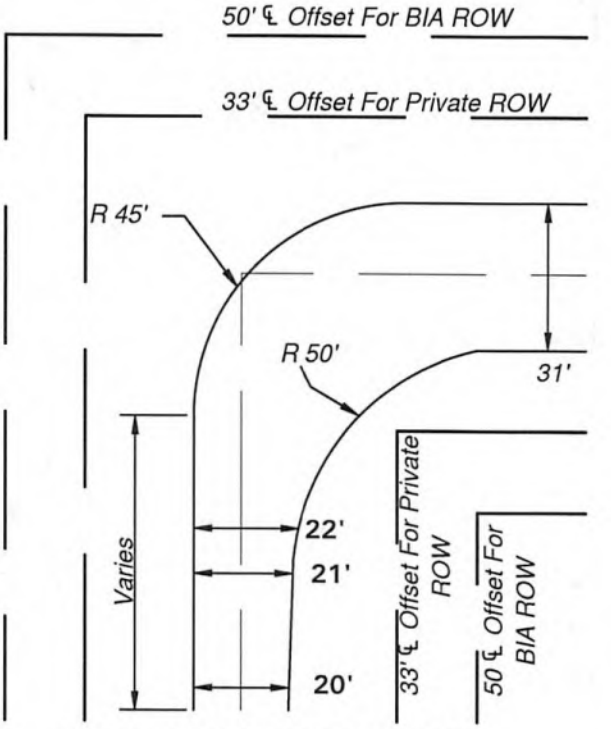


TYPICAL SECTION "V" DITCH ROAD
No Scale

Approach road grade 1% maximum for 100ft.
Install cross drain pipe where needed.

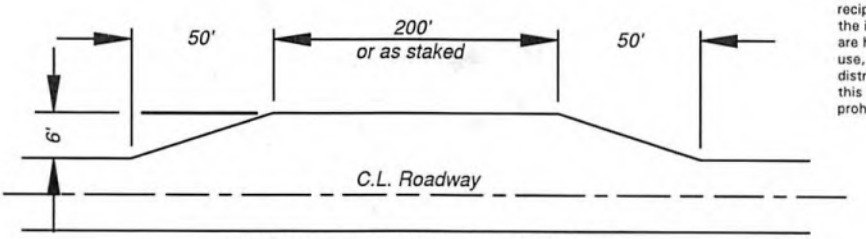


TYPICAL APPROACH ROAD CONNECTION
(DOUBLE LANE)
No Scale



TYPICAL 90 DEGREE ROAD TURN
(DOUBLE LANE)
No Scale

Note: State or County road approach fill slopes shall be constructed to applicable State/County standard.

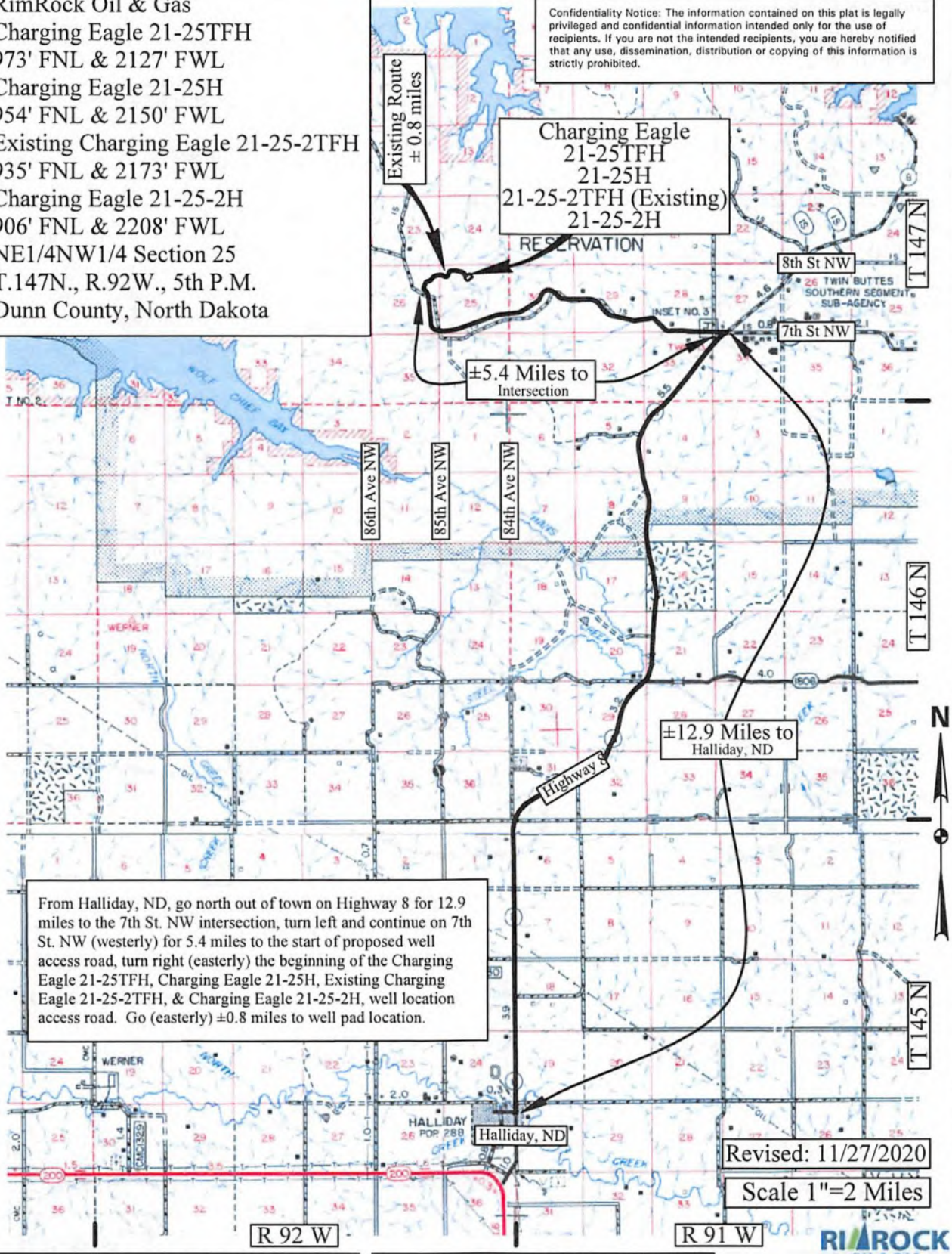


TYPICAL TURNOUT PLAN VIEW
No Scale
Construct turnouts as directed by Whiting representative

Computed & Drawn By	Surveyed By	Approved By	Scale	Date
D.S./.Z.B./A.M.	N. Jensen	M. Washko	None	5/19/2014
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW 324A	Road Typical	11/25/2020	1807-01478 1807-01928,01929	15

RIMROCK OIL & GAS
KLJ

RimRock Oil & Gas
Charging Eagle 21-25TFH
973' FNL & 2127' FWL
Charging Eagle 21-25H
954' FNL & 2150' FWL
Existing Charging Eagle 21-25-2TFH
935' FNL & 2173' FWL
Charging Eagle 21-25-2H
906' FNL & 2208' FWL
NE1/4NW1/4 Section 25
T.147N., R.92W., 5th P.M.
Dunn County, North Dakota



Revised: 11/27/2020

Scale 1"=2 Miles

Map "A"
County Access Route

Legend

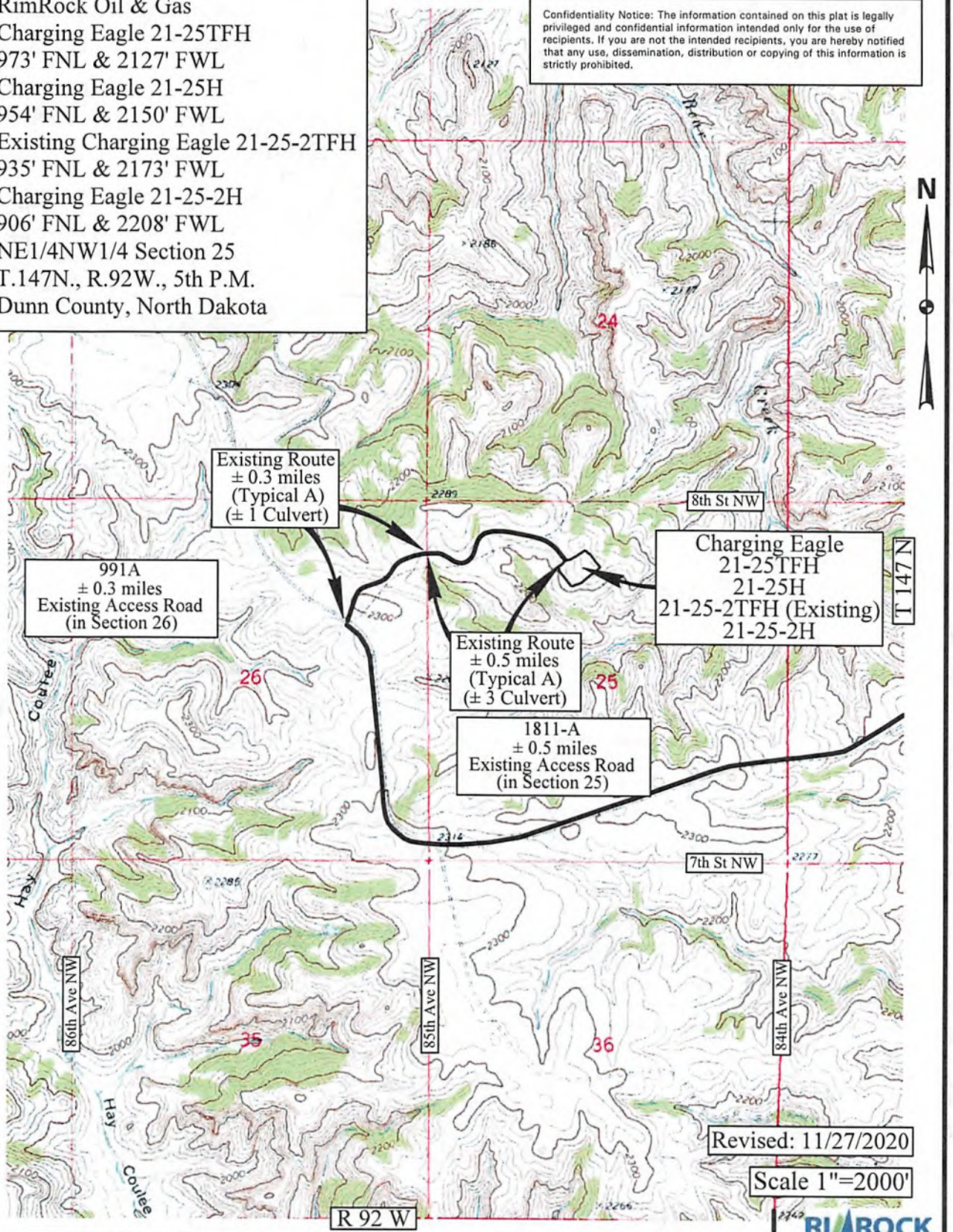
Existing Roads

Proposed Roads

RIMROCK OIL & GAS

KLJ

RimRock Oil & Gas
Charging Eagle 21-25TFH
973' FNL & 2127' FWL
Charging Eagle 21-25H
954' FNL & 2150' FWL
Existing Charging Eagle 21-25-2TFH
935' FNL & 2173' FWL
Charging Eagle 21-25-2H
906' FNL & 2208' FWL
NE1/4NW1/4 Section 25
T.147N., R.92W., 5th P.M.
Dunn County, North Dakota



Revised: 11/27/2020

Scale 1"=2000'

Map "B"
Quad Access Route

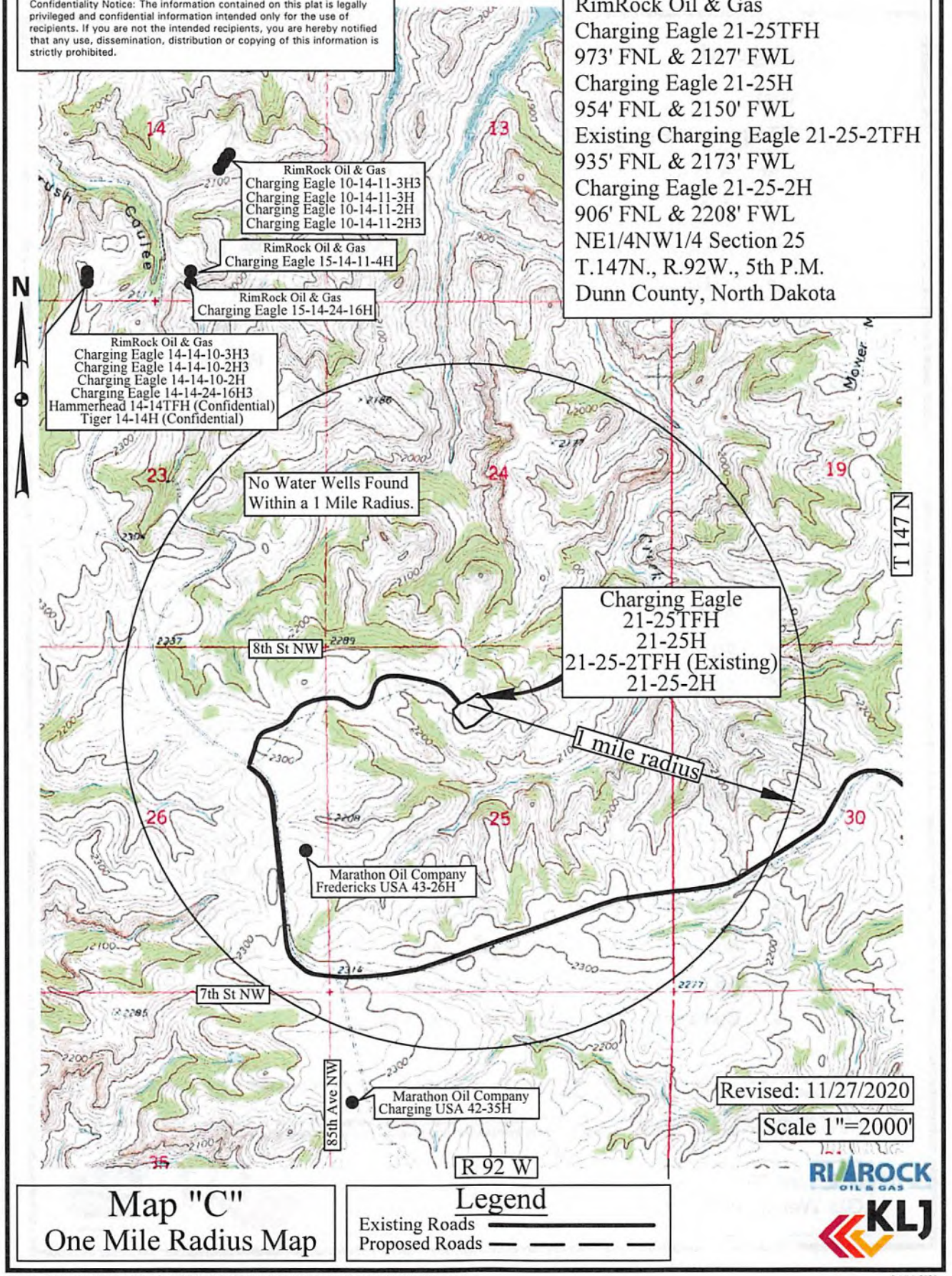
Legend
Existing Roads
Proposed Roads

RIMROCK OIL & GAS

KLJ

Dec 1, 2020 - 10:02 AM - K:\Projects\OilGas\RimRock\1807_01929.1\CADD\1807_01929LOC01.dwg

RimRock Oil & Gas
Charging Eagle 21-25TFH
973' FNL & 2127' FWL
Charging Eagle 21-25H
954' FNL & 2150' FWL
Existing Charging Eagle 21-25-2TFH
935' FNL & 2173' FWL
Charging Eagle 21-25-2H
906' FNL & 2208' FWL
NE1/4NW1/4 Section 25
T.147N., R.92W., 5th P.M.
Dunn County, North Dakota



Revised: 11/27/2020

Scale 1"=2000'

Map "C"
One Mile Radius Map

Legend
Existing Roads
Proposed Roads

RIMROCK OIL & GAS

KLJ

Legend

wells

STATUS, WELL_TYPE

- A, AGD
- A, AI
- A, CBM
- A, DF
- A, DFP
- A, GASC
- A, GASD
- A, GASN
- A, OG
- A, SWD
- A, WI
- A, WS
- A,AI
- AB, AI
- AB, DF
- AB, DFP
- AB, GASC
- AB, GASD
- AB, GI
- AB, OG
- AB, SWD
- AB, WI
- AB, WS
- Confidential, Confidential
- DRL, AI
- DRL, GASC
- DRL, GASD
- DRL, OG
- DRL, SWD
- DRL, WI
- DRY, GASC
- DRY, GASD
- DRY, OG
- DRY, ST
- EXP, GASD
- EXP, OG
- EXP, SWD
- EXP, WS
- IA, AI
- IA, CBM
- IA, DF
- IA, DFP
- IA, GASC
- IA, GASD
- IA, OG
- IA, SWD
- IA, WI
- IA, WS
- IA,AI
- LOC, GASC
- LOC, GASD
- LOC, OG
- LOC, SWD
- LOC, WI
- PA, DF
- PA, GASC
- PA, GASD
- PA, GS
- PA, OG
- PA, SWD
- PA, WI
- PA, WS
- PNC, GASD
- PNC, OG
- PNC, SWD
- TA, AI
- TA, GASC
- TA, GASD
- TA, OG
- TA, SWD
- TA, WI
- TA, WS
- TAO, GI
- TAO, OG
- TAO, WI

A = Active, AB = Abandoned, DRL = Drilling, Dry = Dry, EXP = Expired, IA = Inactive, LOC = Location, PA = Producer Abandoned, PNC = Permit Now Cancelled
TA = Temporarily Abandoned, TAO = Temporarily Abandoned Observation.

AGD = Acid Gas Disposal, AI = Air Injection, DF = Dump Flood, DFP = Dump Flood Producing, GASN = Nitrogen Gas Well, GASC = Gas Condensate, GASD = Gas Dry, GI = Gas Injection, GS = Gas Storage, OG = Oil or Gas Well, SWD = Salt Water Disposal, WI = Water Injection, WS = Water Supply, ST = Strat Test

Exhibit "D"
GIS Well Symbols

KLJ

Prepared by N.D.I.C Oil and Gas Division

Appendix B

BIA Conditions of Approval

BUREAU OF INDIAN AFFAIRS
Ft. Berthold Agency
CONDITIONS OF APPROVAL
(COA'S)

A. OPERATIONS

1. Protection of Property: The Operator will conduct all operations with due regard for proper land management and environmentally friendly practices; avoiding unnecessary damage to vegetation, timber, crops or other cover, and improvements (such as roads, bridges/culverts, cattle guards, telephone lines, etc.) shall be constructed to avoid and minimize impacts to the environment. The Operator will control soil erosion resulting from the operation, to prevent pollution of soil and water resources; and whatever methods deemed appropriate by authorized representatives of the Bureau of Indian Affairs.

2. Area of Operations: The area of operations shall be maintained in a neat and safe manner and in accordance with the conditions herein regardless of well status. The Area of Operations during the production phase is the working area of the well pad which has not been reclaimed and which includes but is not limited to, the production facilities, all diked areas, fifteen (15) feet outside of the anchors (dependent upon anchor spacing), and any area used by vehicles regardless of frequency. During the drilling phase, the area of operations includes the entire disturbed or fenced area of the well pad and ancillary facilities.

B. CHEMICALS AND STORAGE

1. Chemicals: Upon request, the Operator will, within five (5) days, provide the Bureau of Indian Affairs with an inventory of the kinds, amounts, and hazards of all chemicals, additives, mud materials, and/or any other substances used during drilling and/or production of the well. The request may include hazardous/universal waste manifests, straight bill of ladings, chemical inventories, disposal records or any other information deemed necessary by the Bureau of Indian Affairs.

2. Storage: All containers used for chemical storage during production will be properly labeled with chemical name and hazards (MSDS sheet). The maximum number of chemical containers on location during drilling, completion and workover operations shall only include what is necessary for the operations unless authorized by the Bureau of Indian Affairs prior to storage on site. The maximum number of chemical containers on location during production shall not exceed two (2) per chemical type unless authorized by the Bureau of Indian Affairs prior to use or storage on site. Excess containers shall be neatly stored and empty containers shall be properly labeled and promptly removed. Chemical containers laid or turned on their side shall be supported off the ground in a sturdy cradle or stand equipped with a drip pan or catch basin to include secondary containment that will hold 100% of the liquids stored. A mesh screen will be placed over the top of the drip pan or catch basin to deter wildlife from entering and prevent harm.

C. CULTURAL RESOURCES

If, prior to or during any disturbance activity, items of archaeological, paleontological, or historic value are reported or discovered, or an unknown deposit of such items is disturbed, the Operator will immediately cease disturbance activities in the affected area and notify the Bureau of Indian Affairs and Tribal Historical Preservation Office. Disturbance activities will not resume until the BIA Regional Archeologist gives approval. If cultural/historic/archaeological or paleontological items are discovered during the environmental review process, an archeologist must be present during construction to prevent the damage to these resources with the BIA contacted immediately regarding any discoveries.

D. DIKES/BERMS

Every storage vessel containing production fluids of any kind must be surrounded on all four sides by an impermeable dike/berm of sufficient freeboard to contain a 25-year 24-hour storm event and sized to hold 100 percent of the capacity of the largest storage tank. Dike material shall be free of oil, saltwater and/or other waste materials. Dike capacity will be calculated at the lowest point on the dike. Metal walkway(s) over the dike are encouraged to prevent potential damage to the integrity of the secondary containment. Vessel containing facilities include but are not limited to individual tanks, tank batteries, heater treaters, separators, line heaters, etc. Dikes shall be kept bare of all living and/or dead vegetation. All well pad locations will have at least an 24 inch berm around location as to not let any fluids leave the location.

E. ELECTRIC LINES

All electric lines will be buried a minimum of forty-eight (48) inches. No new overhead lines will be allowed to the well locations. Existing overhead lines may be upgraded utilizing overhead installation as long as bird diverters are installed on the upgraded lines.

F. EROSION CONTROL

The Operator shall prevent and control soil erosion. Soils and topsoil stockpiles shall be stabilized and vegetated with approved native species. The Operator shall take prompt action to stabilize, repair, and re-vegetate eroded or washed areas and prevent gullying. If erosion control measures taken prove to be ineffective, the Bureau of Indian Affairs may impose additional requirements at any time to stabilize the affected area. Appropriate measures will be used, to include but not limited to hydro-seeding, drill-seeding and/or protective erosion blankets on sites with the potential for erosion. Additional measures may be required based on information obtained during the on-site selections process. Bureau of Indian Affairs approval of right-of-way is required prior to any earth disturbing activity. All ground will be covered over winter either by cover crops or by spreading weed free straw/hay that will be crimped into place.

G. PRODUCTION FACILITIES

1. Production Facilities on Fill: It is undesirable to locate production facilities on fill material because of potential settling issues. However, in the event that the tank battery or heater treater(s) cannot be located on the cut portion of the pad, the fill material beneath must be compacted to 95% of Standard Proctor (ASTM D698/AASHTO T180). Compaction generally cannot be achieved between freeze-up through spring thaw, therefore placing permanent production facilities on frozen or excessively wet fill will not be allowed, unless approved by the Bureau of Indian Affairs in writing. Spacing of production facilities must be kept to a minimal distance, as prescribed in Bureau of Land Management Gold Book Standards to achieve optimal interim reclamation.

2. Changes to Production Facilities: Facility changes on Indian Leases shall be submitted on a Bureau of Land Management Sundry Notice, Form 3160-5 and submitted to the Bureau of Land Management, who will forward it to the Bureau of Indian Affairs. The Operator can also request an electronic Sundry Form from the Bureau of Land Management.

3. Excessive Equipment (Facilities): Facilities (equipment) not approved, and on location, are excessive facilities (equipment) and shall be promptly removed from the location.

4. Condition and Maintenance: All facilities (equipment and associated accessories) shall be functional and kept maintained to prevent resource damage or shall be promptly removed from the location. Equipment shall be visually inspected daily for leaks and all leaks shall be repaired to avoid unnecessary impacts to the environment.

5. Animal Protection: All facilities shall be designed, maintained and properly fenced to ensure, to the greatest extent possible, that wildlife and domestic animals cannot be harmed from facilities and/or equipment.

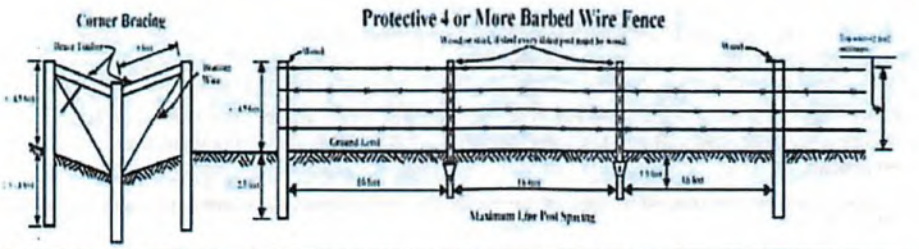
H. FENCES, GATES, AND CATTLEGUARDS

1. General: The entire well location will be fenced and maintained by the operator. Once the vegetation has been re-established under interim reclamation and determined to be satisfactory by the BIA, the fenced area shall be reduced in size to accommodate remaining operations.

2. Cattleguards: Operator will construct cattle guards with wings at all fence crossings. Cattle guards shall not be less than 16 feet wide by 8 feet across and shall be set on concrete sills not less than 24 inches high by 16 inches wide. Fence braces shall be installed on each side of the cattle guards. Fence braces shall be constructed of like quality material and installed in like style and form as the fence braces currently constructed on the land. Cattle guards shall be constructed approximately 6 inches above the existing grade of the road so that water does not run into the cattle guard. Operator shall be responsible for maintenance and repair of all cattle guards used by the Operator, to include wings and braces for the life of the locations.

3. Pad Fences & Gates: Repair and replacement shall be completed in kind as needed to include: wire, posts and braces.

Brace posts will be a minimum of 8' long and 6" in diameter, bracing material will be a minimum of 4"x4"x8' with diagonal bracing wire. Line posts (steel or wood) will be spaced a maximum distance of 16'. By-pass gates shall be a minimum fourteen (14) feet wide. Wire gates shall be maintained the same as a fence. Swing gates, if allowed, shall swing easily. Hinges or latches shall be repaired if not operating properly, with all gates kept closed.



I. FIRE PREVENTION AND SUPPRESSION REQUIREMENTS

The Operator will do all in its power to prevent and suppress forest, brush or grass fires on its leased acreage.

The Operator shall build or construct fire lines or do such clearing around the well location as is necessary for forest, brush and grass fire prevention and shall maintain such fire tools at such locations as are deemed necessary by the Superintendent or his authorized representative.

J. Lines: Load Lines, Vent Lines, Valves, and Catch Basins

Any open-ended line or valve on any production facility (equipment or accessory) will have catch basins installed at the point of hook-up or where the line is open or beneath the valve to capture drips and spills. Catch basins will have a mesh installed to discourage wildlife from entering and prevent harm. Spill prevention containers shall be adequately secured and sized to ensure releases to the environment are avoided. A scheduled inspection of all such secondary containment systems/containers by the operator must be completed to ensure all collected product is removed and properly disposed of before reaching its design capacity.

Load (truck) lines must terminate within the diked area unless approved in writing by the BIA.

Tank battery vent lines must terminate within the diked area and be designed so that no liquids can flow out of the vent lines or outside of the dikes, unless the requirements of the Fort Berthold Indian Reservation Federal Implementation Plan are met.

If constructed, secondary gas containment lines from the production tanks to the flare pit used to capture gas from the tanks and to contain minor spills must be constructed so liquids flow into the pit.

K. NOISE CONTROL (MUFFLERS)

All internal combustion engines associated with production facilities will be equipped with functional noise-reducing mufflers. BMP's may be used to reduce noise (trees, fences, retaining walls, etc.) these practices will be determined in field during the on-site process.

L. NOXIOUS WEEDS AND INVASIVE PLANTS

The Operator is responsible for the prevention and control of noxious weeds, to include minimizing the spread of invasive species and/or eradication on the surface areas within the approved ROW.

1. **Integrated Noxious Weed/Fire Management Program:** The plans may include mechanical, and/or chemical treatments or a combination of the two. The contractor will conduct noxious weed inventories on each well site twice a year (spring and fall). To help prevent the spread of fire, spills, and noxious weeds, the Operator must keep the area of operations bare of all living and/or dead vegetation. A combination of both mechanical and chemical methods may produce the most effective results.

2. **Mechanical Methods-** hand pulling noxious weeds and disposing of them in an approved container.

3. **Chemical Methods-** Includes ground application of herbicides by a certified applicator. A noxious weed report will be filed with the BIA for all chemical applications for weed control, before application.

4. **Existing Weeds-** Annual treatment is required, if noxious weed species are present on the Oil Companies Right of Way.

M. PAD CONSTRUCTION

All well locations will have a minimum 24 inch impermeable berm containment system designed so no fluid runoff can leave the well pad location. No fluids will be allowed to flow off of a well location into the surrounding areas. Well Pad Requirements:

- No drilling or production activities within the first 1,000 feet (305 meters) from the Lake Sakakawea Historical High Water Mark (1,854 feet [561 meters] MSL).
- No drilling or production activities (excluding pipelines and transportation/utility corridors) within 150 feet (46 meters) from wetlands, perennial, and intermittent streams (identified at the onsite).
- Closed Loop systems would be required at all locations under which the BIA has jurisdiction.

N. PAINT

All above ground facilities, equipment, and accessories (including propane tanks) shall be painted as specified by the BIA during the right-of-way on-site inspection to match the surrounding landscape, unless safety requirements for particular components override this requirement. All paints must be flat, gloss and semi-gloss paints are not allowed unless approved in writing by the BIA.

O. PESTICIDES

Any application of a hazardous or potentially hazardous substance to control insects and rodents will not be used without the prior written approval of the BIA. Further defined as any substance requiring an applicators license for commercial purposes will not be applied without written approval of the BIA with all appropriate clearances/permits that may be required by other entities.

P. PIPELINES

1. **Construction:** The Operator is responsible for locating and protecting existing underground pipelines, power lines, water lines and adhering to any conditions of the ROW controlled by other entities.

All oil and gas pipelines, including connecting lines, shall be buried a sufficient depth below the surface as not to interfere with cultivation (48" minimum).

Whenever the line is laid under a road or highway, its construction shall be in compliance with applicable Federal and State laws; during the period of construction, at least one-half the width of the road shall be kept open to travel with appropriate traffic control implemented; and upon completion, the road or highway shall be restored to its original condition and all excavations shall be backfilled and compacted. The Operator is responsible for and repairing any future settlement issues as a result of open cuttings through roadways. The BIA recommends that all roadways be bored to limit the potential for future settlement

issues. On BIA roads an approved Permit to Occupy Right-of-Way is required and all other roads shall be coordinated with the controlling entity.

All jurisdictional type wetlands will be bored under on the Ft Berthold Indian Reservation. Major roadways will be bored; driveways/entrances can be trenched if the operator gets an affidavit from the owner allowing such activity. Settling/maintenance will be the operator's responsibility on the trenched driveways and entrances. When trenching these areas the operator will notify the owners when the trenching will take place and provide an emergency route across the area.

The operators will contact the tenants (renters) of the land they are crossing to provide access for their cattle and farming equipment. All open trenches will be protected from livestock entry. Any damage to fences will be fixed immediately as to not mix different owners livestock, fences will be repaired back to original or better. If land cannot be accessed by the tenant it will be up to the operator to reimburse that tenant for the nonuse of the land.

The on-site Bureau of Indian Affairs official will determine any other areas to be bored in the field.

Trees/Brush that are removed during the construction phase shall be chipped on-site and mixed with the topsoil for biomass, chips will not be placed on top of the soil.

Appropriate erosion control devices must be installed, which may include but not limited to, Hydro-seeding, drilled or broadcast seeding. If broadcast seeding is utilized it must be applied at twice the normal seed rate. Site specific measures will be identified during the on-site selection process.

Before any construction begins a pre-construction meeting will take place in order to review BMP's for the project with the contractor, sub-contractors and consultants.

All bare ground within the company's r/w will be covered over winter either by planting a cover crop or by spreading weed free straw/hay and crimped into place.

2. Completion & Final Inspection: The owner/operator shall contact the BIA when the construction activity is completed. The BIA will conduct a final inspection and prepare a corrective action list for items that need to be addressed by the owner/operator.

3. Valves & Risers: All above ground infrastructure associated with pipelines shall be protected with fences or other appropriate means approved by the BIA to prevent harm to livestock and wildlife.

4. Maintenance: The Operator shall maintain lines so as to prevent and/or repair settling, washouts, erosion, and loss of vegetative cover. The borrowing of fill or replacement materials from Trust lands is not allowed, removal of materials from trust land must be evaluated through the NEPA process, permits/ROW completed and appropriate compensation to the owner. Field visits will consist of the Operator, BIA official, and possible a BLM official with a minimum of 2 field visits a year for compliance checks/issue resolution.

5. Abandonment: Prior to abandonment, the Operator shall notify the BIA of the need for abandonment and shall provide an Abandonment Plan, which specifies how the Operator intends to flush and/or purge the line of all products, methods to cap or seal the line, plans for removal of all surface facilities, and plans for reclamation of all disturbed areas. The Abandonment Plan shall be approved by the BIA prior to any abandonment activity.

Q. Pits

1. Flare Pits: Flare pits will not be constructed in coal seams and all flare pits will be constructed with dikes so that any discharge from the flare stack will be contained within the pit. Flare pit igniters shall be functional at all times and inspected on a schedule.

The Operator must maintain vegetative and weed control on the area of operations including a (30) thirty-foot minimum bare ground area around the flare stack.

During drilling, temporary flare pits will be constructed so that all liquids flow into the pit with all pits diked.

2. Drilling Pits: Closed Loop systems would be required at all locations under which the BIA has jurisdiction. No cuttings pit constructed on the well location. However, the BIA/BLM may allow approve a lined (20 mils) cuttings pit on the well pad in an emergency situation.

2a. If BIA/BLM approves a cuttings pit for emergency use, the pit would be approximately 160 feet by 60 feet (49 meters by 18 meters) and approximately 14 feet (4 meters) deep. The emergency cuttings pit would be lined with a reinforced synthetic liner with a minimum thickness of 20 mils to prevent leakage of the drilling mud and cuttings into shallow groundwater.

R. Reclamation

Earthwork for interim and final reclamation must be completed within 6 months of the well being drilled and completed, or the last well drilled and completed on a multi-well pad or plugging (weather permitting). The Bureau of Land Management shall be notified of all reclamation. The BLM will schedule the appropriate personal and set up a meeting on the well location to design the reclamation plan.

1. Reclamation Plan(s): Plans for surface reclamation must be designed to return the disturbed area to productive use and to meet the objectives of the Surface Use Plan of Operations. Reclamation is required of any disturbed surface that is not necessary for continued production operations. Such plans must include, as appropriate: Configuration of the reshaped topography, drainage systems, segregation of spoil materials (stockpiles), surface disturbances, backfill requirements, proposals for pit/sump closures, redistribution of topsoil, soil treatments, seeding or other steps to reestablish vegetation, weed control, and practices necessary to reclaim all disturbed areas, including any access roads and pipelines.

2. Interim (Production) Reclamation: Interim reclamation consists of minimizing the footprint of disturbance by reclaiming all portions of the well site not needed for production operations.

The portions of the cleared well site not needed for operational and safety purposes must be contoured to a final or intermediate contour that blends with the surrounding topography as much as possible, with sufficient level areas remaining for setup of a work-over rig and to park equipment. When practical, the Operator should spread topsoil over the entire location and vegetate to within a few feet of the production facilities, unless an all-weather, surfaced, access route or turnaround is needed.

The Operator shall set aside sufficient topsoil for final reclamation of the reclaimed area. Any topsoil pile set aside should be vegetated to prevent it from eroding and to help maintain its biological viability

The number of the production facilities (i.e. tanks, treaters, pumps, etc.) affects the size of the pad needed for production and the amount of the pad that can be reclaimed during interim reclamation. All areas not needed for production shall be reclaimed, stabilized, and seeded until final reclamation occurs.

3. Final Reclamation: During final reclamation the entire area including the pad and the areas reclaimed under interim reclamation shall be reclaimed, stabilized, and seeded during final reclamation. Vegetation alone does not constitute successful reclamation. The well site must be contoured to original contour or a contour that blends with the surrounding landform, stockpiled topsoil evenly redistributed, and the site vegetated. The topsoil site shall be prepared to provide a seedbed for reestablishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching, fertilizing, seeding, and planting.

4. Emergency Cuttings Pit. After the emergency cuttings pit is no longer necessary full reclamation would be completed and all contents and liners would be removed and disposed of at a state-approved offsite disposal facility.

5. Contouring: All disturbed areas in the course of construction, reconstruction, or heavy maintenance will be reclaimed and vegetated. All slopes and contours will be shaped and smoothed near the original contour, avoiding to the extent possible concentrate/ponding on disturbed areas. Care shall be taken to eliminate all potential concentrations of water on the disturbed area.

6. Drainage/Water Bars: Water bars should divert water to the opposite sides of the disturbed area to avoid concentrations of water. Water bars shall not be constructed in locations that will divert water to fill slopes.

7. Contaminated Soils: Upon request, the Operator shall sample areas that have been subject to previous spills and/or saturation from wastes to determine hydrocarbon and salt concentrations, chemical additives, minerals, and/or other substances with the potential for contamination. A sampling analysis plan and the results of this plan will be provided to the BIA. A plan of operations to remove contaminated soils will be provided to the BIA. Contaminated soils will be hauled offsite to an approved disposal facility before reclamation starts. Treatment methods and/or plans must be approved prior to treatment/removal.

8. Topsoil: During production reclamation, not all topsoil may be used. Excess topsoil is not to be stock piled any taller than 4 feet and will be seeded and protected until final reclamation occurs. Excess topsoil will not be removed from the site for any other uses. When final reclamation occurs, the topsoil used during production reclamation will be stripped and used with the excess topsoil for final reclamation.

All topsoil will be stripped from the general construction right-of-way for pipelines and/or flow lines. Topsoil shall be stripped from areas requiring excavation for level working surface such as side slopes.

During final reclamation, if the site is short of topsoil, the Operator shall import an adequate amount of certified weed seed free clean topsoil to meet the reclamation requirements.

9. Roads: During construction after grading is completed and before applying vegetation measures, areas to be vegetated shall be raked or otherwise cleared of sticks, stumps, stones, and other debris, which might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass covered areas. If any damage by erosion or other causes occurs after the completion of grading and before beginning the

vegetation work, the Operator shall repair such damages. This shall include filling gullies, smoothing irregularities, and repairing other incidental damage. Immediately in advance of the seeding, any crusted surface shall be scarified at right angles to the slope plane.

10. Pipelines: Reclamation outside the Area of Operations must be completed by the end of the next suggested seeding or planting season. As a general guideline under normal weather conditions this timetable will allow adequate time for the line and berm to settle. The line shall then be reworked to repair erosion, settling, washouts, gullies, etc. The berm shall be reduced and spread to blend with natural contours, and the area seeded with native seed.

11. Time Frames For Releasing Reclamation: The reclamation shall be monitored for 2+ years/growing seasons to assure that it is successful (e.g. vegetation returns).

S. Road(s)

The placement of the access roads will be determined in the field. The Construction and maintenance of roads will be done according to the BLM Gold Book standards. All access roads will have a speed limit, cows on roadway, and other signs necessary for safety. Operators are responsible for the welfare of the livestock grazing within the road right-of way. In the case of an animal being hit on an access road it will be up to the operator to make restitution to the livestock owner. It is the responsibility of the operator to minimize dust on all access roads and to assist the TAT tribal road department on all BIA roads to control dust. If two (2) companies share the same access road, a road sharing agreement will be in submitted to the BIA prior to the BIA approving the second company's right of way.

All operators shall perform snow removal activities as not to destroy or alter the landscape. All activities will be confined to approved ROWs, to include removal and stockpiling. All activities will be conducted with rubber tire equipment; no tracked vehicles will be utilized for removal activities, tracked vehicles generally result in a greater potential for disturbance of the landscape.

If a Company wants to remove snow from an area outside of their approved ROW a revocable permit will need to be issued by the BIA. The permit will contain the permissions from the landowners by tract. The permit will show where the Company can stockpile or push snow off of their ROW If a stockpiling area is needed, the area will need to be staked out prior to any snow piling. All snow removal equipment outside of the approved ROW will need to have 6 inches of clearance above the ground, trucks will not be used to haul snow to the stockpiling area.

All areas within the approved ROW and approved locations outside of the ROW shall be reclaimed after spring melt. This reclamation shall include removal of all deposited debris, reshaping if necessary and reseeding of any disturbed areas, as needed. Final reclamation clearance for any disturbed areas resulting from snow removal activities must be approved in writing by BIA Agency staff.

Companies can use a snow blower to remove snow from there ROW without a permit. This practice can only occur on the approved ROW. All debris will be cleaned up in the spring. Temporary snow fence can be constructed with the approval of the BIA to control drifting.

T. Safety

The Operator shall maintain structures, facilities, improvements, and equipment in a safe and neat manner and must take appropriate measures to protect the public from hazardous sites or conditions resulting from the operations.

U. Seed Mixtures & Seeding

1. Mixtures: The native seed mixture shown in the chart below shall be used for seeding all reclamation work completed within one (1) year of completion of this well, unless additional mixtures are approved by the BIA. The Operator shall request from the Bureau of Indian Affairs updated seed mixtures for any seeding accomplished after the one-year period. Approved cover crops are wheat, barley and oats at the rate of 10lbs per acre.

2. Report of Seeding & Certification: The mixture shall be lab tested to identify the noxious and invasive weed seed present and certified weed free by the Seed Company. A copy of the certification including the purity and viability of the seed mix shall be supplied to the Bureau of Indian Affairs. Upon completion of the planting, a report of Seeding from the Operator or the seeding contractor shall be submitted to the Bureau of Indian Affairs verifying that the seeding is completed.

3. Seeding and/or Planting Dates: The best success rates for seeding or planting are normally from the end of spring thaw to May 15 or from October 1 to freeze-up. Seeding will be repeated annually until such areas are accepted in writing by the BIA as being satisfactorily vegetated (3-5 years average but may take longer) and stabilized.

4. Seeding Methods: Seeding shall be completed with grass seeders or small rangeland drills. Large grain drills are not allowed. Rangeland drills are designed to seed the larger diameter seed and seed mixes that are uniform in size. Rangeland drills should be and typically are equipped with a broadcast (dribble) box that drops the smaller diameter seed if applicable, onto the surface. A drag implement attached will provide a light soil cover over the small diameter seed. All planting will be parallel to contours and use of criss-cross patterns to prevent erosion.

When broadcast seeding, by hand or by hand held spreaders or with ATV mounts, twice the normal seed mixture rate will be used. Areas broadcasted shall be raked or dragged to ensure a minimum of half-inch soil coverage over the seed.

5. Seed Beds: The seedbed should be thoroughly worked, firm, and free of clods. Drill row spacing should be about two (2) inches. Seeding depths vary from ¼ to ½ inch deep and should be no deeper than one half (½) inch. Seeding deeper than one (1) inch will result in a poor stand.

6. Mulches: A variety of mulching techniques may be required on disturbed slopes to hold seed. These sites will be mulched using certified weed free clean straw/hay. When disturbed areas will be bare over winter mulch must be evenly distributed to hold soil until vegetation can be established. Trees/brush that are removed during construction shall be chipped and mixed into the topsoil to serve as biomass, chips will not be placed on top of soil.

Species of Seed	App. Rate PLS (lbs/ac)
Western Wheatgrass	2.4
Green Needlegrass	1.2
Blue Grama	0.2
Sideoats Grama	0.6
Little Bluestem	0.4
Slender Wheatgrass	0.5
Prairie Junegrass	0.1
	Total: 5.4

Use certified seed when available
Origin of non-varietal ('common') grass seed of both native and introduced species for pasture and hayland planting is limited to North Dakota, South Dakota, Nebraska, Montana, Wyoming, Minnesota, Alberta, Saskatchewan, and Manitoba

No noxious weed amounts are allowed on any seed tags.

V. Signs

1. Well Sign: The Operator shall install and maintain a legible and durable well sign showing the well number, name of Operator, lease serial number, surveyed location (quarter/quarter, section, township, range). The sign shall be legible under normal conditions at a minimum distance of fifty feet (15.24 meters)

2. Signs Other: A sign containing the well name, operator name, no trespassing, and emergency contact information will be installed before drilling of the well commences. The sign will be posted at the cattle guard entering the well site and maintained for the life of the well site. The sign shall be legible under normal conditions at a minimum distance of fifty feet (15.24 meters).

3. Hydrogen Sulfide (H2S): The Operator shall provide signs warning of the dangers of hydrogen sulfide around developed oil production sites, where periodic gas monitoring shows presence of hydrogen sulfide in excess of 10ppm. Note that the gas purchaser conducts monthly monitoring.

W. Storage (Bone) Yards

The Operator shall obtain an approved commercial lease from the BIA for any Bone yards or areas of storage placed on trust lands and complete the NEPA process on all proposed areas. Note: this COA does not apply to temporary storage of materials on a well pad utilized in normal drilling and production operations.

X. Wastes

1. Trash, Garbage, Junk, Debris, etc.: During drilling, portable dumpsters will be used for all trash. All trash will be hauled off site; no burning or burying will be allowed. Doors, covers, and/or lids will be kept closed.

During production of the well, all debris, garbage, trash, junk, etc., shall be removed from the site and properly disposed of at an approved EPA certified landfill and/or permitted by the State of North Dakota.

2. Sewage: During the life of the well, sewage will be disposed of and/or treated according to county and state requirements in portable chemical toilets and/or approved facilities.

3. Production Fluids: During drilling, testing, and establishing production, all fluids shall be contained in tanks.

4. Equipment Fluids: Motor oil, hydraulic fluids, brake fluids, antifreeze, etc. will be properly disposed at an approved facility. Soils contaminated by these fluids will be removed and properly disposed of at an approved facility.

5. Leaks and Spills: All leaks and spills will be handled in accordance with the Gold Book standards and specifications. For reference see Gold Book pages 39-40 on reporting procedures.

Y. Wildlife

1. Compliance with the Migratory Bird Treaty Act

Avoidance – All avenues to move the access road or well pad away from a discovered nest or sensitive habitats shall be undertaken.

February 1 to July 15 is considered nesting season and construction activities during this time shall be avoided to the extent possible.

Options:

A) Areas identified as migratory bird nesting habitat shall be mowed or grubbed in the fall and early spring to minimize nesting of ground nesting birds and maintained through the season. A Right of Way will need to be in place before any disturbance occurs.

B) An avian bird survey will be implemented five (5) days prior to construction during the nesting season to determine if active nest are present. If Active nests are discovered one of two avenues can occur; **First**, allow construction to be delayed until birds have hatched and abandon nest and or moved. **Second**, contact USFWS and TAT Game and Fish for other options, with the BIA being notified of any options and decisions made.

All other Wildlife species will also be considered a valuable resource and mitigated appropriately.

2. Concurrence with Endangered Species Act

A 0.5 mile buffer from piping plover critical habitat will be maintained for the well pad sites, unless intervening topographical features provide a visual barrier.

Whooping Cranes

During construction, work must stop within one (1) mile of any whooping crane(s) sighted from the proposed project area, and the USFWS Ecological Services Office will be contacted immediately at (701) 250-4402. In coordination with the service, work may resume after the crane(s) have left the area.

Underground power lines are the standard. Any installation of above ground power lines will be evaluated by BIA Environmental staff, TAT Environmental staff and the USFWS as to the applicability of an exception to the standard. If an exception is granted based on site conditions by the involved parties, at a minimum all new lines will utilize approved visual marking devices within the whooping crane migration corridor.

3. Compliance with the Bald and Golden Eagle Protection Act

Maintain a minimum 0.5 mile buffer around all known bald and golden eagle nests.

A survey of the proposed project area will be conducted between March1 and May 15, before leaf-out so nests are clearly visible. Any active and inactive nests discovered should be reported to the USFWS Bismarck Ecological Services Office, and the Oil Company must maintain a minimum 0.5 mile buffer

The information gathered from these surveys will be shared with the USFWS Bismarck Ecological Services Office.

Z. Water

Control & Drainage: The Operator shall control water run-off so as to control soil erosion and prevent damage to facilities. During the production phase of the well, drainage ditches will be established and maintained on the pad to divert water away from the pad location and off the area of operations. Standing water and/or puddles will not be allowed.

Adequate clinker/scoria or gravel will be used on the area of operations to prevent muddy or soft ground conditions causing vehicles to rut or sink. The taking or borrowing of clinker/scoria or gravel from Trust lands is not allowed.

Pad drainage devices such as valves, pipes, etc. will not be allowed. No water shall runoff the production pad, a containment system will need to in place and maintained by the operator. Specifics of the measures needed will be discussed and specified during the on-site process.

SPECIAL CONDITIONS:

The Operator shall protect the Indian grazing rights, water rights, and other Indian rights to the surface of the lands.

The operator may install steel locked gates to deter trespassing on their locations. Operators will furnish the BIA and BLM with the combinations to these locked locations.

All trespasses by the oil company/ROW holder will be assessed a penalty double of what the original negotiations were made on the right-of-way. This penalty will be determined after the as-built is turned into the

BIA. Additional surveys may be required and financial responsibility for additional surveys is the responsibility of the ROW holder/oil company.

Dust control will be the responsibility of the Oil Company/Operator. This includes dust control on access roads and haul roads utilized by the companies.

A weekly report will sent to the BIA on the status of each Oil Companies wells on the Ft Berthold Indian Reservation.

The BIA will be notified a minimum of one (1) week prior to the start of construction of the access road and well location.

Communitization Agreements will be submitted before a Right-of Way and Concurrence Letter for the APD is issued to the Oil Company.

The Right-of-Way will be paid by the Oil Company/Grantee before construction begins on the access road and well location.

Road sharing agreements will be signed and submitted to the BIA prior to any company using another company's access road.

Emergency contact information for each well will be turned into the BIA after the well is put into production. Form will be provided by the BIA.

All Rights of Ways that are associated with a well location are the responsibility of the Oil Company (access roads, well location, electrical, pipelines, etc.)

ENVIRONMENTAL ASSESSMENT

United States Bureau of Indian Affairs

Great Plains Regional Office
Aberdeen, South Dakota

Whiting Oil and Gas Corp.

Drilling of Two Multiple Well Pads, Charging Eagle 14-22 and Charging Eagle 3-25 Well Pads
(Seven Oil & Gas Wells)

Fort Berthold Indian Reservation

December 2015

For information contact:

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

Finding of No Significant Impact

Whiting Oil and Gas Corp. (Whiting)

Environmental Assessment for
Drilling of Two Multiple Well Pads, Charging Eagle 14-22 and Charging Eagle 3-25 Well Pads
(Seven Oil & Gas Wells)

Fort Berthold Indian Reservation
Dunn County, North Dakota

The U.S. Bureau of Indian Affairs (BIA) has received a proposal to drill seven oil and gas wells located atop two well pads as follows:

- Charging Eagle 14-22-10-12H3, Charging Eagle 14-22-10-12H, and Charging Eagle 14-22-10-12H3A (Charging Eagle 14-22 Site) located in Section 22, T147N, R92W, 5th P.M.

- Charging Eagle 3-25-13-3H3, Charging Eagle 3-25-13-2H3, Charging Eagle 3-25-13-2H3 and Charging Eagle 3-25-13-1H3 (Charging Eagle 3-25 Site) located in Section 25, T147N, R92W, 5th P.M.

Associated federal actions by BIA include determinations of effect regarding environmental resources and positive recommendations to the Bureau of Land Management regarding the Applications for Permit to Drill.

The potential of the proposed action to impact the human environment is analyzed in the following Environmental Assessment (EA), as required by the National Environmental Policy Act. Based on the EA, I have determined that the proposed project will not significantly affect the quality of the human or natural environment. No Environmental Impact Statement is required for any portion of the proposed activities.

This determination is based on the following factors:

1. Agency and public involvement solicited for the preceding NEPA document was sufficient to ascertain potential environmental concerns associated with the currently proposed project.

2. Protective and prudent measures were designed to minimize impacts to air, water, soil, vegetation, wetlands, wildlife, public safety, water resources, and cultural resources. The remaining potential for impacts was disclosed for both the proposed action and the No Action alternatives.

3. Guidance from the U.S. Fish and Wildlife Service has been fully considered regarding wildlife impacts, particularly in regard to threatened or endangered species. This guidance includes the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) (MBTA), the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.) (NEPA), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250) (BGEPA), Executive Order 13186 “Responsibilities of Federal

Agencies to Protect Migratory Birds", and the Endangered Species Act (16 U.S.C. 1531 et seq.) (ESA).

4. The proposed action is designed to avoid adverse effects to historic, archaeological, cultural and traditional properties, pads and practices. Compliance with the procedures of the National Historic Preservation Act is complete.

5. Environmental justice was fully considered.

6. Cumulative effects to the environment are either mitigated or minimal.

7. No regulatory requirements have been waived or require compensatory mitigation measures.

8. The proposed project will improve the socio-economic condition of the affected Indian community.

_____ _____

Regional Director Date

CONTENTS

FIGURES

TABLES

CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 Introduction

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321–4370h) and regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] Parts 1500–1508). An EA is an informational document intended for use by both decision-makers and the public. It discloses relevant environmental information concerning the Proposed Action and No Action Alternative.

1.2 Description of the Proposed Action

The Fort Berthold Reservation encompasses 988,000 acres, 457,837 of which are in tribal and individual Indian ownership by the Three Affiliated Tribes (Mandan, Hidatsa, and Arikara) and its members. The reservation is located in west central North Dakota and is split into three areas by Lake Sakakawea, which traverses the center of the reservation. The Fort Berthold Reservation occupies sections of six counties including Dunn, McKenzie, McLean, Mercer, Mountrail and Ward counties.

The Fort Berthold Reservation lies atop the Bakken Formation, a geologic formation rich in oil and gas deposits that extends approximately 25,000 square miles beneath North Dakota and Montana, United States and Saskatchewan and Manitoba, Canada. Approximately two-thirds of the Bakken Formation is beneath North Dakota. The Three Forks Formation lies beneath the Bakken formation. In 2013, the North Dakota Department of Mineral Resources (NDDMR) and the US Geological Survey (USGS) estimated that there are approximately 7.4 billion barrels of recoverable oil available in the Bakken and Three Forks Formations[1]. The Department's director estimates that there are 30 to 40 remaining years of production, or more if technology improves.

The proposed action includes a positive recommendation to the Bureau of Land Management (BLM) by the Bureau of Indian Affairs (BIA) and approval of right-of-way (ROW) for Whiting Oil & Gas Corp. (Whiting) to construct two proposed well pads on the Fort Berthold Reservation, resulting in the drilling and completion of seven wells. These well pads are proposed to be positioned in the following locations and as shown on ***Figure 1, Project Location Map.***

[1] The Bakken contains about 169 billion barrels of oil and the Three Forks contains about 20 billion barrels; however, most of this is not expected to be recoverable.

Figure 1, Project Location Map

Charging Eagle 14-22 well pad located in the SE¼SW¼ of Section 22, T147N, R92W, 5th P.M. and containing the following wells:

- Charging Eagle 14-22-10-12H3
- Charging Eagle 14-22-10-12H
- Charging Eagle 14-22-10-12H3A

Charging Eagle 3-25 well pad located in the NE¼NW¼ of Section 25, T147N, R92W, 5th P.M. and containing the following wells:

- Charging Eagle 3-25-13-1H3
- Charging Eagle 3-25-13-2H3
- Charging Eagle 3-25-13-3H3
- Charging Eagle 3-25-13-4H3

Each well would have an associated drilling unit in which the minerals to be developed by that well are located. Proposed completion activities include acquisition of rights-of-way (ROW), infrastructure (including subsurface oil/gas gathering lines, water lines and buried electric lines) for the proposed wells, and roadway improvements.

1.3 Need for the Proposed Action

The Three Affiliated Tribes own their mineral resources, which are held in trust by the United States government through the BIA. The BIA's positive recommendation to the BLM for approval of the Applications for Permit to Drill (APDs) of the seven wells would provide important benefits to the Three Affiliated Tribes, including revenue that could contribute to the Tribal budgets, satisfying Tribal obligations, and funding land purchase programs to stabilize its land base. It would also provide individual members of the Tribes with needed employment and income. Furthermore, the proposed action gives the United States an opportunity to reduce its dependence on foreign oil and gas by the development of domestic sources of oil and gas.

1.4 Purpose of the Proposed Action

The purpose of the proposed action is to allow the Three Affiliated Tribes to provide for oil and gas development on the identified land on the Fort Berthold Reservation. Additionally, the purpose is to access commercially recoverable oil and gas resources on the lands subject to Whiting's lease areas by drilling seven wells at the identified locations.

1.5 Regulations that Apply to Oil and Gas Development Activities

The BIA must comply with NEPA before it issues a determination of effect regarding environmental resources and provides a recommendation to the BLM regarding the APDs. Therefore, this EA for the proposed wells is necessary to analyze the potential direct, indirect, and cumulative impacts of the proposed project.

Oil and gas development activities on Indian lands are subject to a variety of federal environmental regulations and policies under authority of the BIA and BLM. This inspection and enforcement authority derives from the United States trust obligations to the Tribes, the Indian Mineral Leasing Act of 1938, the Indian Mineral Development Act of 1982, and the Federal Oil and Gas Royalty Management Act of 1982. Under the BIA's regulations (25 CFR Part 225), the BLM exercises authority over oil and gas development on Tribal lands under its implementing regulations (43 CFR Part 3160) and its internal supplemental regulations and policies. The BLM's authority includes the inspection of oil and gas operations to determine compliance with applicable statutes, regulations, and all applicable orders. These include, but are not limited to, conducting operations in a manner which ensures the proper handling, measurement, disposition, and site security of leasehold production; and protecting other natural resources, environmental quality, life and property.

CHAPTER 2 ALTERNATIVES

2.1 Introduction

This chapter provides information on the development and evaluation of project alternatives. The development of alternatives is directly related to the purpose and need for the project. Two alternatives are being considered for this project: a no action alternative and a proposed action alternative.

2.2 Alternative A: No Action

Under the no action alternative (Alternative A), the BIA would not recommend and BLM would not authorize the drilling of seven oil and gas wells atop two well pads. There would be no environmental impacts associated with Alternative A; however, the Three Affiliated Tribes would not receive potential royalties on production or other economic benefits from oil and gas development on the reservation. Further, the oil and gas resources targeted by the proposed action would not be recovered and made available for domestic energy use.

2.3 Alternative B: Proposed Action

The proposed action (Alternative B) includes a positive recommendation by the BIA and authorization by the BLM to construct and drill seven oil and gas wells atop two well pads, as well as associated ROW acquisition, roadway improvements, and infrastructure for the wells. Infrastructure may include subsurface oil or gas gathering pipelines, water lines and buried electrical lines, all of which may be located within the access road corridor (about 250-foot wide area surveyed).

The proposed action would consist of construction of two well pads containing a total of seven well heads, two access roads, associated infrastructure, and drilling within one spacing unit and one consolidated Bakken pool. The well pad is where the actual surface disturbance caused by drilling activities would occur. The spacing unit is the location of the minerals that are to be developed. The location of the proposed well pads, access roads, and proposed drilling techniques were specifically selected to minimize surface disturbance and environmental impacts.

The well pads would require new ROW for access points, supporting buried electrical lines, water lines, and oil/gas gathering lines associated with oil and gas production. ROW would be located to avoid sensitive surface resources and any cultural resources identified during site surveys. Access roads would be improved to eliminate overly steep grades, maintain current drainage patterns, and provide an all-weather driving surface.

Intensive pedestrian resource surveys of the proposed Charging Eagle well pad and access road locations were conducted on July 22, 2014 by KLJ. The purpose of the surveys was to gather site-specific data and photos with regard to botanical, biological, threatened and endangered species, eagles, migratory birds, and water resources. A study area of more than 20 acres centered on each well pad center point and a 250-foot wide access road corridor was evaluated for each site. Resources were evaluated using visual inspection and pedestrian transects across the site. In addition, an aerial helicopter survey was conducted May 14–15, 2014 for eagles and eagle nests within 0.5 miles of all

project disturbance areas. These consisted of surveying Whiting lease areas for nests focusing on wooded areas and draws capable of providing suitable habitat for non-ground nesting birds, as well as cliffs and prairie grassland areas suitable for ground nests. These surveys were conducted to aid in project design and avoidance of nests. No eagle nests were identified within 0.5 miles of the proposed access roads and well pads.

The BIA-facilitated EA onsite assessments of the proposed well pads and access roads were conducted on September 10, 2014. The BIA Environmental Protection Specialist, Kodiak (now Whiting), Mandan, Hidatsa, Arikara (MHA) Energy, KLJ, and Juniper Archaeology (Juniper) participated in these assessments. Representatives from the Tribal Historic Preservation Office (THPO) were invited to the onsite, but did not participate. The BIA and MHA Energy recommended minor design changes for the Charging Eagle 3-25 well pad location and changes to the Charging Eagle 14-22 access road during this September 10th onsite. These locations were revisited on 24th, 2014 with the BLM during a ROW onsite and the adjusted locations were deemed acceptable. During these assessments, construction suitability with respect to topography, stockpiling, drainage, erosion control, and other surface issues were considered. Well pad and access road locations were adjusted, as appropriate; to avoid conflicts with identified environmental and cultural areas of concern. Those present at the onsite assessments agreed that the selected locations, along with the best management practices (BMPs) and other commitments Whiting has made, are positioned to avoid, minimize, or mitigate impacts to sensitive environmental and cultural resources. Conditions agreed upon by the United States Fish and Wildlife Service (USFWS) and BIA during preparation of the Programmatic Biological Assessment were considered during the onsites and have been implemented for the proposed projects. Please refer to ***Appendix I, PBA Checklist.***

2.3.1 Charging Eagle 14-22 Well Site

The Charging Eagle 14-22 site would consist of a three well pad located in the SE¼SW¼ of Section 22, T147N, R92W, 5th P.M. to access potential oil and gas resources within the spacing units consisting of Section 10, 15 and 22, T147N, R92W, 5th P.M. Please refer to ***Figure 2, Charging Eagle 14-22 Spacing Unit.*** All three of the wells would access resources within this spacing unit. The Charging Eagle 14-22-10-12H3 and Charging Eagle 14-22-10-12H3A wells would target the Three Forks Formation, while the Charging Eagle 14-22-10-12H well would target the Bakken Formation.

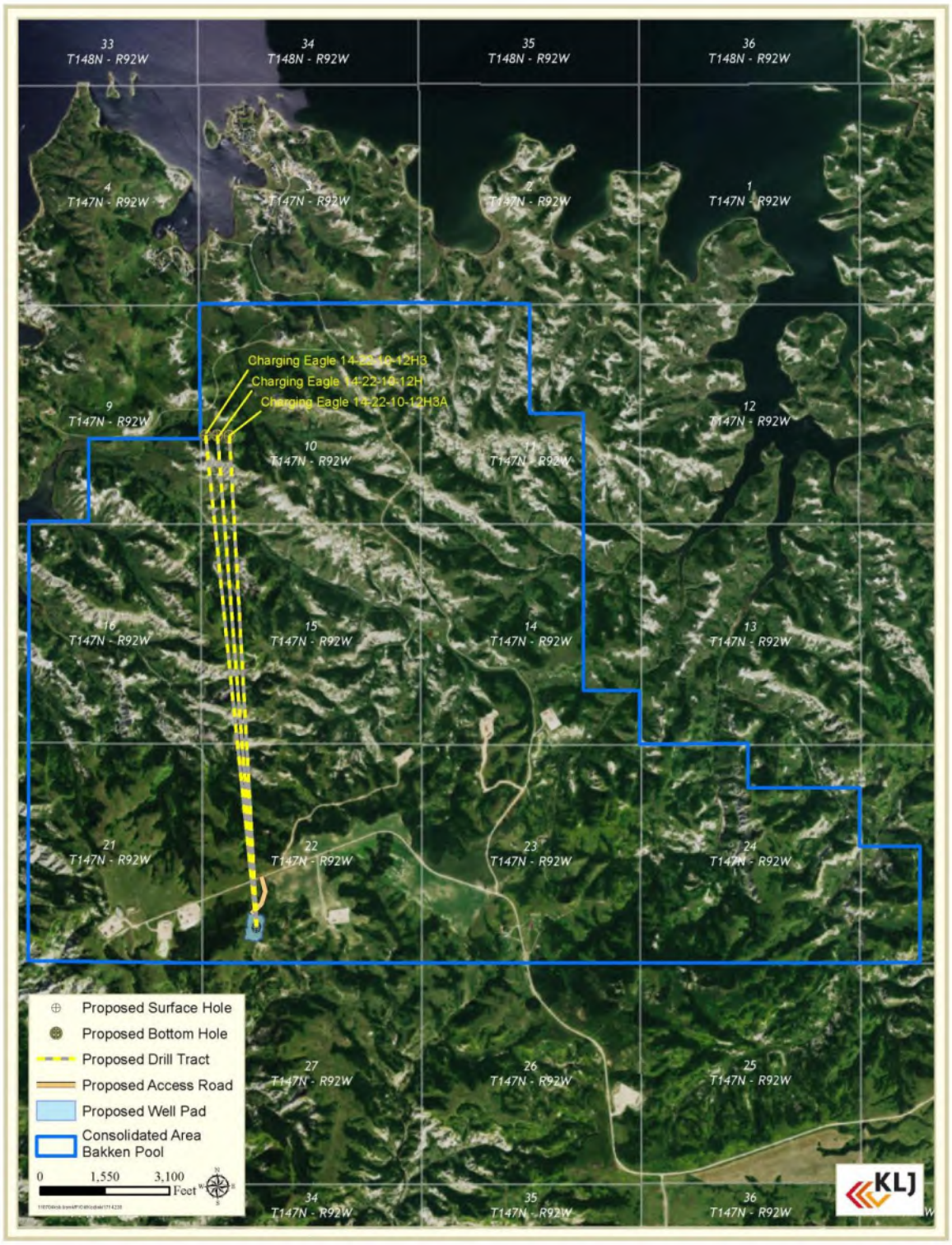


Figure 2, Charging Eagle 14-22 Spacing Unit

The Charging Eagle 14-22 site would be accessed from the north. A new access road, approximately 1,332 feet long, would be constructed to connect the Charging Eagle 14-22 site to BIA Route 22 roadway. This new road would provide access to all three wells on the Charging Eagle 14-22 well pad. Minor spot grading may be needed to flatten existing landscape grades along the remainder of the proposed access road alignment. At least one cattle guard and two culverts would be installed along this new access road with additional being placed if determined necessary during site construction. Please refer to ***Figure 3, Charging Eagle 14-22 Well Pad Overview, Northwest Corner Side Facing*** **South*east*** for a depiction of the well site. The north side of the Charging Eagle 14-22 access road will be armored with rock rip rap at the location of the intermittent drainage. The access road will also be matted and have straw wattles placed on it to minimize erosion.

Figure 3, Charging Eagle 14-22 Well Pad Overview, Northwest Corner Side Facing Southeast

2.3.2 Charging Eagle 3-25 Well Site

The Charging Eagle 3-25 site would consist of a four well pad located in the NE¼NW¼ of Section 25, T147N, R92W, 5th P.M. to access potential oil and gas resources within the spacing unit consisting of Sections 13 and 24 in T147N, R92W, 5th P.M. Please refer to ***Figure 4, Charging Eagle 3-25 Spacing Unit.*** All four of the wells would access resources within this spacing unit. All four wells would target the Three Forks Formation.

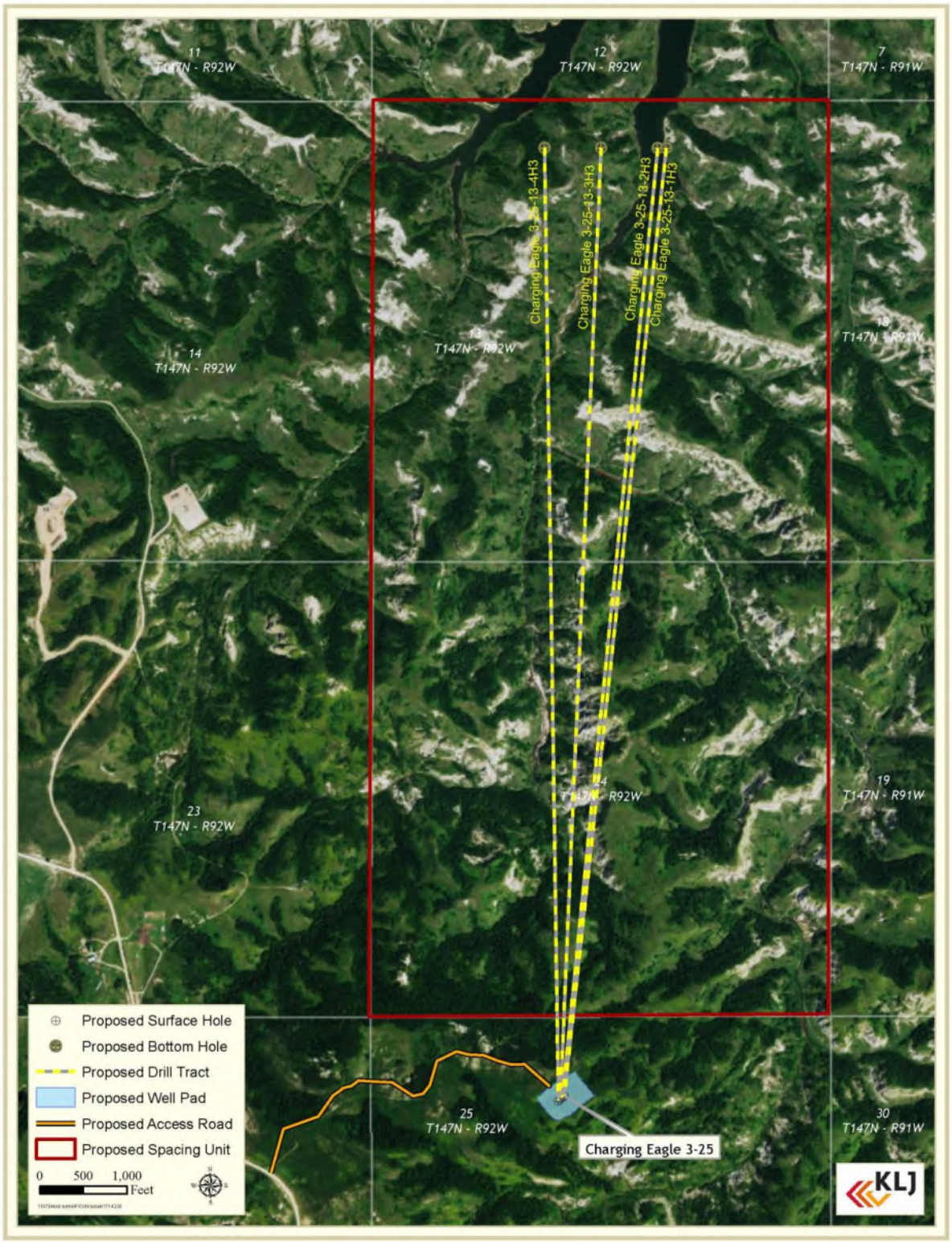


Figure 4, Charging Eagle 3-25 Spacing Unit

The Charging Eagle 3-25 site would be accessed from the west. A new access road approximately 4,125 feet long would be constructed to connect the Charging Eagle 3-25 site to BIA Route 22 roadway. This road would provide access to all four wells on the Charging Eagle 3-25 well pad. Minor spot grading may be needed to flatten existing landscape grades along the proposed access road alignment. Approximately three culverts and one cattle guard would be installed along this new access road with additional being placed if determined necessary during site construction. Please refer to ***Figure 5*** for a depiction of the well site.

Figure 5, Charging Eagle 3-25 Well Pad Overview, North Side Facing Southeast

2.3.3 Activities that Apply to Development of All Wells

The following sections include a discussion of items that would be consistent for construction of the proposed well pads.

2.3.3.1 Field Camps

Self-contained trailers may temporarily house key personnel onsite during drilling operations. No long-term residential camps are proposed. Sewage would be collected in standard portable chemical toilets or service trailers onsite and then transported off-site to a state-approved wastewater treatment facility. Other solid waste would be collected in enclosed containers and disposed of at a state-approved facility. All sewage holding tanks would be either double walled or contained within a secondary containment system.

2.3.3.2 Access Road

Existing roadways would be used to the extent possible to access the proposed wells; however, the construction of new access roads would also be required. The running surface of the access roads would be surfaced with crushed gravel or scoria from a previously approved location, and erosion control measures including straw wattles, silt fences, straw mulch, and/or hydro seeding would be installed on down sloping sides. A ROW width of 100 feet would be required for access road construction, and utilities and pipelines installation. The access road for the Charging Eagle 3-25 was modified during the onsite to abut the tree line, in order for the landowner to continue to get the best use of the hay field occurring adjacent to the proposed access road alignment. This measure mitigated effects to the landowner and the current land use in the vicinity of the project. The access road for each well site would consist of a 20 to 28-foot wide roadway with the remainder of the disturbed area due to construction slopes, gathering pipelines, and electrical infrastructure. The out slope portions of the constructed access roads would be re-seeded upon completion of construction to reduce access road related disturbance. Access road construction would comply with road design standards outlined in the BLM's Gold Book (4th Addition, 2007). The access road corridors were surveyed and cleared by KLJ, Juniper, and BIA.

All efforts would be made to complete construction outside the migratory bird nesting season (February 1 through July 15) in order to avoid impacts to migratory birds during the breeding/nesting season. In the event that construction needs to take place during the migratory bird nesting season, a pre-construction survey for migratory bird nests would be conducted by a qualified biologist within five days prior to the initiation of all construction activities. The findings of the pre-construction surveys would be reported to the BIA and MHA Energy. In-lieu of pre-construction surveys, the project areas could be stripped, mowed and grubbed prior to the nesting season and maintained throughout the season prior to construction.

2.3.3.3 Well Pad

Each proposed well pad would consist of a leveled area surfaced with several inches of gravel or crushed scoria. The pad would be used for the drilling rig and related equipment. A 24-inch high berm would be installed along the perimeter of the well pad to prevent runoff from leaving the pad. A pit-less, closed loop system would be used during drilling. Cut and fill slopes on the edge of the well pad would be determined on a well-by-well basis. The level well pad, plus cut and fill slope areas, required for drilling and completing operations would range from approximately 6.06 to 7.92 acres. To prevent livestock from accessing the site, the entirety of each well pad would also be fenced. The total quantity of land within the well pad fenced area would range from approximately 7.71 to 11.44 acres. Please refer to ***Figure 6, Charging Eagle 14-22 Well Site Overview*** and ***Figure 7, Charging Eagle 3-25 Well Site Overview.*** The BIA identified that the west corner of the Charging Eagle 3-25 well pad be designed with a 1.5:1 ratio slopes which are to be matted immediately and have straw wattles placed following grading to hold the soils in place.

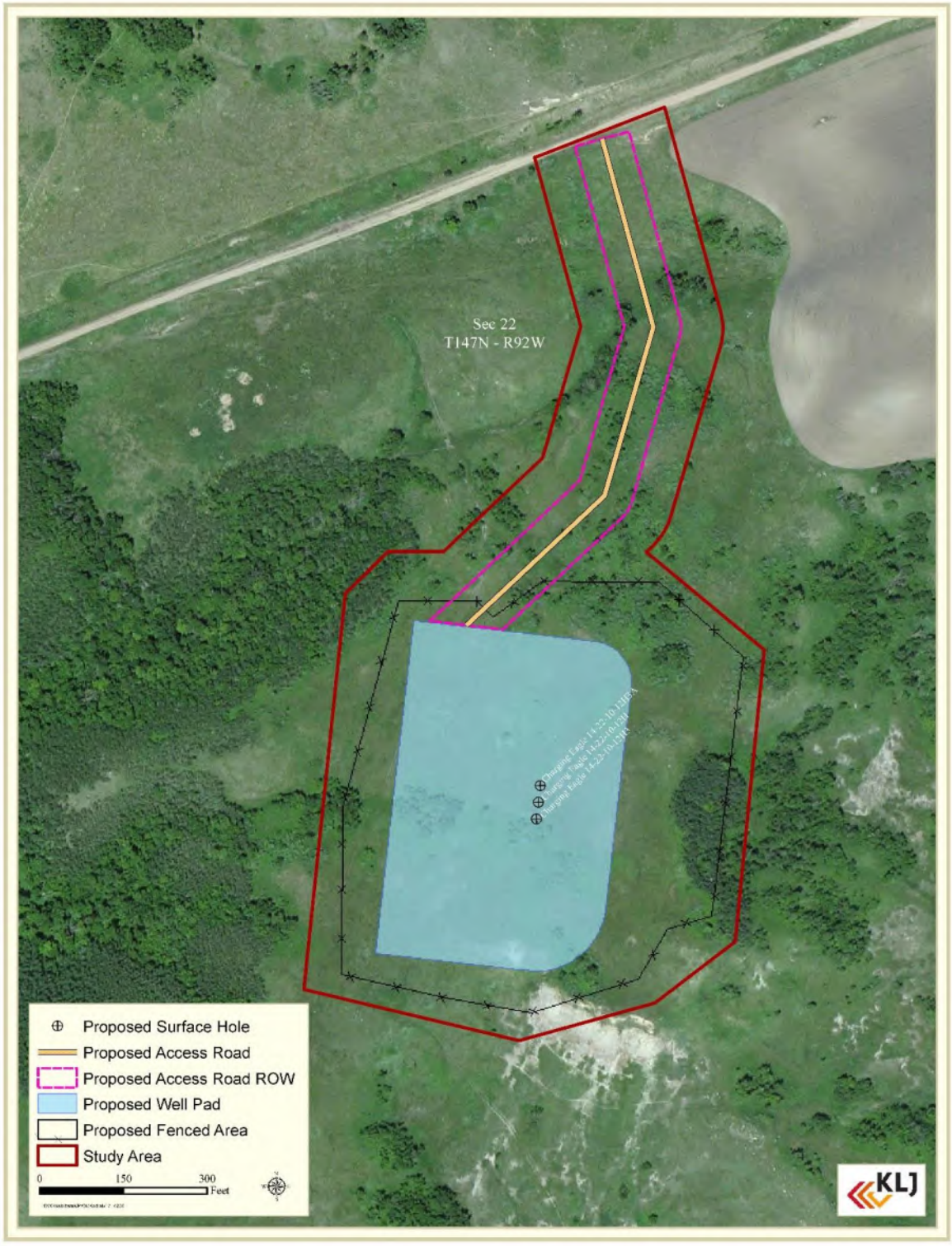


Figure 6, Charging Eagle 14-22 Well Site Overview

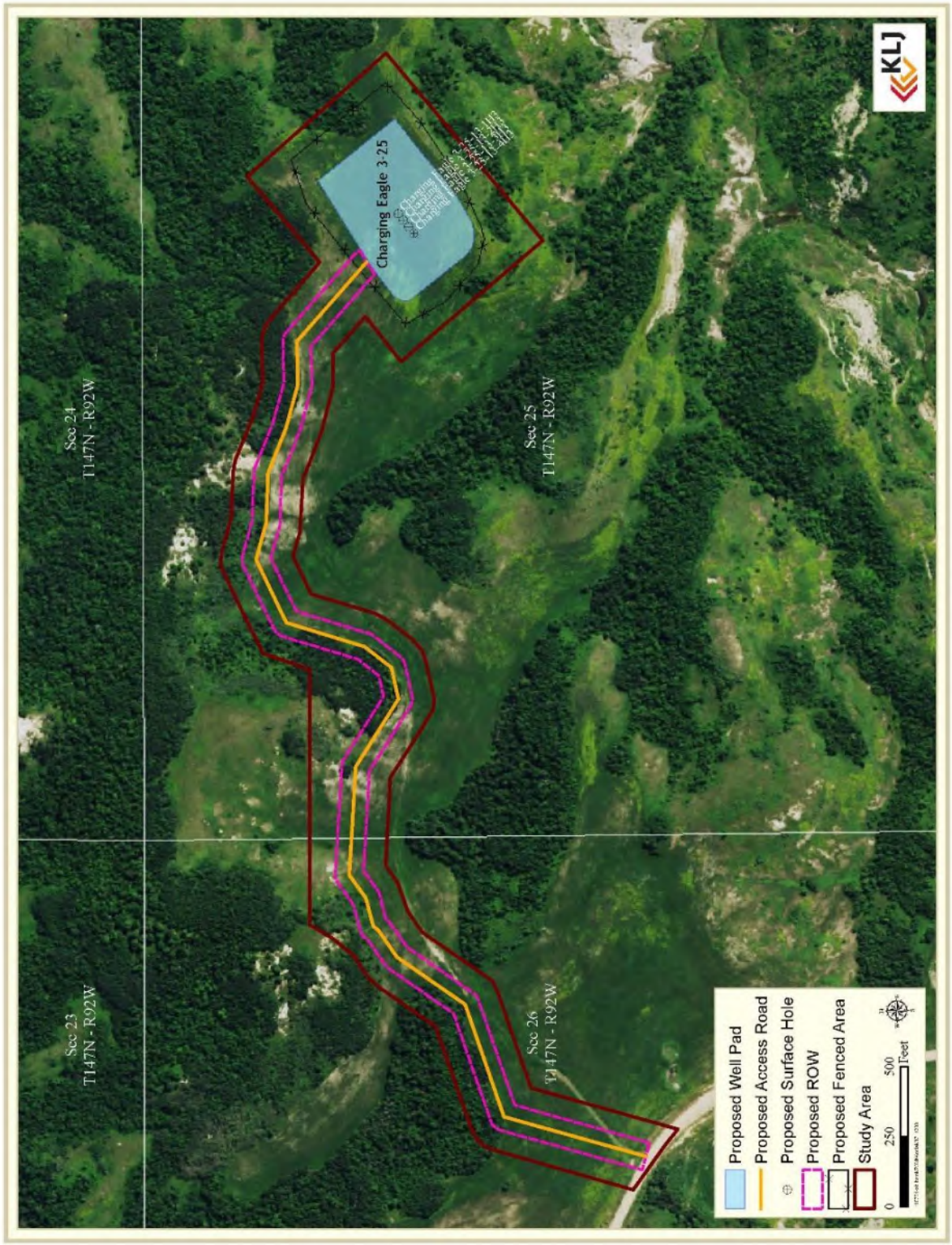


Figure 7, Charging Eagle 3-25 Well Site Overview

The well pad area would be cleared of vegetation, stripped of topsoil and graded to specifications in the APDs submitted to the BLM. Construction would comply with the standards and guidelines prescribed in the BLM's Gold Book. Topsoil would be stockpiled and stabilized until disturbed areas are reclaimed and re-vegetated. Excavated subsoils would be used in pad construction, with the finished well pad graded to ensure water drains away from the drill site. Erosion control at the site would be maintained through the use of BMPs, which may include, but are not limited to, water bars, diversion ditches, bio-logs, silt fences and re-vegetation of disturbed areas. Additional site-specific BMPs are as follows:

- A 24-inch high berm would be installed around the well pads to prevent run-off from leaving the site and run-on from entering the site.
- The access road for the Charging Eagle 14-22 was modified to avoid impacts to adjacent cropland and lessen impacts to an intermittent drainage. The north side of the access road will be armored with rock rip rap at the location of the intermittent drainage. The access road will also be matted and have straw wattles placed on it.
- The west corner of the Charging Eagle 3-25 well pad be designed with a 1-1 ½ slopes which is to be matted immediately and have straw wattles placed following grading to hold the soils in place. Per BIA request, KLJ will inspect pad construction to ensure measures are being installed and provide photo documentation back to BIA.
- All electrical/utility lines would be buried along the access road corridors.
- A water diversion ditch would be placed along the cut sides of the well pads to assist in diverting water around the pad.
- Woody vegetation cleared from the pads would be mulched and incorporated into topsoil stockpiles.
- The topsoil stockpiles would not exceed four feet in height.
- Straw waddles or equivalent erosion control measures would be installed on cut and fill slopes.

All efforts would be made to complete construction outside the migratory bird nesting season (February 1 through July 15) in order to avoid impacts to migratory birds during the breeding/nesting season. In the event that construction needs to take place during the migratory bird nesting season, a pre-construction survey for migratory bird nests would be conducted by a qualified biologist within five days prior to the initiation of all construction activities. The findings of the pre-construction surveys would be reported to the BIA and MHA Energy. In-lieu of pre-construction surveys, the project areas could be stripped, mowed and grubbed prior to the nesting season and maintained throughout the season prior to construction.

2.3.3.4 Drilling

Following access road construction and well pad preparation, a drilling rig would be rigged up at the well pad. The time for rigging up, drilling the well, and rigging down the well is anticipated to be about 17 days. During this phase, vehicles and equipment would access the site several times a day.

Initial drilling would be vertical to a depth of approximately 10,100 feet, at which time it would angle to become horizontal at 11,000 feet. Drilling would then be followed by lateral reaches into the Middle Bakken Member target. The Three Forks Formation would become horizontal about 100 feet lower in

elevation and follow similar lateral reaches. This horizontal drilling technique would minimize surface disturbance.

For the first 2,000 feet drilled at each well (commonly referred to as a "surface hole"), a fresh water based mud system with non-hazardous additives would be used to minimize contaminant concerns. Water would be obtained from a commercial source for this drilling stage. About eight gallons of water would be used per foot of hole drilled, for a total of about 40,000 gallons (20,000 gallons in the hole and 20,000 gallons as working volume at the surface). After setting and cementing the surface casing, an oil-based mud system consisting of about 80% diesel fuel and 20% saltwater would be used to drill the remainder of the vertical hole and curve. Seven-inch production casing would be set and cemented through the curve and into the lateral. A saltwater based drilling mud would then be utilized for the horizontal portion of the wellbore.

Drilling fluids would be separated from cuttings and contained in steel tanks placed on liners until they are ready for re-use. Cuttings generated from drilling would be separated out from drilling fluids, dumped into a truck and transported to an approved disposal site/facility. Whiting would institute density testing of soils at the entire well pad to ensure a requirement of > 95% soil compaction for site stabilization. This compaction is to be confirmed by a third party with a standard or modified soil proctor test or both, depending on the moisture content. This stabilizes fill areas for facilities so that there are not weight concerns that would normally occur in "non-engineered" fills. Fill would be placed in six to eight inch lifts with documented density tests on each lift. The test results would be provided to BIA upon request.

2.3.3.5 Blowout Prevention and Monitoring

Blowouts at well sites rarely occur, but when they do, it is primarily during drilling, completion or maintenance operations. By regulation, Whiting utilizes blowout preventers (BOPs) on all wells that: a drilling rig is on (actively drilling), any completion work is being completed on (hydraulic fracturing the well), or during any routine maintenance work on producing wells. The prevention of blowouts from wells is covered by several onshore orders discussed in 43 Code of Federal Regulations (CFR) part 3160; Onshore Orders #1 and #2. These orders are included in Attachment A, Onshore Orders #1 and #2.

BOPs are utilized any time the well is being worked on and any time the potential for release exists. During times when BOPs are not utilized, the wells are controlled by a supervisory control and data acquisition (SCADA) system when producing. The SCADA system allows for remote monitoring of producing conditions and remote shut down of the well and equipment. All equipment (valves, piping, casings, etc.) on all phases is rated for pressures well in excess of any pressures expected during drilling and operation. Whiting has not had an instance of a BOP failing in the Bakken.

Whiting also has a very detailed offset well protection program. An offset well protection program protects existing producing wells in the vicinity of another well that is undergoing hydraulic fracturing. Whiting communicates with offset operators and advises them of the hydraulic fracturing schedules.

In addition, Whiting employs the addition of a hydraulic fracturing string back to surface for completion/hydraulic fracturing operations. This method is used to pump the water/proppant down hole during the hydraulic fracturing. The hydraulic fracturing string is usually a 4.5-inch string that ties into the liner and packer set that is run in the lateral portion of the drilled hole. It offers an extra layer

of protection for the 7-inch well casing and surface casing during these operations. The tie back liner is usually left in the wellbore until the well pressures have declined.

2.3.3.6 Casing and Cementing

Casing and cementing methods would be used to isolate all near-surface aquifers and hydrocarbon zones encountered during drilling.

2.3.3.7 Completion and Evaluation

Once each well is drilled and cased, approximately 17 additional days (depending on availability of services) would be required to complete and evaluate it. Completion and evaluation activities include cleaning out the well bores, pressure testing the casings, perforating and fracturing to stimulate the horizontal portion of the wells, and running production tubing for potential future commercial production. Fluids utilized in the completion process would be captured in tanks and would be disposed of in accordance with BLM and NDIC rules and regulations. Once each well is completed, site activity and vehicle access would be reduced. If the well is determined to be successful, tank trucks (and, if appropriate, gathering pipelines) would transport the product to market.

2.3.3.8 Commercial Production

If commercially recoverable oil and gas resources are found at the proposed site, the site would become established as a production facility. Production equipment, including a well pumping unit, vertical heater/treater, storage tanks (typically four 400 barrel steel oil tanks and one 400 barrel fiberglass saltwater tank per well) and a flare with associated piping would be installed. The storage tanks and heaters/treaters would be surrounded by a steel containment system that would act as secondary containment to guard against possible spills. The steel containment system would be sized to hold 100% of the capacity of the largest storage tank plus one full day's production. A 40 mil liner would be placed under the steel containment and tanks to prevent contaminants from leaking through the soil. All permanent above ground production facilities would be painted to blend into the surrounding landscape, as determined by the BIA, based on standard colors recommended by the BLM.

Oil would be collected in the storage tanks and periodically trucked to an existing oil terminal to be sold. Produced water would also be captured in storage tanks and periodically trucked to an approved disposal site. The frequency of trucking activities for both oil resources and produced water would be dependent upon volumes and rates of production. It is expected that oil would be trucked via existing oil field, BIA, and/or county roads off the Fort Berthold Reservation to a regional oil terminal. All haul routes used would be either private roads or roads that are approved for this type of transportation use by the local governing tribal, township, county, and/or state entities. All associated applicable permits would be obtained and compliance with restrictions enforced. Should oil, gas, and/or saltwater pipelines be installed nearby the proposed project (such as the proposed Whiting Charging Eagle Gathering System), every attempt to tie production facilities at the proposed pads to these pipelines would be made, thereby minimizing truck traffic. The proposed well pads are anticipated to tie into the previously approved Charging Eagle Phase I gathering system and the proposed Charging Eagle Phase II gathering system. Any future oil, gas, or saltwater transportation pipelines would be constructed within the 250-foot area surveyed or additional NEPA analysis and approval from the BIA would be undertaken.

When any of the proposed wells cease to flow naturally, a pump jack would be installed. After production ceases, the well would be plugged and abandoned, and the land would be fully reclaimed in accordance with BIA and BLM requirements.

Whiting would mitigate the effects of the well pad by incorporating applicable conditions, mitigation measures, and BMPs from the BLM's regulations, BLM's Gold Book, and applicable BLM Onshore Oil and Gas Orders, including Numbers 1, 2, and 7.

Whiting is anticipated to be the pipeline provider for the Charging Eagle well pads, should pipeline facilities be constructed. As current estimates expect the Bakken field to remain active for 30 to 40 years, it is important that pipeline systems are designed to perform for this period of time. Pipelines, if designed effectively and well maintained, may have an indefinite life expectancy.

Whiting or Future Pipeline Provider

To ensure their long-term viability, all pipelines would be coated with between 14–16 mils of fusion bonded epoxy coating, which helps protect the pipelines against corrosive elements in the soil. The coating would be inspected thoroughly at the time of installation, both visually and by electronic testing means. Specialty coatings that are applicable for underground fittings, bore crossings, etc. would be used to provide additional levels of protection in areas that require it. Velocities and pressure drops for the pipeline system would be carefully evaluated and lines are sized so as to prevent erosion velocity. Additionally, lines are designed to be cleaned and inspected via internal tools (e.g., cleaning pigs and smart pigs), which helps in the identification of issues in the pipes.

Following design and installation, Whiting would immediately conduct a cathodic survey utilizing test stations, rectifier pads and other means designed by cathodic protection specialists. Whiting would also install pig launchers and receivers on its trunk lines and primary laterals to identify pipeline conditions both internally and externally to maintain the integrity of the pipeline system.

All installations would be monitored by an inspection/construction management team as well as independent third party contract experts. Construction specifications would require contractors to allow for inspection, and ensure that no pipeline is laid and backfilled without appropriate approvals. Hydrotesting of pipelines would be used to assure no possibility of leakage at the time of installation. Per conversations with the MHA Pipeline Safety Director, all pipelines would have SCADA systems installed for leak detection. In addition, Fiberspar pipe would not be allowed for use on the gathering lines.

2.3.3.9 Reclamation

Interim reclamation measures to be implemented upon well completion include reduction of cut and fill slopes where possible, redistribution of stockpiled topsoil, and re-seeding of the disturbed areas via hydro-seeding or matting. This would occur within six months following completion of the wells; if this commitment cannot be met due to occurring during winter months, an extension may be granted by BIA. BIA also recommended that small trees or saplings impacted by the project be ground up and incorporated into topsoil piles to help stabilize the soil. If commercial production equipment is installed, the well pad would be reduced in size to accommodate the production facilities, while leaving adequate room to conduct normal well maintenance and potential recompletion operations, with the remainder of the well pad reclaimed. Reclamation activities would include leveling, re-contouring,

treating, backfilling and re-seeding with native vegetation. Erosion control measures including straw wattles, silt fences, straw mulch and/or hydro seeding would be installed on down sloping sides. Stockpiled topsoil would be redistributed and re-seeded as recommended by the BIA.

If no commercial production were developed from one or any of the proposed wells, or upon final abandonment of commercial operations, all disturbed areas would be promptly reclaimed. As part of the final reclamation process, all well facilities would be removed, well bores would be plugged with cement, and dry hole markers would be set in accordance with NDIC and BLM requirements. Please refer to ***Figure 8, BLM Gold Book Example of Successful Well Pad Reclamation (BLM, USFS 2007).*** The access road and well pad would be re-contoured to match topography of the original landscape, and re-seeded with a native grass seed mixture that is consistent with surrounding native species to ensure a healthy and diverse vegetative community that is free of noxious weeds. Maintenance of the grass seeding would continue until such time that the productivity of the stand is consistent with surrounding undisturbed vegetation and is free of noxious weeds. An exception to these reclamation measures may occur if the BIA approves assignment of an access road either to the BIA roads inventory or to concurring surface allottees.

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

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

Figure 8, BLM Gold Book Example of Successful Well Pad Reclamation (BLM, USFS 2007)

Whiting or Future Pipeline Provider

Installation of the pipelines may require clearing and grading within the entire 100-foot ROW along the entire pipeline corridor. Every effort would be made to minimize surface disturbance during the construction process. Topsoil would be separated and stockpiled along either side of any disturbed cross section to be used for prompt reseeding and reclamation of the disturbed area. If construction activities take place close to the end of construction season, topsoil would only be removed far enough in advance that the pipeline could be installed and the site re-graded prior to the end of the construction season. If topsoil cannot be spread in a timely manner that allows vegetation to reestablish prior to winter, topsoil would be spread the following spring and reseeded so as to not be susceptible to wind and/or water erosion over the winter.

For locations that are reclaimed in winter months or late fall such that no germination is possible, the pipeline service provider would either use a sprayed reinforcement, lain matting reinforcement, spread and crimp straw and/or would minimize erosion issues with straw wattle and silt fence through winter months. Any temporary reclamation measures would remain until the pipeline service provider can completely reclaim and re-vegetate the property in the spring. All temporary reclamation measures would be inspected on a monthly basis, or more frequently as necessary, throughout the winter. In addition, the pipeline service provider would also install straw bales on slopes as needed to provide erosion breaks.

Continued use of pasture and livestock grazing areas would be maintained during construction via use of temporary fencing or cattle guards when crossing land with livestock present and temporary crossings, as needed. Trenches would be excavated to a depth sufficient to maintain a minimum of 48 inches of ground coverage over the pipeline. It is understood that other utilities, including phone and water pipelines, may be present in the immediate area and would need to be coordinated with the appropriate utilities accordingly.

2.3.4 Potential for Future Development

Development beyond the drilling of the following wells and installation of supporting facilities, as described in this document, is not included with this proposal:

- Charging Eagle 14-22 well pad containing the following wells: Charging Eagle 14-22-10-12H3, Charging Eagle 14-22-10-12H, and Charging Eagle 14-22-10-12H3A
- Charging Eagle 3-25 well pad containing the following wells: Charging Eagle 3-25-13-1H3, Charging Eagle 3-25-13-2H3, Charging Eagle 3-25-13-3H3 and Charging Eagle 3-25-13-4H3

Further development would be subject to applicable regulations, including 43 CFR Part 3160, and the BLM's Onshore Oil and Gas Order No. 1 – Approval of Operations on Onshore Federal and Indian Oil and Gas leases, and would be subject to review under NEPA, as appropriate.

2.4 Alternatives Considered and Eliminated from Further Analysis

The U.S. Army Corps of Engineers requested consideration of well pad locations in its project scoping response letter that are set as far from the Lake as possible to minimize any risk of accidental releases to the lake (particularly in the event of a blowout), while still accessing the same mineral resources.

The alternative to the proposed action was considered during the onsite meeting with BIA officials and project sponsors on September 24th, 2014 and those present agreed the proposed locations were sited to avoid impacts to resources to the extent practicable. As discussed further in chapter 3, Whiting has an emergency response plan to address the potential for a large-scale accidental release of petroleum or produced water, which could contaminate downstream waters. Measures identified in the emergency response plan are considered sufficient to protect Lake Sakakawea from such an event. BIA has determined that the proposed action includes sufficient measures to avoid, minimize, and mitigate harm to environmental resources while meeting the project purpose and need; therefore, the alternative will not be carried forward for detailed analysis in this EA.

CHAPTER 3 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND IMPACTS

3.1 Introduction

This chapter describes the existing conditions within the study area. The existing conditions, or affected environment, are the baseline conditions that may be affected by the proposed action. This chapter also summarizes the positive and negative direct environmental impacts of the project alternatives, as well as cumulative impacts. Indirect impacts are discussed in impact categories where relevant. Information regarding the existing environment, potential effects to the environment resulting from the proposed alternative, and avoidance, minimization, and/or mitigation measures for adverse impacts is included.

3.2 Climate, Geologic Setting, and Land Use

The proposed wells and access roads are situated geologically within the Williston Basin, where the shallow stratigraphy consists of sandstones, silts, and shales dating to the Tertiary Period (65 to 2 million years ago), including the Sentinel Butte and Golden Valley Formations. The underlying Bakken and Three Forks Formations are a well-known source of hydrocarbons; both formations are targeted by the proposed project. Although earlier oil and gas exploration activity within the Fort Berthold Reservation was limited and commercially unproductive, recent advances in drilling technologies, including horizontal drilling techniques, now make accessing oil in the Bakken and Three Forks Formations feasible.

According to High Plains Regional Climate Center data collected at the Dunn Center 2 SW, North Dakota (322365) weather station from 1918–2013, temperatures in excess of 80 degrees Fahrenheit are common in summer months. The area receives approximately 16.4 inches of precipitation annually, predominantly during spring and summer. Winters in this region are cold, with temperatures often falling near zero degrees Fahrenheit. Snow generally remains on the ground from November to March, and about 36 inches of snow are received annually.

The topography within the project areas is primarily identified as part of the United States Geological Survey's (USGS's) Northwestern Great Plains, River Breaks Ecoregion. According to the USGS, the River Breaks Ecoregion "consists of terraces and uplands that descend to the Missouri River and its major tributaries. They have formed particularly in soft, easily erodible strata, such as Pierre shale. The dissected topography, wooded draws, and uncultivated areas provide a haven for wildlife. Riparian gallery forests of cottonwood and green ash persist along major tributaries such as the Moreau and Cheyenne rivers, but they have largely been eliminated along the Missouri River by impoundments."

The western and southern portions of the Fort Berthold Reservation consist of prairie grasslands and buttes. The northern and eastern areas of the reservation provide fertile farmland. The proposed project area is located within a predominately rural area dominated by grazing and woody habitat located near the towns of Twin Buttes and Halliday (USDA NRCS, 2006). According to National Agricultural Statistics Services (NASS) data, the proposed project areas are mostly a mixture of grasslands (71 percent), deciduous forest (24 percent), cropland (3.2%) and shrubland (1 percent). Please refer to ***Figure 9, Charging Eagle Land Use.***

Figure 9, Charging Eagle Land Use

3.2.1 Climate, Geologic Setting and Land Use Impacts/Mitigation

Alternative A (No Action)—Alternative A would not impact land use or geology within the study area.

Alternative B (Proposed Action)—Alternative B would result in conversion of approximately 31.67 acres of land from present use to part of an oil and gas network. Of this, 13.98 acres would be from the result of actual well pad construction footprint and 12.52 acres would be from access road construction. Please refer to ***Table 1, Summary of Land Use Conversion.***

Table 1, Summary of Land Use Conversion

WELL PAD NAME	WELL PAD ACRES ONLY	PAD DISTURBANCE INSIDE FENCE ACRES	ACCESS ROAD ACRES	TOTAL ACRES BEING DISTURBED
Charging Eagle 14-22	7.92	11.44	3.05	**14.49**
Charging Eagle 3-25	6.06	7.71	9.47	**17.18**

Mineral resources would be impacted through the development of oil and gas resources within the spacing unit, as is the nature of this project. Impacts to the geologic setting and paleontological resources are not anticipated.

3.3 Soils

The Natural Resources Conservation Service (NRCS) Soil Survey of Dunn County dated from 1982, with updated information available online through the NRCS Web Soil Survey, identified ten soil types within the proposed project impact area. Locations and characteristics of these soils are identified in ***Table 2, Soils.***

Table 2, Soils

MAP UNIT SYMBOL	SOIL NAME	PERCENT SLOPE	COMPOSITION (IN UPPER 60 INCHES)			EROSION FACTOR[2]		HYDROLOGIC SOIL GROUP[3]
			% SAND	% SILT	% CLAY	T	KF	
E0701F	Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes	6 to 35	4.5	47.1	48.4	2	.43	D
E1333D	Vebar-Cohagen fine sandy loams, 9 to 15 percent slopes	9-15	75.4	14.8	9.8	3	.15	B
E1423F	Flasher-Vebar-Parshall 9 to 35 percent slopes	9-35	82.2	12.6	5.2	3	.20	D
E2601D	Amor-Cabba loams, 9 to 15		37.9	39.5	22.6	3	.28	C
E2737C	E2737C Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	6-9	10.7	66.7	22.6	3	.37	C
E3199F	E3199F Arikara-Cabba loams, 15 to 70 percent slopes	15-70	37.8	37.6	24.6	5	.02	B
E6151B	E6151B Lefor fine sandy loam, 3 to 6 percent slopes	3-6	71.1	16.2	12.7	3	.17	C
E6151C	Lefor fine sandy loam, 6 to 9 percent slopes	6-9	71.1	16.2	12.7	3	.17	C
L3191F	Badland-Arikara-Cabbart Complex, 15 to 70 percent slopes	15-70	15.4	64.6	20.1	5	.37	B
L3199F	Arikara-Cabbart loams, 15 to 70 percent slopes	15-70	37.8	37.6	24.6	5	N/A	B

The soils listed have mostly moderate susceptibility to sheet and rill erosion, with three that can tolerate high levels of erosion without loss of productivity. All of these soils can tolerate moderate levels of erosion without loss of productivity. All are well drained and have no susceptibility to ponding or flooding. The average water table according to NRCS Soil Survey information for each of these soil types is recorded at greater than six feet.

[2] Erosion Factors indicate susceptibility of a soil to sheet and rill erosion by water. Kf indicates the erodibility of material less than two millimeters in size. Values of K range from 0.02 to 0.69. Higher values indicate greater susceptibility. T Factors estimate maximum average annual rates of erosion by wind and water that will not affect crop productivity. Tons/acre/year range from 1 for shallow soils to 5 for very deep soils. Soils with higher T values can tolerate higher rates of erosion without loss of productivity.

[3] Hydrologic Soil Groups (A, B, C, and D) are based on estimates of runoff potential according to the rate of water infiltration under the following conditions: soils are not protected by vegetation, soils are thoroughly wet, and soils receive precipitation from long-duration storms. The rate of infiltration decreases from Group A (high infiltration, low runoff) to D (low infiltration, high runoff).

3.3.1 Soil Impacts/Mitigation

Alternative A (No Action)—Alternative A would not impact soils.

Alternative B (Proposed Action) — Construction activities associated with the proposed well pads and associated access roads would result in soil disturbances, though impacts to soils associated with the proposed action are not anticipated to be significant. Topsoil depths taken at single locations during the onsite visits yielded eight to nine inches at the well pad locations. All topsoil found on site would be excavated and stockpiled during construction. Total topsoil quantities are anticipated to be close to figures identified in the plats. If additional topsoil is encountered it will be added to topsoil piles and utilized for future reclamation. Topsoil requirements for the pads are identified in ***Table 3, Topsoil Requirements for Future Site Reclamation.***

Table 3, Topsoil Requirements for Future Site Reclamation

WELL PAD NAME	TOPSOIL DEPTH AT PAD	CUBIC YARDS OF TOPSOIL	CUBIC YARDS OF SUB-SOIL MATERIAL
Charging Eagle 14-22	8 inches	8,520	80,620[4]
Charging Eagle 3-25	8 inches	6,515	20,810

The stockpiles would be positioned to assist in diverting runoff away from the disturbed areas, thus minimizing erosion, and to allow for interim reclamation soon after the wells are put into production. Topsoil and embankment stockpile locations for the proposed site are identified in ***Table 4, Topsoil and Embankment Stockpile Locations.***

Table 4, Topsoil and Embankment Stockpile Locations

	TOPSOIL STOCKPILE LOCATION	EXCESS SOIL STOCKPILE LOCATION
Charging Eagle 14-22	Northeast Side of Pad	East Side of Pad
Charging Eagle 3-25	Northeast Side of Pad	None

Soil impacts would be localized, and BMPs including straw wattles, silt fences, straw mulch, and/or hydro seeding would be implemented to minimize these impacts on down sloping sides. Surface disturbance caused by well development, road improvements and facilities construction would result in the removal of vegetation from the soil surface. This can damage soil crusts and destabilize the soil. As a result, the soil surface could become more prone to accelerated erosion by wind and water. BMPs used at the well site to reduce these impacts would include: erosion and sediment control measures

[4] Excess subsoil was utilized on the roadway construction.

during and after construction, segregating topsoil from subsurface material for future reclamation, chipping any woody vegetation that is removed onsite and incorporating it into topsoil stockpiles, re-seeding of disturbed areas immediately after construction activities are complete, the use of construction equipment appropriately sized to the scope and scale of the project, ensuring the road gradient fits closely with the natural terrain and maintaining proper drainage. According to discussions during the field onsite assessments regarding site construction practices and reclamation, BMPs identified in the BLM Gold Book shall be utilized to further minimize site erosion, including straw wattles, silt fences, straw mulch, and/or hydro seeding on down sloping sides.

Soil compaction can occur through use of heavy equipment. When soil is compacted, it decreases permeability and increases surface runoff. This is especially evident in silt and clay soils. In addition, soils may be impacted by mixing of soil horizons. Soil compaction and mixing of soil horizons would be minimized by the previously discussed topsoil segregation.

Contamination of soils from various chemicals and other pollutants used during oil development activities is not anticipated. In the rare event that such contamination may occur, it shall immediately be reported to the BLM, the NDIC, and; where appropriate, the North Dakota Department of Health (NDDH). In addition, the procedures of the surface management agency shall be followed to contain spills and leaks. Please refer to ***Figure 10, Charging Eagle Soils.***

3.4 Water Resources

The Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977, provides the authority to the Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (USACE) to establish water quality standards, control discharges into surface and ground waters, develop waste treatment management plans and practices, and issue permits for discharges (Section 402) and for dredged or fill material (Section 404). Within the Fort Berthold Reservation, the Missouri River and Lake Sakakawea are both considered navigable waters and are therefore subject to Section 10 of the Rivers and Harbors Act of 1899.

The EPA also has the authority to protect the quality of drinking water under the Safe Drinking Water Act (SDWA) of 1974. As amended in 1986 and 1996, the SDWA requires many actions to protect drinking water and its sources: rivers, lakes reservoirs, springs, and ground water wells[5].

The Energy Policy Act of 2005 excludes hydraulic fracturing operations related to oil, gas, or geothermal production activities from EPA regulation under the SDWA[6].

[5] The SDWA does not regulate private wells that serve fewer than 25 individuals

[6] The use of diesel fuel during hydraulic fracturing is still regulated under the SDWA.

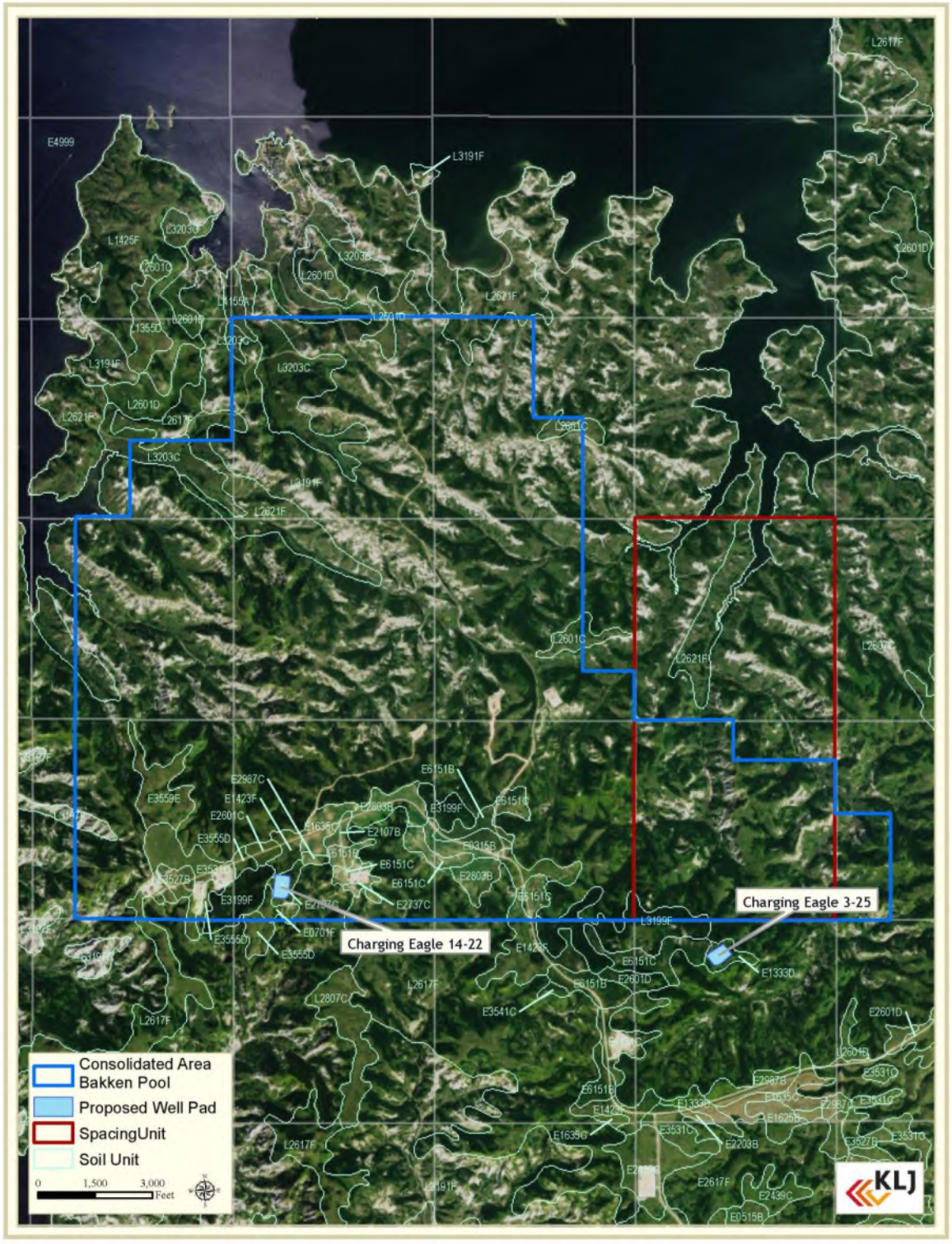


Figure 10, Charging Eagle Soils

3.4.1 Surface Water

The project area is situated in the Great Plains region of North Dakota that borders the Badlands to the west. This is an arid area with few isolated surface water basins. The majority of the surface waters in the region are associated with the Missouri River, Lake Sakakawea, and tributaries to these water bodies. Surface water generally flows overland until draining into these systems.

The proposed well pads are located in the Lake Sakakawea basin, meaning surface waters within this basin drain to Lake Sakakawea. The projects are located in the following Watersheds and Sub-Watersheds: Lower Little Missouri River Watershed and Lower Hans Creek Sub-Watershed (Charging Eagle 14-22) and Lake Sakakawea Watershed and Bear Creek Sub-Watershed (Charging Eagle 3-25) (USGS, 2011). Runoff throughout the project areas is by sheet flow until collected by ephemeral and perennial streams draining to Lake Sakakawea.

The Charging Eagle 14-22 well pad is situated on an upland area at the westerly end of BIA 22 Roadway. The existing Charging Eagle 15-22 well pad occurs directly east of the proposed Charging Eagle 14-22 well pad, along with the Charging Eagle 16-21 well pad occurring to the west. The proposed well pad drains primarily in two different directions off of the pad, being north and southwest; the shortest drainage to Lake Sakakawea being to the southwest of the well pad. Runoff would enter the southwest drainage from the west edge of the proposed well pad and would flow west, and then southwest into Wolf Chief Bay of Lake Sakakawea for a total drainage distance of approximately 2.4 miles. The remainder of runoff from the proposed well pad would flow southeast into a drainage and extend south, and southwest where it would empty into Wolf Chief Bay of Lake Sakakawea. The nearest wooded draw is located north of the proposed well pad. Water diversions are planned along the cut slopes to divert water around the pad.

The Charging Eagle 3-25 well pad is situated within an alfalfa hay field. The Charging Eagle 3-25 well pad is located on the southwestern sideslope of a hill. The well pad drains primarily south and southwest off of the well pad across the alfalfa field into a wooded drainage. Runoff then flows south, east, and then north where it flows into Bear Creek Bay of Lake Sakakawea. A northeast corner portion of the well pad, drains north straight to Bear Creek Bay for a distance of approximately 2.7 miles (shortest drainage distance). The nearest wooded draw is located northeast of the well pad.

3.4.1.1 Surface Water Impacts/Mitigation

Alternative A (No Action)—Alternative A would not impact surface water.

Alternative B (Proposed Action)—No significant impacts to surface waters are expected to result from Alternative B. The proposed projects have been sited to avoid direct impacts to surface water and to minimize the disruption of drainage patterns across the landscape. Construction site plans would contain measures to divert surface runoff around the well pads by implementation of a water diversion ditch along the cut slopes. Please refer to ***Figure 11, Surface Water Resources for Charging Eagle 14-22 and 3-25 Well Pads.***

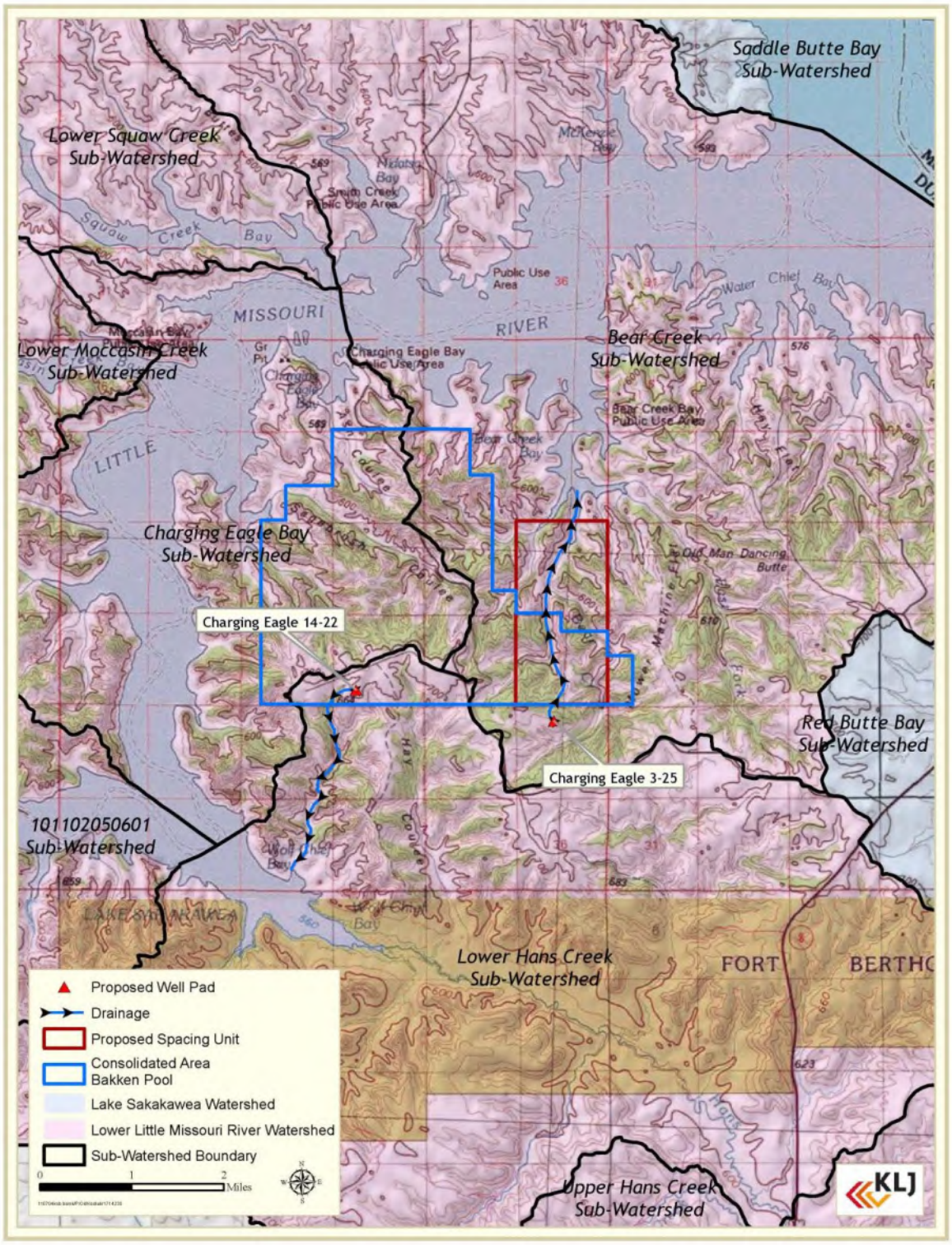


Figure 11, Surface Water Resources for Charging Eagle 14-22 and 3-25 Well Pads

It is anticipated that two culverts be installed at the Charging Eagle 14-22 well pad, and three be installed at the Charging Eagle 3-25 well pad to maintain natural drainage of the surrounding area. Additional culverts would be placed if determined necessary during site construction. Roadway engineering and the implementation of BMPs to control erosion would mitigate runoff of sediment downhill or downstream. Specific measures to mitigate the impacts to surface waters and to minimize the disruption of drainage patterns were agreed upon by the BIA EA onsite participants. Measures include a pit-less drilling system and the construction of a 24-inch tall berm around the perimeter of the well pads as an additional containment measure. The proposed project's drilling tracts do not extend under waters of the U.S.; therefore, a Section 10 permit application to the USACE would not be required.

Whiting or Future Pipeline Provider

Third-party intrusions are one of the biggest contributing factors to spills. To aid in the prevention of such intrusions, Whiting or future pipeline provider, would fully comply with the marking requirements specified in the US Department of Transportation's rules and regulations, specifically contained in 49 CFR Parts 192 and 195. To ensure such compliance, the provider would develop construction specifications to delineate the requirements for pipeline marking in accordance with applicable laws, rules, and regulations, including the locations of such markings (e.g., road crossings, waterbody crossings, line of sight, etc.) and the manner of marking such pipelines (e.g., height of markings and signage on the markings).

The pipeline provider would commit to develop a spill response plan that would be submitted to the BIA prior to the commencement of the construction activities. The response plan would include procedures that specifically address making the appropriate contacts, isolating the incident, protecting waterways and providing contact information for all the appropriate contractors and experts necessary to facilitate a rapid response.

Any proposed pipelines would be sited to avoid direct impacts to surface water and to minimize the disruption of drainage patterns across the landscape. Implementation of BMPs to control erosion would mitigate runoff of sediment downhill or downstream.

3.4.2 Ground Water

Groundwater is defined as the water from precipitation that soaks into the soil and is stored or moved through the porous locations between rocks and soil particles. Groundwater can flow through the spaces between rocks and soil via gravity and may be brought to the surface which helps fill rivers, streams or lakes, or can be pumped to the surface through water wells located in aquifers. Aquifers are underground porous rocks, sandstones or gravel that yield a sufficient and consistent supply of groundwater to be useful as a water source for streams, rivers or human uses. Approximately 60% of North Dakota residents use ground water for residential or agricultural purposes (NDSWC, 2014).

The aquifers located in North Dakota have been grouped into four major units; A through D. Aquifers classified as Unit A are located near the surface and are composed of sandstone and lignite beds located mostly in the Western portion of the state. Unit B is an extensive sandstone aquifer located all across the state where it slopes deeper westward to approximately 2,000 feet below ground surface. This aquifer class supplies farms and ranches and several small towns in western ND. Unit C underlies most of the state and consists of sandstone layers approximately 3,000 to 4,000 feet below surface in

western portions of the state. This aquifer class's groundwater is saline but is used for livestock ranches, and oil and gas industry for fracking and re-injection of wastewater. Unit D is separated by thick deposits of shale and other fine grained rocks which cannot hold water readily. Unit D is the deepest aquifer at depths of 9,000 feet, which make it impractical as a water source for many uses. In addition, oil and gas data from drilling in this unit indicate the water is saline and not useable for most purposes (USGS, 1990).

The North Dakota State Water Commission's electronic Ground and Surface Water Data Query revealed that no active or permitted ground water wells are located within the vicinity of the proposed well pads. The landscape of the proposed project areas is non-glaciated and as a result, lacks aquifers that are major sources of freshwater. Aquifers occurring in Dunn County, ND, that are potential sources of freshwater include the Little Missouri River, Missouri River-Lake Sakakawea, Squaw Creek, Killdeer, Goodman Creek, and Horse Nose Butte aquifers (NDDH, 1997). The Little Missouri River Aquifer is located approximately 1.9 miles west of the proposed Charging Eagle 14-22 well site (closest well site). No aquifers are located within any of the proposed spacing units or Consolidated Area Bakken Pool for the wells. No sole source aquifers have been identified within the state of North Dakota. Please refer to ***Figure 12, Aquifers and Groundwater Wells.***

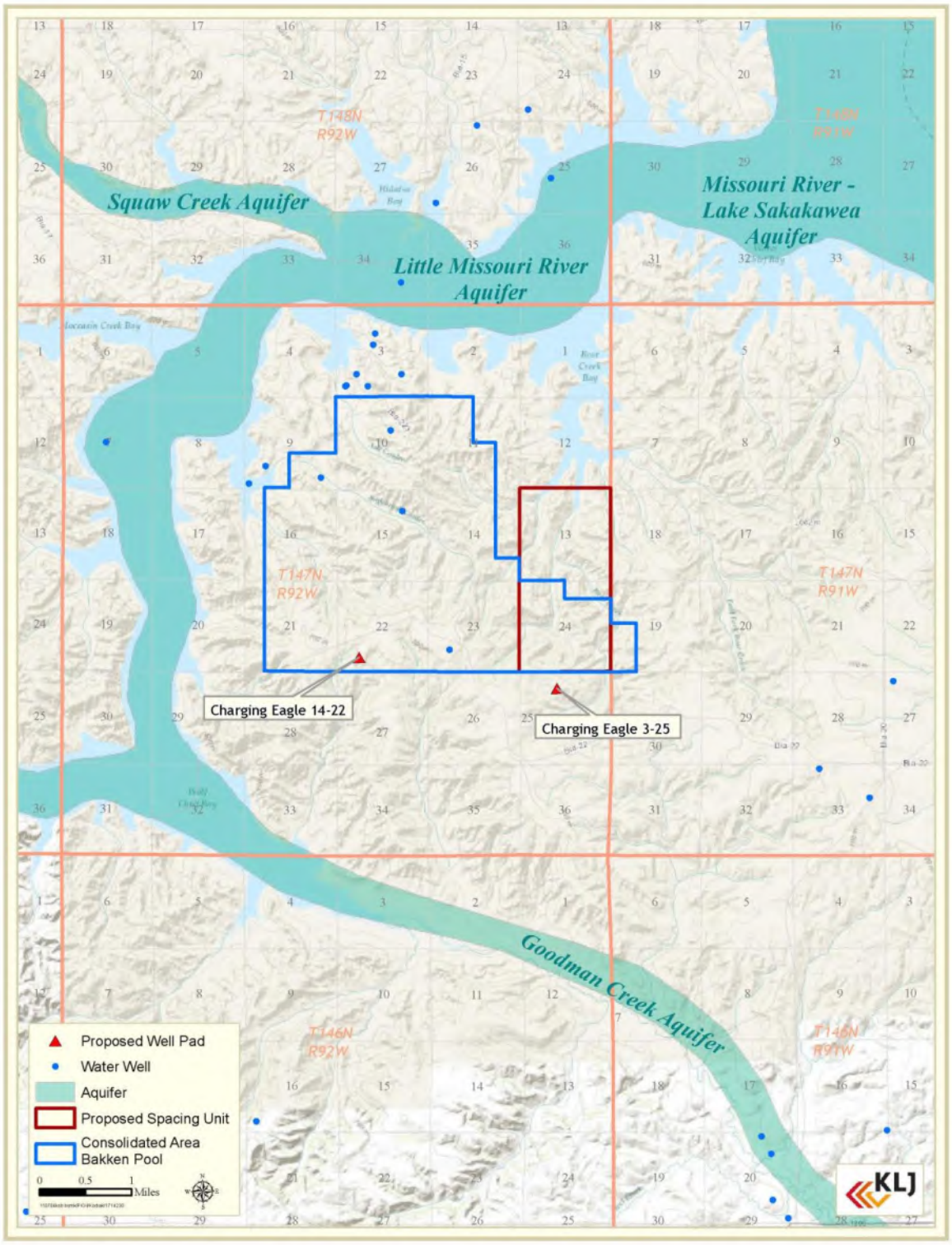


Figure 12, Aquifers and Groundwater Wells

3.4.2.1 Ground water Impacts/Mitigation

Alternative A (No-Action) – Alternative A would not impact groundwater.

Alternative B (Proposed Action) – Groundwater can become directly contaminated in a number of ways. If surface water which recharges an aquifer is polluted, this pollution will transfer to the groundwater source. Groundwater can also become contaminated when a fluid or hazardous substance leaches downward through the soil and into a groundwater source; however, current research has shown the most frequent source of groundwater contamination from oil production is due to leaky waste water storage units (DiGuilio et al, 2011) and faulty cement casings (Darrah et al, 2014). Whiting has committed to developing an individual spill response plan. The response plans would include monitoring protocols, notification procedures, spill detection and on-scene spill mitigation procedures, response activities, contacts, trainings and drill procedures. These measures would be enacted upon a spill to limit leaching into soil and/or groundwater sources. The spill response plans would be submitted to the BIA prior to the commencement of construction activities. Four ground water wells are located within the Consolidated Area Bakken Pool for the Charging Eagle 14-22 well pad, however these groundwater wells are not anticipated to be impacted due to the horizontal distance of minerals being acquired based on typical spacing unit areas wells and the depth between the ground water aquifers and oil/gas minerals. In addition, as required by applicable law, all proposed oil and gas wells would be cemented and cased to isolate aquifers from potentially productive hydrocarbon and disposal/injection zones.

Due to the presence of thick geological formations between aquifers, depth of the proposed oil wells in comparison to residential groundwater wells and aforementioned precautions that would be implemented by Whiting, no significant impacts to groundwater are expected to result from Alternative B.

3.5 Wetlands

Wetlands are defined in both the 1977 Executive Order 11990, Protection of Wetlands, and in Section 404 of the Clean Water Act of 1986, as those areas that are inundated by surface or ground water with a frequency to support and, under normal circumstances, do or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Three parameters that define a wetland, as outlined in the Federal Manual for Delineating Jurisdictional Wetlands (US Army Corps of Engineers, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0), are hydric soils, hydrophytic vegetation and hydrology. Wetlands are an important natural resource serving many functions, such as providing habitat for wildlife, storing floodwaters, recharging groundwater, and improving water quality through purification.

No wetland or riparian areas were identified within the proposed project areas during the field surveys.

3.5.1 Wetland impacts/Mitigation

Alternative A (No Action) – Alternative A would not impact wetlands.

Alternative B (Proposed Action) – No wetlands occur within the proposed project areas. Review of the USFWS National Wetland Inventory revealed the shoreline of Lake Sakakawea as wetlands, and other potential wetlands occurring downstream in drainages of the proposed well pads.

Due to the implementation of secondary and tertiary containment measures and the use of a pit-less drilling system, the transfer of accidentally released fluids to Lake Sakakawea's shoreline is unlikely. Alternative B is not anticipated to result in impacts to nearby wetlands or those wetlands associated with Lake Sakakawea's shoreline.

3.6 Air Quality

The Clean Air Act, as amended, requires the EPA to establish air quality standards for pollutants considered harmful to public health and the environment by setting limits on emission levels of various types of air pollutants. The NDDH operates a network of Ambient Air Quality Monitoring (AAQM) stations. The nearest AAQM station is located in Dunn Center, ND; located approximately 16.5 miles south from the Charging Eagle 14-22 well site (closest well).

Criteria Pollutants

Criteria pollutants tracked under EPA's National Ambient Air Quality Standards (NAAQS) in the Clean Air Act include sulfur dioxide (SO_2), particulate matter (PM), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb) and carbon monoxide (CO). In addition, the NDDH has established state air quality standards. State standards must be as stringent as (but may be more stringent than) federal standards (NDDH, 2014). Additionally, North Dakota has set air quality standards for hydrogen sulfide (H_2S). The federal and state air quality standards for these pollutants are summarized in ***Table 5, Federal and State Air Quality Standards and Reported Data for Dunn Center*** (EPA 2013, NDDH 2014).

In addition to meeting all state standards, North Dakota was one of thirteen states in 2014 that met standards for all criteria pollutants. The state also met standards for fine particulates and the eight-hour ozone standards established by the EPA (NDDH 2014). Additionally, the Fort Berthold Reservation complies with the North Dakota National Ambient Air Quality Standards and visibility protection. The Clean Air Act affords additional air quality protection near Class I areas. Class I areas include national parks greater than 6,000 acres in size, national monuments, national seashores, and federally designated wilderness areas larger than 5,000 acres designated prior to 1977. There are no Federal Class I areas within the project areas. The nearest Class I area is Theodore Roosevelt National Park, located approximately 40.5 miles southwest of the nearest proposed well pad.

Table 5, Federal and State Air Quality Standards and Reported Data for Dunn Center

POLLUTANT	AVERAGING TIME	EPA STANDARD		NDDH STANDARD		TRNP-NU 2014 REPORTED DATA		DUNN CENTER 2014 REPORTED DATA	
		µg/m³	parts per billion	µg/m³	parts per billion	µg/m³	parts per billion	µg/m³	parts per billion
$PM_{2.5}$[7]	Annual[8]	12	—	—	—	4.6	—	4.8	—
	24-Hour	35	—	—	—	15.0	—	14.0	—
PM_{10}[9]	24-Hour	150	—	150	—	30.0	—	60.0	—
SO_2	1-Hour	196	75	196	75	—	8.0	—	7.0
	24-Hour	N/A[10]	N/A	365	140	—	2.4	—	2.5
	3-Hour	1,309	500	1,309	500	—	—	—	—
	Annual	—	30	—	30	—	0.37	—	0.31
CO[11]	8-Hour	10,000	9,000	10,000	9,000	—	—	—	—
	1-Hour	40,000	35,000	40,000	35,000	—	—	—	—
O_3	8-Hour	—	75	147	75	—	57	—	57
NO_2	Annual	100	53	100	53	—	2.20	—	1.64
	1-Hour	188	100	188	100	—	11	—	11
Pb	3-Month	0.15	—	0.15	—	—	—	—	—
H_2S	Instantaneous	—	—	14,000	10,000	—	—	—	—
	1-Hour	—	—	280	200	—	—	—	—
	24-Hour	—	—	140	100	—	—	—	—
	3-Month	—	—	28	20	—	—	—	—

[7] $PM_{2.5}$ refers to particulates 2.5 micrometers (µ) or less in size.
[8] Average refers to a three year average annual calculation.
[9] PM_{10} refers to particulates 10 micrometers (µ) or less in size.
[10] The 24-hour standard was revoked by the USEPA and replaced with the 1-hour standard for SO_2 effective August 23, 2010. This revision was made to provide requisite protection of public health with an adequate margin of safety.
[11] Only one monitoring site for Carbon monoxide occurs in the state located in Fargo, North Dakota. Neither the state nor federal CO standards of 35,000 ppb (1-hour) or 9,000 ppb (8-hour) were exceeded at the monitoring site.

Volatile Organic Compounds

On August 1st, 2012 the EPA approved the Federal Implementation Plan (FIP) for oil and gas well production facilities on the Fort Berthold Reservation. The Reservation-specific FIP regulates emissions from oil and gas production facilities in the Bakken Pool that were constructed and operating on or after August 12th, 2007. The Interim Final Rule (IFR) became effective on August 3rd, 2012 and compliance with the IFR is required no later than 90 days after publication in the Federal Register. The FIP will be a permit by rule. The emission control requirements are clearly defined as follows:

> *"The owner or operator is required to reduce the mass content of VOC emissions from natural gas during oil and natural gas production and storage operations by at least 90.0 percent on the first date of production. Within ninety (90) days of the first date of production, we require the owner or operator to route the natural gas from the production and storage operations through a closed-vent system to a utility flare or equivalent combustion device capable of reducing the mass content of VOC in the natural gas vented to the device by at least 98.0 percent."*

Greenhouse Gases

In 2009, the EPA declared greenhouse gas emissions from human-related activities trap heat in the atmosphere, causing climate change and ocean acidification. In the same year, the EPA published a rule (40 CFR Part 98) requiring sources that emit greater than 25,000 metric tons of carbon dioxide equivalent (CO_2e) per year in the United States to report their emissions through the Greenhouse Gas Reporting Program. Greenhouse gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases. The factors which determine a gas's effect on climate change include concentration, duration and Global Warming Potential (GWP). The GWP is determined by the length of time a gas remains in the atmosphere and the strength with which it absorbs energy. For example, fluorinated gases, such as hydrofluorocarbons and perfluorocarbons, only come from human-related activities and are emitted in small quantities; however, they are referred to as high GWP gases due to their longevity and absorption in the atmosphere. Conversely, CO_2 and CH_4 are emitted in high quantities from natural and human-related activities; however they are considered low GWP gases. Emissions of CO_2 and CH_4 accounted for 82% and 9%, respectively, of all greenhouse gas emissions in the United States in 2012. Fossil fuel combustion accounted for a majority of CO_2 emissions, while natural gas and petroleum production accounted for a majority of CH_4 emissions.

3.6.1 Air Quality Impacts/Mitigation

Alternative A (No Action)—Alternative A would not impact air quality.

Alternative B (Proposed Action) - The Fort Berthold Reservation complies with North Dakota National Ambient Air Quality Standards and visibility protection. In addition, the Dunn Center AAQM station reported air quality data well below the state and federal standards. Alternative B would not include any major sources of air pollutants. Construction activities would temporarily generate minor amounts of dust and gaseous emissions of PM, SO_2, NO_2, CO and volatile organic compounds. Emissions would be limited to the immediate project areas and are not anticipated to cause or contribute to a violation of NAAQS. No detectable or long-term impacts to air quality or visibility are expected within the airsheds of the Fort Berthold Reservation, state or Theodore Roosevelt National Park. Whiting would comply with all rules and regulations set forth in the FIP. In addition, Whiting would provide dust control for their access roads and haul roads. No mitigation or monitoring measures are recommended. Whiting would obtain a synthetic minor source permit from the EPA as required.

Alternative B would result in the release of CO_2 and CH_4 into the atmosphere through the production, flaring, transportation, storage, refining and distribution of oil and natural gas. Emissions of CO_2 and CH_4 in 2012 from petroleum and gas systems resulted in 3% of all greenhouse gas emissions in the U.S. Increases in truck traffic during construction and initial production phases will result in temporary increases in CO_2 emissions; however, those emissions will be reduced after construction and drilling are complete and production facilities and pipeline infrastructure are in place. Based on the current contribution of petroleum and gas systems to the overall greenhouse gas emissions in the U.S., the contribution of 7 additional oil wells to the overall carbon cycle is not anticipated to have an effect on climate change. Greenhouse gas emissions from the proposed action would be well below the threshold for reporting.

3.7 Threatened, Endangered, and Candidate Species

In accordance with Section 7 of the Endangered Species Act (ESA) of 1973, 50 CFR Part 402, as amended, each federal agency is required to ensure the following two criteria: first, any action funded or carried out by such agency must not be likely to jeopardize the continued existence of any federally-listed endangered or threatened species or species proposed to be listed; second, no such action can result in the destruction or adverse modification of habitat of such species that is determined to be critical by the Secretary.

An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. A candidate species is a plant or animal for which the USFWS has sufficient information on its biological status and threats, to propose it as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. While candidate species are not legally protected under the ESA, it is within the spirit of the ESA to consider these species as having significant value and worth protecting. A proposed species is a candidate species that was found to warrant listing as either threatened or endangered and was officially proposed as such in a Federal Register notice after the completion of a status review and consideration of other protective conservation measures. The USFWS has one year after a species is proposed for listing under the ESA to make a final determination whether to list a species as threatened or endangered. Finally, critical habitat includes specific areas that are occupied by a species at the time of listing or unoccupied areas that are considered essential to the conservation of a species. Critical habitat must contain physical or biological features essential to conservation and may require special management considerations or protection.

The proposed project area was evaluated to determine the potential for occurrences of federally listed threatened, endangered, and candidate species. An inquiry via the United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System – Information, Planning, and Conservation (ECOS-IPaC) website identified the following federally protected resources within Dunn County: the endangered whooping crane (*Grus americana*), endangered gray wolf (*Canis lupus*), endangered black-footed ferret (*Mustela nigripes*), endangered interior least tern (*Sternula antillarum*), endangered pallid sturgeon (*Scaphirynchus albus*), threatened piping plover (*Charadrius melodus*), designated piping plover critical habitat, threatened northern long-eared bat (*Myotis septentrionalis*), threatened

Dakota skipper (*Hesperia dacotae*), threatened rufa red knot (*Calidris canutus rufa*), and the Sprague's pipit (*Anthus spragueii*) as a candidate species[12] (USFWS, 2015).

3.7.1 Dakota Skipper

The Dakota skipper is a small butterfly that was listed as a threatened species under the Endangered Species Act on October 23rd, 2014 due to habitat loss and degradation. The Dakota skipper relies on healthy native prairie within its current range of North Dakota, South Dakota, Minnesota, and Manitoba and Saskatchewan to complete its life cycle.

The Dakota skipper overwinters as larvae in shelters at ground or subsurface levels, relying on medium-stature native grasses, such as prairie dropseed (*Sporobolus heterolepis*), little bluestem (*Schizachyrium scoparium*), and sideoats grama (*Bouteloua curtipendula*) for growth and survival in order to complete one generation per year. The adult Dakota skipper requires a diversity of flowering forbs as a nectar source during its flight period from late June to early or mid-July. Two preferred habitat types have been identified throughout the range of the Dakota skipper, consisting of moist bluestem prairie (Type A) and upland mixed-grass prairie (Type B). Type A habitat consists of tall-grass prairie and can be found in eastern North Dakota. Type A habitat is dominated by bluestem species (*Andropogon gerardii* and *Schizachyrium scoparium*) and almost always contains prairie lilies (*Lilium philadelphicum*), harebells (*Campanula rotundifolia*), and smooth camas (*Zigadenus elegans*) (Royer and Marrone 1992). Type B habitat occurs in mixed-grass prairie on ridges and hillsides in western North Dakota and is dominated by bluestems and needlegrasses (*Nassella viridula*, *Hesperostipa comata*, and *Hesperostipa spartea*). Purple coneflower (*Echinacea angustifolia*), prairie coneflower (*Ratibida columnifera*), and blanketflower (*Gaillardia aristata*) are reliable indicators of Type B habitat, although prairie lilies and harebells may also be present (Royer and Marrone 1992). Both Type A and Type B habitat also contain other native grass and forb species which have been documented as important food and habitat sources (Rigney 2013 and McCabe 1981).

3.7.1.1 Desktop Analysis

A screening tool was developed by KLJ to determine the potential for larval and adult skipper habitat within the project area. The tool was developed utilizing the Guidance for Interagency Cooperation under Section 7(a)(2) of the Endangered Species Act, Version 1.0, U.S. Fish & Wildlife Service, Regions 3 and 6, February 2015 (Section 7 Guidance), the Bureau of Land Management (BLM) survey protocol released February, 2015 (Dakota Skipper Operator Letter), and through personal communication with Phil Sjursen of the US Forest Service (USFS). The USFS currently uses a similar screening tool created by Gary Foli and Ron Royer for identifying suitable larval habitat for the purposes of surveying for Dakota skipper. The screening tool developed by KLJ first identifies if the project area lies within a county listed in the Section 7 Guidance where the Dakota skipper may be present and the distance from proposed critical habitat**.** Other parameters included in the screening tool include land use, slope, aspect, distance to water, and Ecological Site Descriptions (ESD) developed by the US Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) within the project area. Please refer to ***Figure 13*** and ***Figure 14*** for ecological desktop analysis maps.

[12] In past conversations, and ECOS-IPac inquiry was the preferred method of the USFWS as the system has the most up to date information regarding T & E listed species.

The proposed location of the well pads and the access roads occur within Dunn County where the Dakota skipper may be present. Designated critical habitat for the Dakota skipper occurs approximately 42 miles northwest of the proposed well pad locations. Additionally, the desktop analysis indicates potential habitat within the study area of the well pad and access road. It was also found that the Ecological Site Description (ESD) indicated the possible presence of Dakota skipper preferred plant species within the well pad and access road study areas. As a result of these findings, it was determined that an on-site field botany survey was needed at the Charging Eagle 3-25 location; an onsite survey was also completed for the Charging Eagle 14-22 location due to habitat adjacent to the access road and pad.

Table 6, Counties Where Dakota Skipper May Be Present

Burke	*Dunn	Eddy	McHenry
McKenzie	McLean	Mountrail	Ransom
Richland	Sargent	Stutsman	Wells

**As of May 2015, Dunn County is not listed within the Section 7 Guidance; however personal communication with Kevin Shelley of the US Fish & Wildlife Service indicates the Dakota skipper is present within this county.*

3.7.1.2 Field Botany Survey

Throughout the proposed well pads and access roads, one transect was placed at the Charging Eagle 14-22 location to provide a comprehensive overview of the study area. No transects were placed at the Charging Eagle 3-25 location as that study area consisted of a hayfield (previously plowed). Please refer to ***Figure 15, Ecological Site Description and Transect Map.*** The study area of the proposed project consisted of two different ecological sites, thin loamy and sandy. The thin loamy ecological site is a tame-grass hayland consisting of smooth bromegrasss, crested wheatgrass and alfalfa along with a woody draw. The sandy ecological site was heavily invaded with western snowberry and Kentucky bluegrass. The estimated visual cover was 50 percent western snowberry and 45 percent Kentucky bluegrass. Kentucky bluegrass was the dominant plant species, occurring 100 percent of the time in the frequency plots in the study area. Introduced cool season grasses, such as Kentucky bluegrass and smooth bromegrass, are not actively growing when Dakota skipper larvae are feeding, thus a prevalence of these grasses reduces food availability for the larvae.

Little bluestem is a favored forage for Dakota skipper larvae (Dana 1991 and Royer and Marrone 1992) and was not found in any of the frequency plots in the study area. Swengel and Swengel (1999) and Dana (1991) observed that purple coneflower is the most frequented plant as a nectar source for the adult Dakota skippers (Swengel and Swengel, 1999 and Dana, 1991). While purple coneflower was not observed in the transect, two other Dakota skipper preferred plants occurred in 40 percent of the frequency plots. Forb species did not contribute to the overall visual ground cover estimates. Please refer to ***Appendix G, Data Sheets*** and ***Appendix H, Transect and Plot Photos***, to see the plant species recorded in each plot.

3.7.2 Rufa Red Knot

The rufa red knot (Calidris canutus rufa) is one of the longest-distance migrants in the animal kingdom migrating more than 9,300 miles north to south and back every year. They migrate during the spring and fall between breeding grounds in northern Canada and wintering grounds in the Southeast US, the Northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego in South America. While a majority of red knots follow migration routes along the east and west coast of the US, small numbers of this species follow an inland migration route across the Midwest along the Great Lakes. Preferred stopover habitat in North America includes sandy or gravely beaches, tidal mudflats, salt marshes, shallow coastal impoundments and peat banks (78 FR 189, September 30, 2013). The species requires suitable stopover habitat with a large food source, habitat and favorable weather conditions within a narrow time frame to allow for successful migration between summer and wintering grounds. Their life cycles may make them particularly susceptible to climate changes. Although no documented sightings have occurred along Lake Sakakawea (eBird, 2012), the shoreline of the lake may provide suitable stopover habitat in the form of sandy beaches, along with the primary prey found in non-breeding habitats including snails, mollusks and insect larvae.

The closest potential habitat for the species is largely associated with the Missouri River and its shoreline; however, the closest reported sighting of the species was approximately 80 miles east of the FBIR which occurred in 1998, in Wells County, North Dakota (BA/BE, 2014). The proposed well pads and access roads are located on upland areas of native rangeland 1.75 miles from the closest potential habitat. The topographic features of the area and distance from the shoreline would provide sight and sound buffers for any shoreline-nesting birds, including the rufa red knot.

3.7.3 Northern Long-eared Bat

The Western Population of northern long-eared bats (Myotis septentrionalis) occurs partially in North Dakota, where bats have been observed during the summer in the Turtle Mountains, Missouri River Valley and the Badlands. No hibernacula (overwintering sites such as caves, abandoned mines, or similar constructions) are known to exist in the state; however, this may be a function of lack of adequate survey data (USFWS, 2013). Suitable habitat for summer maternity/non-maternity activities, as well as spring staging/fall swarming would include forests and woodlots, as well as fencerows, riparian forests and other wooded corridors. Density and canopy cover is variable within these forested habitats, which may be interspersed with wetlands, agricultural or fallow fields, or pastures. Potential roosts sites include live trees or snags that are greater than or equal to three inches in diameter at breast height (dbh) and may include the following: exfoliating bark, cracks, crevices, or cavities. Isolated trees could be potential roost sites if they exhibit the characteristics previously described and are less than 1,000 feet from the nearest roosting site or suitable forested habitat (USFWS, 2014).

Suitable summer habitat is present within the proposed project areas in the form of wooded draws (USDA NAIP, 2014).

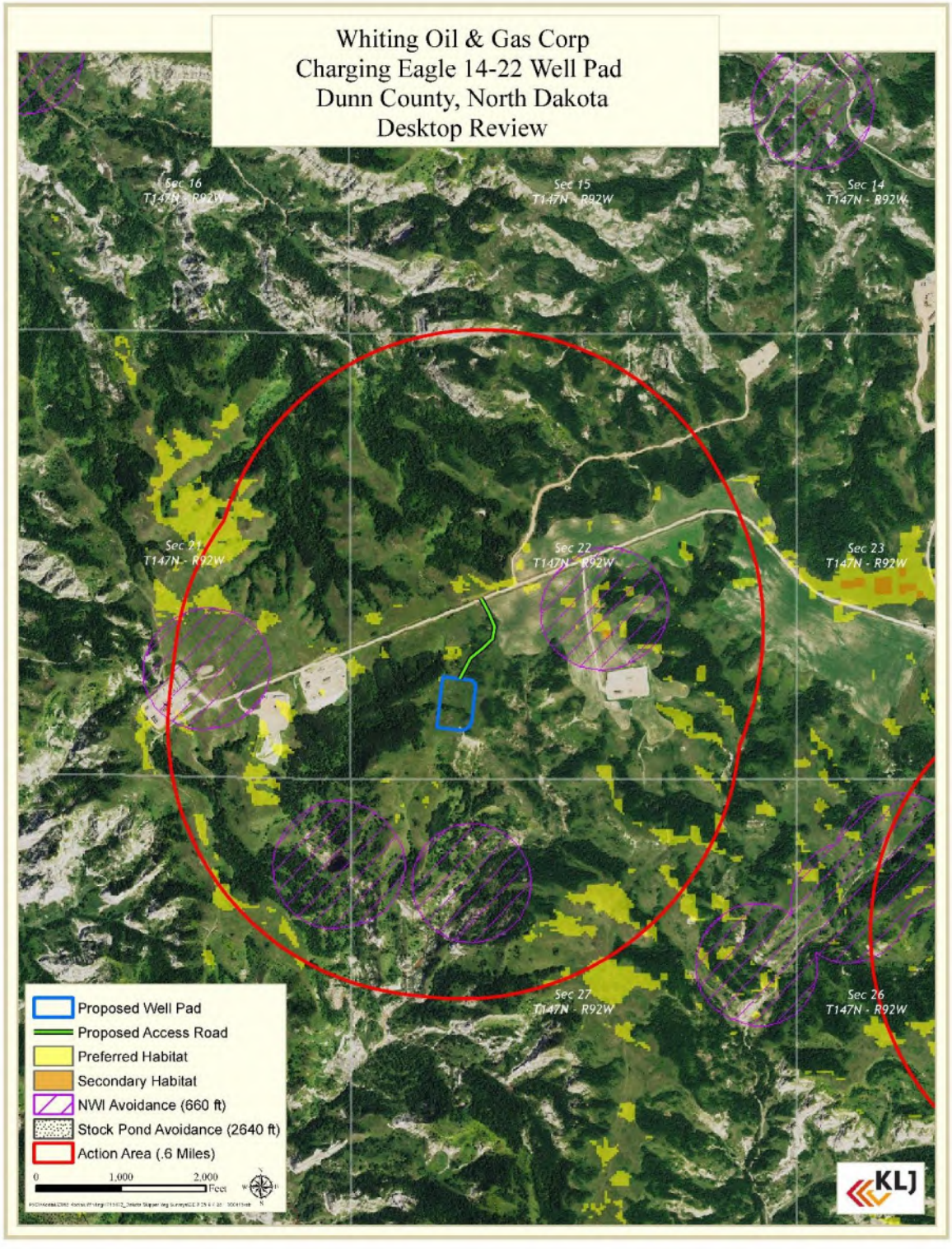


Figure 13, Desktop Analysis Map

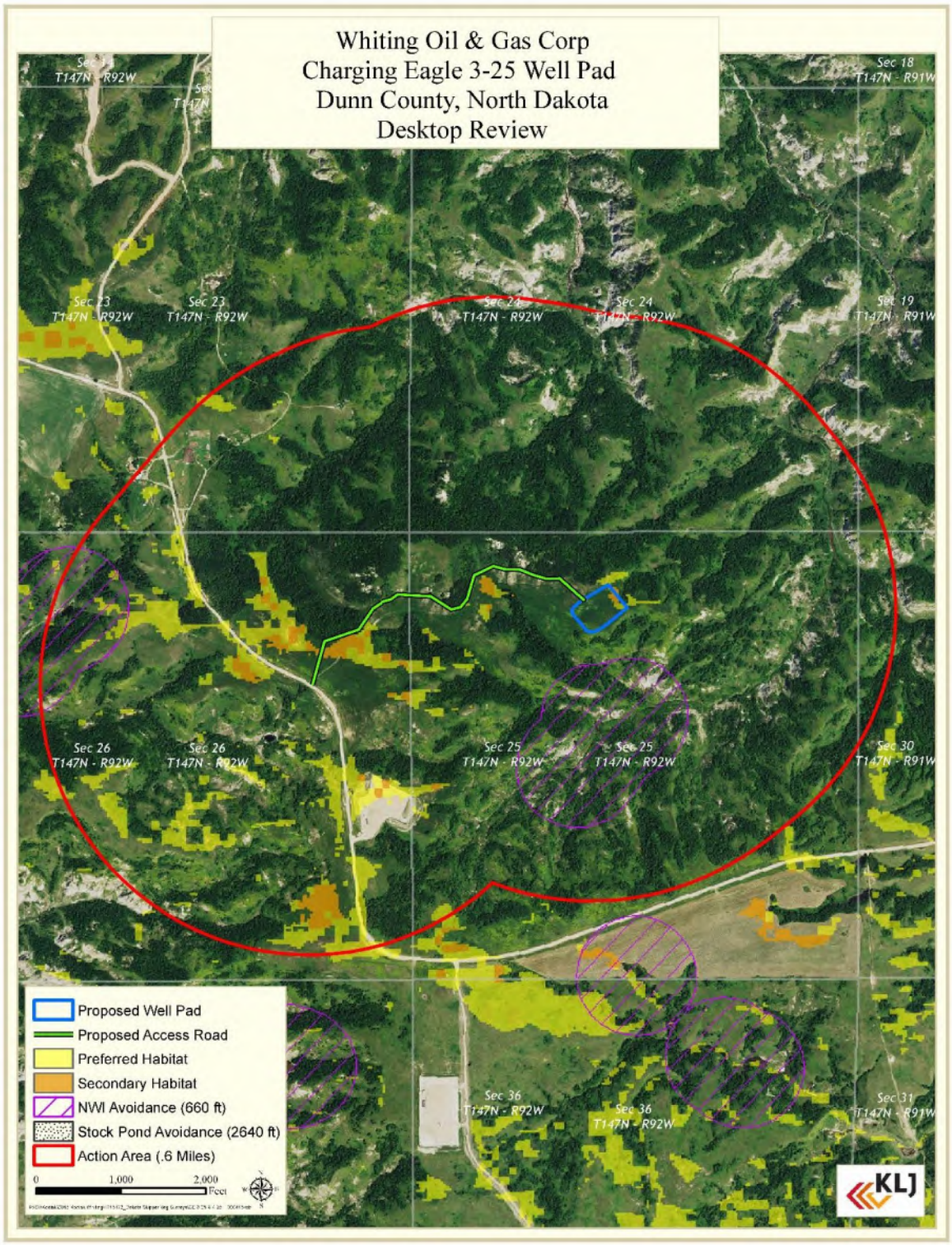


Figure 14, Desktop Analysis Map

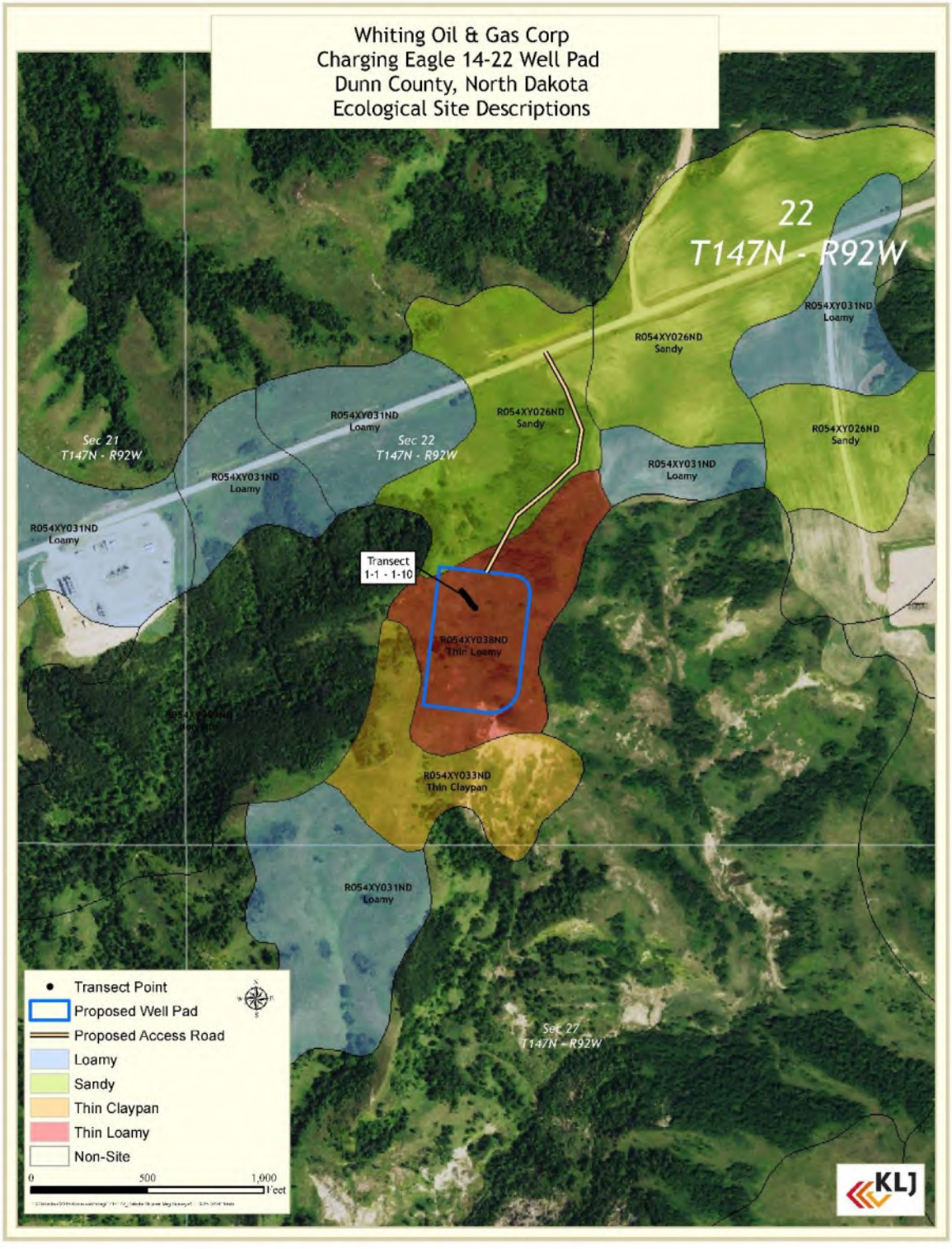


Figure 15, Ecological Site Description and Transect Map

3.7.4 Threatened, Endangered and Candidate Species Impacts/Mitigation

Alternative A (No Action) – Alternative A would have no effect on any of the listed species.

Alternative B (Proposed Action) – In May 2014, the BIA released a Programmatic Biological Assessment Biological Evaluation (BA/BE) that analyzed the anticipated oil and gas development on the Reservation during the next five years and the effects it would have on listed species. The BA/BE received USFWS concurrence in a letter dated June 4, 2014 for the following determination of effects for listed species. Please refer to ***Appendix E***. This concurrence applies only if the commitments outlined in section 3.20 of this EA and the BIA's required Conditions of Approval included in ***Appendix D,*** are adhered to by Whiting during construction and operation of the proposed project. None of these species were visually observed during field surveys; however, potential habitat was observed within the project area for the northern long-eared bat.

The project "may affect, but is not likely to adversely affect" the endangered interior least tern, the endangered whooping crane, the endangered pallid sturgeon, the threatened piping plover and will not adversely modify or destroy designated critical habitat for the piping plover. The BA/BE indicates a "no effect" determination for the endangered gray wolf, the endangered black-footed ferret, the proposed northern long-eared bat, and the proposed rufa red knot. In addition, the BA/BE identified indicated the projects would "not likely to jeopardize the continued existence" of the Dakota skipper[13] and would "not likely contribute to the future listing" of the Sprague's pipit.

The USFWS issued a letter of concurrence to the BIA, dated June 4, 2014, for the above effect determinations only based on the information contained within the 2014 BA/BE, and therefore, species effect determinations would need to be re-analyzed if: "(1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation, (2) the 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, or (3) a new species is listed or Critical Habitat is designated that may be affect by this action" (USFWS, 2014).

Under the above USFWS concurrence, if a new species is listed or critical habitat is designated that may be affected by this action, the information contained in the BA/BE would need to be reanalyzed. As of April 2, 2015 the previously "proposed" Northern long-eared bat has been listed as threatened by the USFWS (80 FR 63, USFWS). On October 24, 2014 the USFWS made a determination of threatened for the Dakota Skipper, which was previously proposed for listing (79 FR 206, USFWS). On December 11, 2014 the USFWS made a determination of threatened for the rufa red knot, which was previously proposed for listing (79 FR 238, USFWS) Finally, on October 1, 2015, critical habitat for the Dakota skipper, previously proposed, was designated as final (80 FR 190, USFWS). Therefore, habitat requirements, the potential for suitable habitat within the project area and other information are discussed in the previous subsections (***Sections 3.7.1- 3.7.3***) for the Dakota skipper, northern long-eared bat, and rufa red knot.

[13] At the time of publication of the BA/BE, the Dakota skipper was listed as a "proposed species"; therefore, the USFWS effect determination language for proposed species was used at that time.

The BIA provided a biological assessment to USFWS on October 30, 2015 for these newly listed species (Northern long-eared bat, Dakota skipper, and Rufa red knot). USFWS concurred with this determination on December 3, 2015. This December 2015 approved protocol was not used in this EA document's analysis for the Northern long-eared bat, Dakota skipper, and Rufa red knot. Species specific analysis is discussed in ***Sections 3.7.1- 3.7.3*** above. The USFWS is not required to concur with "no effect" determinations and the responsibility of the "no effect" determinations remain with the BIA. The paragraphs below summarize the "no effect" determinations and environmental commitments Whiting would implement for the newly listed Northern long-eared bat, Dakota skipper, and Rufa red knot.

Tree removal will be avoided between April and September. If removal cannot be avoided during this timeframe, then northern long-eared bat surveys would be conducted to confirm absence of the species. A bat presence/absence acoustic survey may also be conducted prior to construction activities. Surveys would be completed following the January 2014 USFWS "Range-wide Indiana Bat Summer Survey Guidelines" and be completed by a qualified biologist[14]. Due to the tree removal timing restrictions and/or surveys, committed to by Whiting, the proposed project would have ***no effect*** on the Northern long-eared bat.

Due to lack of potential habitats within the proposed project area and BMPs Whiting would commit to, the Alternative B would have ***no effect*** on the rufa red knot.

Results of the field botany survey indicated the absence of Dakota skipper preferred forb and nectar species throughout the study area for both well pads. In addition, due to the distance of proposed critical habitat from the project and lack of recent detections, the establishment of a new population within the project area is unlikely. The proposed project will have ***no effect*** on the Dakota skipper.

3.8 Bald and Golden Eagles

Protection is provided for bald and golden eagles through the Bald and Golden Eagle Protection Act (BGEPA). The BGEPA of 1940, 16 U.S.C. 668–668d, as amended, was written with the intent to protect and preserve bald and golden eagles, both of which are treated as species of concern within the Department of the Interior. The BGEPA prohibits, except under certain specified conditions, the taking, possession or commerce of bald and golden eagles. Under the BGEPA, to "take" includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb, wherein "disturb" means to agitate or bother a bald or golden eagle to the degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, causing injury, death, or nest abandonment.

The bald eagle (*Haliaeetus leucocephalus*) is sighted in North Dakota along the Missouri River during spring and fall migration periods and periodically in other places in the state such as the Devils Lake and Red River areas. According to the North Dakota Game and Fish Department, a total of 61 eagles were counted along the Missouri River from Bismarck to the Garrison Dam during the 2013 Midwinter Eagle Survey (USFWS, 2013). Preferred habitat for the bald eagle includes open areas, forests, rivers, and large lakes. Bald eagles tend to use the same nest year after year, building atop the previous year's

[14] A qualified biologist is defined by the USFWS as someone who has obtained a four year degree from an accredited university in a natural sciences filed and is employed as an environmental professional.

nest. No bald eagles or nests were observed within 0.5 miles of proposed project disturbance areas during the field surveys.

The golden eagle (*Aquila chrysaetos*) can be spotted in North Dakota throughout the badlands and along the upper reaches of the Missouri River in the western part of the state. Golden eagle pairs maintain territories that can be as large as 60 square miles and nest in high places including cliffs, trees, and human-made structures. They perch on ledges and rocky outcrops and use soaring to search for prey (NDGF, 2012). Golden eagle preferred habitat includes open prairie, plains, and forested areas. No golden eagle nests were observed within 0.5 miles of proposed project disturbance areas during the field surveys.

The USGS Northern Prairie Wildlife Research Center maintains information on bald eagle and golden eagle habitat within the state of North Dakota. According to the predicted distribution maps, potential breeding habitat for both the golden and bald eagles occurs within a 0.5-mile radius of the proposed project area (USGS, 2005).. Dr. Anne Marguerite Coyle completed focused research on golden eagles and maintained a database of golden eagle nest sightings. According to Dr. Coyle's information (last updated in 2010) and North Dakota Game and Fish Department information (last updated in 2012) the closest recorded golden eagle nest is located approximately 1.34 miles south of the proposed Charging Eagle 14-22 well site. Intensive pedestrian resource surveys of each proposed well pad and access road locations were conducted on July 22nd, 2014 by KLJ staff. During these KLJ ground inventories, resources were evaluated using visual inspection and pedestrian surveys across the sites. On April 14–15, 2014, an aerial helicopter survey was conducted for Whiting proposed lease areas, to aid in project design and avoidance of nests. A large raptor nest occurred approximately 0.40 miles southwest of the proposed Charging Eagle 14-22 well pad. The nest was unoccupied at the time of the aerial and ground surveys and was located in a tree at the bottom of a draw. It was of sufficient size to be utilized by an eagle, though no indications were observed relating to it being an eagle nest over a large hawk nest. It was located over one hundred lower in elevation down in a wooded drainage and was not visible from the well pad location. No historic eagle nests occurred within the 0.5 mile study area around the proposed well pads and access roads. Please refer to ***Figure 16, Bald and Golden Eagle Habitat and Nesting Sites.***

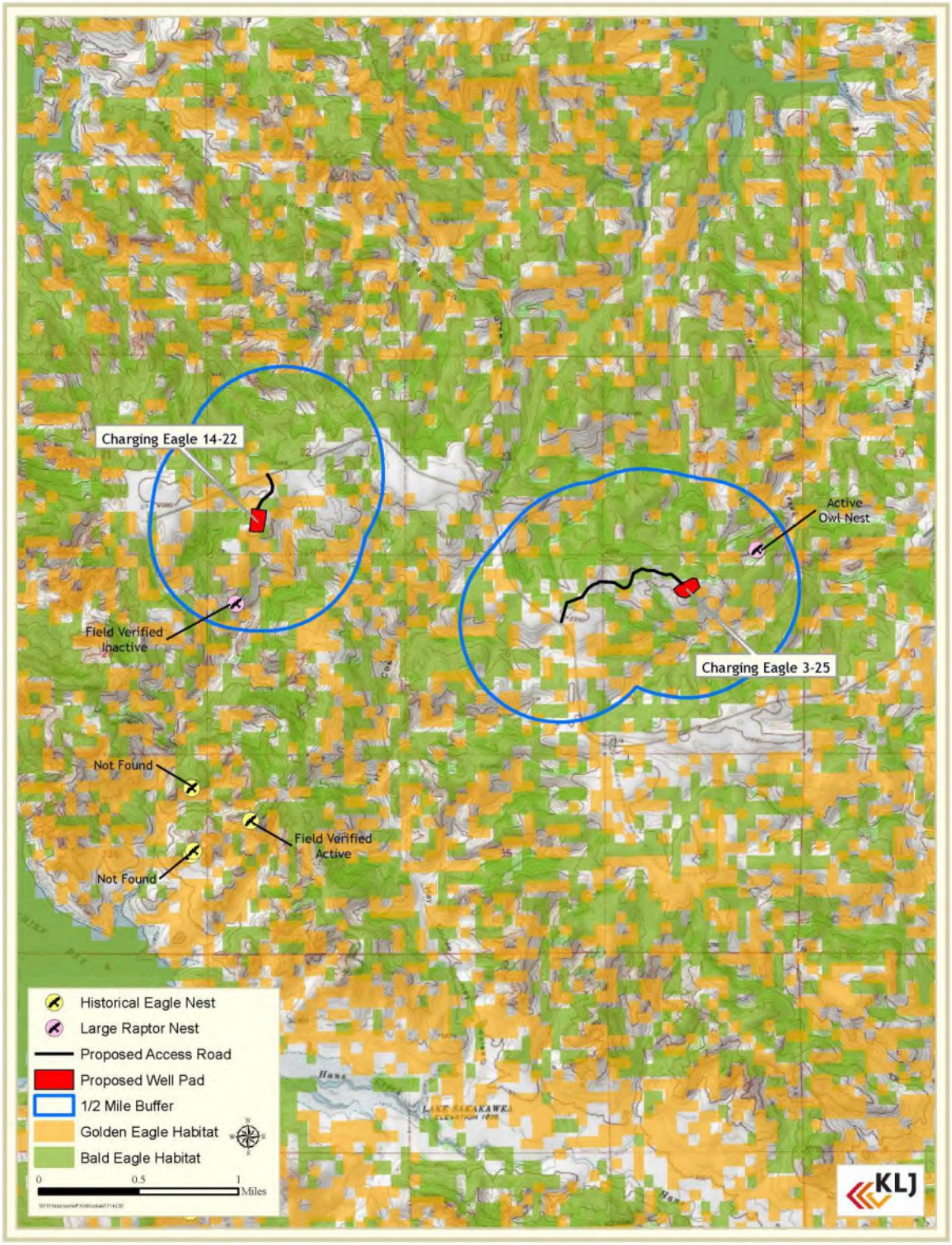


Figure 16, Bald and Golden Eagle Habitat and Nesting Sites

3.8.1 Bald and Golden Eagle Impacts/Mitigation

Alternative A (No Action)—Alternative A would not impact bald or golden eagles.

Alternative B (Proposed Action)—The proposed projects are located within areas of recorded suitable bald eagle and golden eagle habitat. No evidence of active eagle nests were found within 0.5 miles of the project areas. Therefore, no impacts to bald or golden eagles are anticipated to result from the proposed project. Additionally, if electrical lines are installed, the lines would be buried to prevent the potential for the eagles to strike electrical lines.

3.9 Migratory Birds and Other Wildlife

The Migratory Bird Treaty Act (MBTA), 916 U.S.C. 703–711, provides protection for 1,007 migratory bird species, 58 of which are legally hunted. The MBTA regulates impacts to these species such as direct mortality, habitat degradation, and/or displacement of individual birds. The MBTA defines "taking" to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof, except when specifically permitted by regulations.

The proposed project study areas lie in the Central Flyway of North America. As such, this area is used as resting grounds for many birds on their spring and fall migrations, as well as nesting and breeding grounds for many waterfowl species. Other non-game bird species are known to fly through and inhabit this region. In addition, the project areas contain suitable habitat for mule deer (*Odocoileus hemionus*), whitetail deer (*Odocoileus virginianus*), sharp-tailed grouse (*Tympanuchus phasianellus*), ring-necked pheasant (*Phasianus colchicas*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), wild turkey (*Meleagris gallopavo*), song birds, coyote (*Canis latrans*), red fox (*Vulpes vulpes*), Eastern cottontail rabbit (*Sylvilagus floridanus*), jackrabbit (*Lepus townsendii*), North American badger (*Taxidea taxus*) and North American porcupine (*Erethizon dorsatum*) (NRCS, 2006).

During the pedestrian field surveys, migratory birds, raptors, big and small game species, non-game species, and potential wildlife habitats were identified, if present. The following migratory birds or other wildlife species were observed during the field surveys: cedar waxwing (*Bombycilla cedrorum*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), lazuli bunting (*Passerina amoena*), Eastern bluebird (*Sialia sialis*), American goldfinch (*Spinus tristis*), bobolink (Dolichonyx oryzivorus), ring necked pheasant (*Phasianus colchicus*), and American crow (*Corvus brachyrhynchos*).

3.9.1 Migratory Birds and Other Wildlife Impacts/Mitigation

Alternative A (No Action)—Alternative A would not impact migratory birds or other wildlife.

Alternative B (Proposed Action)—Due to the presence of suitable habitat at the project site for many wildlife and avian species, ground clearing, drilling, and long-term production activities associated with the proposed project may impact individuals by displacing animals from suitable habitat. While many species of wildlife may continue to use the project areas for breeding and feeding and continue to thrive, the activities associated with oil and gas development may displace animals from otherwise suitable habitats. As a result, wildlife may be forced to utilize marginal habitats or relocate to unaffected habitats where population density and competition increase. Consequences of such displacement and competition may include lower survival, lower reproductive success, lower

recruitment, and lower carrying capacity leading ultimately to population-level impacts. Therefore, the proposed project may impact individuals and populations within these wildlife species, but is not likely to result in a trend towards listing of any of the species identified. As no grouse leks were observed in the project areas, additional timing restrictions for construction are not required.

The proposed well pads are located on upland areas that are at a higher elevation than the Lake Sakakawea shoreline. Additionally, the distance to Lake along with the topographic features of the area, would assist in providing sight and sound buffers for shoreline-nesting birds.

During drilling activities, the noise, movements, and lights associated with the drilling are expected to deter wildlife from entering the area.

Design considerations would be implemented to further protect against potential habitat degradation. The storage tanks and heater/treater would be surrounded by a steel containment system that would act as secondary containment to guard against possible spills. The steel containment would be sized to hold 100 percent of the capacity of the largest storage tank plus one full day's production. BMPs to minimize wind and water erosion of soil resources, as well as implementing pit-less drilling system, would also be employed. The use of BOPs while drilling also minimizes the risk of a potential well blowout. Please refer to section ***2.3.3.5 Blowout Prevention and Monitoring.*** Each site also has a Well Site Guard, which is used to prevent leakage at the well head if overspray were to occur during the production of the well when construction equipment has left. This device would be placed on the surface at the well head and would contain a powder coated aluminum basin, which would be covered by a clear plastic dome. In the event that an overspray would occur, the dome would prevent oil from leaving the area and traps oil in the basin beneath it. This bucket would contain a manual float connected to Whiting's continuous computer controlled systems which will trigger automatically in the event of an overspray, subsequently shutting down the well.

All efforts would be made to complete construction outside the migratory bird nesting season (February 1 through July 15) in order to avoid impacts to migratory birds during the breeding/nesting season. In the event that construction needs to take place during the migratory bird nesting season, a pre-construction survey for migratory bird nests would be conducted by a qualified biologist within five days prior to the initiation of all construction activities. The findings of these surveys would be reported to BIA. In-lieu of surveys, the project area could be mowed and grubbed outside of the breeding season and maintained up to construction to prevent species from nesting in the project area.

Additionally, all reasonable, prudent, and effective measures to avoid the taking of migratory bird species would be implemented during the construction and operation phases. If electrical lines are installed, the lines would be buried to prevent the potential for bird strikes. Other measures would include: the use of suitable mufflers on all internal combustion engines; certain compressor components to mitigate noise; only utilizing approved roadways; placing wire mesh or grate covers over barrels or buckets placed under valves and spigots to collect dripped oil.

3.10 Vegetation

During the pedestrian field survey, botanical resources were evaluated using visual inspection. The project study area was also investigated for the presence of noxious weed species.

The Charging Eagle 14-22 well pad and access road study area consisted of native and introduced upland grasses and shrubs. Western wheatgrass (*Agropyron smithii*), Kentucky bluegrass (*poa pratensis*), green needle (*Stipa viridula*) and western snowberry (*Symphoricarpos occidentalis*) dominated the well pad and access road. Forbs such as heath aster (*Aster ericoides*), silverleaf scurfpea (*Psoralea argophylla*), yellow sweetclover (*Melilotus officinalis*), raspberries, yellow coneflower (*Ratibida columnifera*) and some purple coneflower (*Echinacea angustifolia*) dominated the landscape. Green ash (*Fraxinus pennsylvanica*), and silver buffaloberry (*Shepherdia argentea*) occurred in the wooded drainages adjacent to the pad and crossing the access road. Please refer to ***Figure 17***, which shows the typical vegetation on the well pad and ***Figure 18*** for the adjacent wooded draw.

Figure 17, Charging Eagle 14-22 Well Pad Vegetation

Figure 18, Charging Eagle 14-22 Adjacent Wooded Draw

The Charging Eagle 3-25 well pad and access road study area consisted of a planted agricultural hayfield with wooded areas adjacent to the field. Dominant vegetation along the access road consisted of alfalfa (*Medicago sativa*) and quaking aspen (*Populus tremuloides*). The well pad consisted primarily of alfalfa (*Medicago sativa*), smooth brome (*Bromus inermus),* heath aster (*Aster ericoides*), yellow sweetclover (*Melilotus officinalis*), yellow coneflower (*Ratibida columnifera*) and Maximilian sunflower (*Helianthus maximiliani).* Please refer to ***Figure 19***, which shows the typical vegetation on the well pad and ***Figure 20*** for the vegetation within the access road corridor.

Figure 19, Charging Eagle 3-25 Well Pad Vegetation (View West)

Figure 20, Charging Eagle 3-25 Access Road Vegetation (View East)

No threatened or endangered plant species are listed for Dunn County. The project areas were also surveyed for the presence of noxious weeds. The North Dakota Department of Agriculture has declared 11 noxious species within North Dakota and four are known to occur in Dunn County. In addition, under the North Dakota Century Code (Chapter 4.1-47), counties and cities have the option to add species to the list to be enforced within their jurisdictions. Dunn County has no additional species listed. There were noxious weed species observed within both project study areas during the field survey including leafy spurge, Canada thistle, and field bindweed. Please refer to ***Table 7, Noxious Weed Species.***

Table 7, Noxious Weed Species

COMMON NAME	SCIENTIFIC NAME	2013 DUNN COUNTY REPORTED ACRES
Absinth wormwood	*Artemesia absinthium L.*	8,2500
Canada thistle	*Cirsium arvense (L.) Scop*	4,2800
Dalmation toadflax	*Linaria genistifolia ssp. Dalmatica*	10
Diffuse Knapweed	*Centaurea diffusa Lam*	—
Leafy spurge	*Euphorbia esula L.*	10,250
Musk thistle	*Carduus nutans L.*	—
Purple loosestrife	*Lythrum salicaria*	—
Russian knapweed	*Acroptilon repens (L) DC.*	—
Salt cedar (tamarisk)	*Tamarix ramosissima*	—
Spotted knapweed	*Centaurea maculosa Lam.*	—
Yellow toadflax	*Linaria vulgaris*	—

3.10.1Vegetation Impacts/Mitigation

Alternative A (No Action)—Alternative A would not impact vegetation.

Alternative B (Proposed Action)—Ground clearing activities associated with construction of the proposed well pads and access roads would result in vegetation disturbance; however, the areas of proposed surface disturbances are minimal in the context of the setting, and these impacts would be further minimized in accordance with the BLM Gold Book standards for well reclamation. Disturbance of vegetation in areas of noxious weed infestations may also result in redistribution of noxious weeds throughout the project areas. Thus, areas not currently dominated by these species would have a high potential to become infested. The spread of invasive grasses can have an adverse effect on multiple aspects of the vegetation resource ranging from the suitability of sensitive plant habitat and maintenance of native biodiversity, to forage production for livestock grazing. It is recommended that the project areas be chemically treated for noxious weeds (where present) prior to construction, and the topsoil piles be monitored/sprayed for noxious weeds during development of the well pad.

Following construction, interim reclamation measures to be implemented include reduction of cut and fill slopes, redistribution of stockpiled topsoil and re-seeding of disturbed areas with a native grass seed mixture consistent with surrounding vegetation. If commercial production equipment is installed, the well pad would be reduced in size to accommodate the production facilities, while leaving adequate

room to conduct normal well maintenance and potential recompletion operations, with the remainder of the well pad reclaimed. Reclamation activities would include leveling, re-contouring, treating, backfilling and re-seeding with a native grass seed mixture from a BIA/BLM-approved source. Erosion control measures including straw wattles, silt fences, straw mulch, and/or hydro seeding would be installed on down sloping sides. Stockpiled topsoil would be redistributed and re-seeded as recommended by the BIA.

If no commercial production is developed from any of the proposed wells, or upon final abandonment of commercial operations, all disturbed areas would be promptly reclaimed. The access road and well pad areas would be re-contoured to match topography of the original landscape as closely as possible and re-seeded with vegetation consistent with surrounding native species to ensure a healthy and diverse mix free of noxious weeds. Seed would be obtained from a BIA/BLM-approved source. Re-vegetation of the site would be consistent with the BLM Gold Book standards. Erosion control measures would be installed as appropriate in a manner that is consistent with the BLM Gold Book standards. In addition, erosion control measures would be installed in a manner consistent with the BLM *Gold Book* standards. The BLM *Gold Book* standards state:

> *"Erosion control is generally sufficient when adequate groundcover is re-established, water naturally infiltrates into the soil, and gullying, headcutting, slumping, and deep or excessive rilling is not observed."*

Maintenance of the re-vegetated pads would continue until such time that the stands were consistent with the surrounding undisturbed vegetation and the pads free of noxious weeds. The surface management agency would provide final inspection of the pads to deem the reclamation effort complete.

3.11 Cultural Resources

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

The Archaeological and Historic Preservation Act of 1974 provides for the survey, recovery, and preservation of significant scientific, prehistoric, archaeological, or paleontological data when such

data may be destroyed or irreparably lost due to a federal, federally licensed, or federally-funded project.

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

The NAGPRA of 1990 is triggered by the possession of human remains or cultural items by a federally-funded repository or by the discovery of human remains or cultural items on federal or tribal lands and provides for the inventory, protection, and return of cultural items to affiliated Native American groups. Permits are required for intentional excavation and removal of Native American cultural items from federal or tribal lands.

The American Indian Religious Freedom Act of 1978 requires consultation with Native American groups concerning proposed actions on sacred pads on federal land or affecting access to sacred pads. It establishes federal policy to protect and preserve for American Indians, Eskimos, Aleuts and Native Hawaiians the right to free exercise of their religion in the form of site access, use and possession of sacred objects, as well as the freedom to worship through ceremonial and traditional rites. The Act requires federal agencies to consider the impacts of their actions on religious pads and objects important to these peoples, regardless of eligibility for listing on the National Register.

In accordance with 16 U.S.C. 470hh(a), information concerning the nature and location of archaeological resources and traditional cultural properties, and detailed information regarding archaeological and cultural resources, is confidential. Such information is exempt from the Freedom of Information Act and is not included in this EA.

Whatever the nature of the cultural resource addressed by a particular statute or tradition, implementing procedures invariably include consultation requirements at various stages of a federal undertaking. The MHA Nation has designated a THPO by Tribal Council resolution, whose office and functions are certified by the National Park Service. The THPO operates with the same authority exercised in most of the rest of North Dakota by the State Historic Preservation Officer (SHPO). Thus, BIA consults and corresponds with the THPO regarding cultural resources on all projects proposed within the exterior boundaries of the Fort Berthold Reservation.

A Class III Cultural Resource survey was completed by Juniper for the Charging Eagle 14-22 well pad on August 27, 2014 and September 10, 2014. A total of 61 acres was inventoried in and around the well pad and access road. A representative from THPO was contacted and informed of the inventory, but declined to participate in the inventory. No new or previously recorded cultural resources were encountered during the inventory. Because no newly or previously recorded cultural resources were encountered within the project area, Juniper recommended a finding of *No Historic Properties Affected* to the BIA.

A Class III Cultural Resource Survey was completed by Juniper for the Charging Eagle 3-25 well pad on August 27th, 2014 and September 10, 2014. A total of 42 acres was inventoried in and around the well

pad and access road. A representative from THPO was contacted and informed of the inventory, but declined to participate in the inventory. THPO did request to be contacted if cultural resources were encountered during the inventory. No new or previously recorded cultural resources were encountered during the inventory. Because no newly or previously recorded cultural resources were encountered within the project area, Juniper recommended a finding of *No Historic Properties Affected* to the BIA.

3.11.1 Cultural Resources Impacts/Mitigation

Alternative A (No Action)—Alternative A would not impact cultural resources.

Alternative B (Proposed Action)—The well pads and access roads have been positioned to avoid impacts to cultural resources. As such, cultural resources impacts are not anticipated. A recommendation of effect was made for the projects to the BIA in a letter dated January 9, 2015.

No archaeological and tribal monitors were recommended to be present during the construction of the locations. If cultural resources are discovered at any site during construction or operation, work shall immediately be stopped, the affected site secured, and BIA and THPO notified. In the event of a discovery, work shall not resume until written authorization to proceed has been received from the BIA. All project workers are prohibited from collecting artifacts or disturbing cultural resources in any area under any circumstances.

3.12 Socioeconomic Conditions

Socioeconomic conditions depend on the character, habits and economic conditions of people living within the proposed project areas. Business, employment, transportation, utilities, etc. are factors that affect the social climate of a community. Other factors that distinguish the social habits of one particular area from another include the geography, geology and climate of the area.

The Fort Berthold Reservation is home to six major communities, consisting of New Town, White Shield, Mandaree, 4 Bears, Twin Buttes and Parshall. These communities provide small business amenities such as restaurants, grocery stores and gas stations; however, they lack the shopping centers that are typically found in larger cities of the region, such as Minot and Bismarck. According to 2010 US Census data, educational/health/social services is the largest industry on the reservation, followed by the entertainment/recreation/accommodation/food industry[15]. The 4 Bears Casino, Convenience Store and Recreation Park are also major employers with over 320 employees, 90 percent of whom are tribal members. In addition, several industries are located on the reservation, including Northrop Manufacturing, Mandaree Enterprise Corporation and Three Affiliated Tribes Lumber Construction Manufacturing Corporation as well as multiple companies who service oil and gas operations.

Several paved state highways provide access to the reservation including ND Highways 8, 22, 23 and 1804. These highways provide access to larger communities such as Bismarck, Minot and Williston. Paved and gravel BIA Route roadways serve as primary connector routes within the reservation. In addition, networks of rural gravel roadways are located throughout reservation boundaries providing

[15] Since 2010, there has been an increasing focus on oil and gas development on the Fort Berthold Reservation. As such, it is anticipated that these trends have likely shifted; however, data from the 2010 US Census for these categories has not been released for the Fort Berthold Reservation.

access to residences, oil and gas developments and agricultural land. Major commercial air service is provided out of Bismarck and Minot, with small-scale regional air service provided out of New Town and Watford City.

3.12.1Socioeconomic Impacts/Mitigation

Alternative A (No Action)—Alternative A would not impact the socioeconomic conditions in the project area; however, Alternative A would not allow for the collection of oil and gas resources from the 8 proposed wells, which could have positive effects on employment and income through the creation of jobs and payment of leases, easement, and/or royalties to Tribal members.

Alternative B (Proposed Action)—Alternative B is not anticipated to substantially impact the socioeconomic conditions in the project areas, but it does have the potential to yield beneficial impacts on Tribal employment and income. Qualified individual tribal members may find employment through oil and gas development and increase their individual incomes. Additionally, the proposed action may result in indirect economic benefits to tribal business owners resulting from construction workers expending money on food, lodging, and other necessities. The increased traffic during construction may create more congested traffic conditions for residents. Whiting and contractors would follow Dunn County, BIA, and North Dakota Department of Transportation rules and regulations regarding oversize/ overweight loads on state and county roads used as haul roads in order to maintain safe driving conditions.

3.13 Environmental Justice

Per Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, measures must be taken to avoid disproportionately high adverse impacts on minority or low-income communities.

Generally, the Three Affiliated Tribes qualify for environmental justice consideration as a minority and low-income population. The population of North Dakota is predominantly Caucasian. Tribal members comprise 5.4 percent of North Dakota's population and 12.7 percent of the population of Dunn County[16].

According to U.S. Census Bureau data, the Fort Berthold Reservation has lower than statewide averages of per capita income and median household income, whereas Dunn County has a higher per capita income and median household income than the statewide average. In addition, Dunn County has slightly lower rates of unemployment than the state average, while Fort Berthold's rate of unemployment was substantially greater[17]. Please refer to ***Table 8, Employment and Income.***

[16] Based on 2010 US Census Bureau data

[17] While more current data reflecting income, unemployment, and poverty levels within the Fort Berthold Reservation is not available, it is anticipated that 2010 numbers may show different trends. The exploration and production of oil and gas resources on the Reservation since 2006 have created employment opportunities and have likely affected these economic indicators; however, this assessment uses the best available data.

Table 8, Employment and Income

LOCATION	PER CAPITA INCOME	MEDIAN HOUSEHOLD INCOME	UNEMPLOYMENT RATE	INDIVIDUALS LIVING BELOW POVERTY LEVEL
Dunn County	$32,625	$54,539	3.0%	9.0%
Fort Berthold Reservation	$21,884	$50,341	6.6%	23.1%
Statewide	$28,700	$51,641	3.4%	12.1%

Sources: US Census Bureau, 2009-2013 American Community Survey

Population decline in rural areas of North Dakota has been a growing trend as individuals move toward metropolitan areas of the state, such as Bismarck and Fargo. While Dunn County's population has historically been slowly declining, the Fort Berthold Reservation has witnessed a steady increase in population. American Indians are the majority population on the Fort Berthold Reservation but are the minority population in Dunn County and the state of North Dakota. Please refer to ***Table 9, Demographic Trends.***

Table 9, Demographic Trends

LOCATION	POPULATION 2010	% OF STATE POPULATION	% CHANGE 2000–2010	PREDOMINANT RACE	PREDOMINANT MINORITY
Dunn County	3,536	0.53	-1.8	White	American Indian & Native Alaskan (12.7%)
Fort Berthold Reservation	6,341	0.94	+7.2	American Indian & Native Alaskan	White (23.8%)
Statewide	672,591	—	+4.7%	White	American Indian & Native Alaskan (5.4%)

Sources: U.S. Census Bureau 2000, U.S. Census Bureau 2010

3.13.1Environmental Justice Impacts/Mitigation

Alternative A (No Action)—Alternative A would not result in disproportionately high adverse impacts to minority or low-income communities.

Alternative B (Proposed Action)—Alternative B would not require relocation of homes or businesses or cause community disruptions. Alternative B would also not cause disproportionately high adverse impacts to members of the Three Affiliated Tribes. The proposed project has not been found to pose impacts to any other critical element (public health and safety, water, wetlands, wildlife, soils or vegetation) within the human environment. The proposed project is also not anticipated to result in disproportionately high adverse impacts to non-Tribal minority or low-income populations.

Oil and gas development of the Bakken and Three Forks Formations is occurring both on and off the Fort Berthold Reservation. Employment opportunities related to oil and gas development may lower the unemployment rate and increase the income levels on the Fort Berthold Reservation. In addition, the Three Affiliated Tribes and allotted owners of mineral interests may receive income from oil and gas development on the Fort Berthold Reservation in the form of royalties, if drilling and production are successful, as well as from Tribal Employee Rights Office taxes on construction of drilling facilities.

3.14 Infrastructure and Utilities

The Fort Berthold Reservation's infrastructure consists of roads, bridges, utilities and facilities for water, wastewater and solid waste.

Known utilities and infrastructure within the vicinity of the proposed project includes gravel BIA 22 Roadway. The proposed well pad access roads connect directly to BIA Roadway 22. Existing well pads in the vicinity of the proposed wells may have closed system facilities on the pad locations for generating power or capturing hydrocarbons. Bureau of Reclamation (BOR) rural water pipelines are located within Section 26, Township 147 North, Range 92 West, where the Charging Eagle 3-25 access road meets BIA Road 22 Roadway. Based on aerial photos, it appears the rural water line is located on the south side of BIA Road 22 and provides service to a residence to the northwest in Section 23.

3.14.1 Infrastructure and Utility Impacts/Mitigation

Alternative A (No Action) – Alternative A would not impact infrastructure or utilities.

Alternative B (Proposed Action) – Alternative B would require construction of two new access roadways which would ultimately connect to BIA Roadway 22. Additionally, vehicular traffic associated with construction, operation and maintenance of the proposed action would increase the overall traffic on the local roadway network. To minimize potential impacts to the roadway conditions and traffic patterns in the area, all haul routes used would either be private roads or roads that have been approved for this type of transportation use by the local governing tribal, township, county, and/or state entities. Whiting would follow Dunn County, BIA and NDDOT rules and regulations regarding rig moves and oversize/overweight loads on state and county roads used as haul roads. All contractors are required to permit their oversize/overweight loads through these entities. Whiting's contractors would be required to adhere to all local, county, tribal and state regulations regarding rig moves, oversize/ overweight loads and frost restrictions. Whiting would coordinate with utility providers prior to construction to avoid impacting lines within the project area. It is not anticipated that impacts would occur to waterlines due to them occurring on the opposite side of the road as the new proposed access roads; however. Whiting will coordinate with the BOR regarding access road improvements in Section 26, Township 147 North, Range 92 West to ensure no impacts occur to water lines.

The well pads may also require the installation of supporting buried electrical lines. In addition, if commercially recoverable oil and gas are discovered at the well pads, a natural gas, oil and water gathering system may be required. It is expected that electric lines and other pipelines would be constructed within the approximate 250-foot wide area surveyed, or additional NEPA analysis and BIA approval would be completed prior to construction of these utilities. Other utility modifications would be identified during design and coordinated with the appropriate utility company.

Drilling operations at the proposed well pads may generate produced water. In accordance with the BLM Gold Book and BLM Onshore Oil and Gas Order Number 7, produced water would be disposed of via subsurface injection, or other appropriate methods that would prevent spills or seepage. Produced water may be trucked to nearby oil fields where injection wells are available.

Safety hazards posed from increased traffic during the drilling phase are anticipated to be short-term and minimal for the proposed pads. It is anticipated that approximately 30 to 40 trips, over the course of several days, would be required to transport the drilling rig and associated equipment to the proposed well pads. If commercial operations are established at any of the proposed wells following drilling activities, the pump would be checked daily and oil and water hauling activities would commence. Oil would be hauled using a semi tanker trailer, typically capable of hauling 140 barrels of oil per load. Traffic to and from the well site would depend upon the productivity of the well. For example, a 1,000 barrel per day well would require approximately seven tanker visits per day, while a 300 barrel per day well would require approximately two visits per day. Produced water would also be hauled from the site using a tanker, which would typically haul 110 barrels of water per load. The number of visits would be dependent upon daily water production. Established load restrictions for state and BIA roadways would be followed and haul permits would be acquired as appropriate.

3.15 Public Health and Safety

Health and safety concerns include hydrogen sulfide (H_2S) gas, hazardous materials used or generated during well installation or production and traffic hazards associated with heavy drill rigs and tankers[18].

3.15.1 Public Health and Safety Impacts/Mitigation

Alternative A (No Action) – Alternative A would not impact public health and safety.

Alternative B (Proposed Action) – Project design and operational precautions would minimize the likelihood of impacts from H_2S gases, hazardous materials, and traffic, as described below.

H_2S Gases — It is unlikely that the proposed action would result in release of H_2S at dangerous concentrations; however, Whiting would submit H_2S Contingency Plans to the BLM as part of the site APDs. These plans establish safety measures to be implemented throughout the drilling process to prevent accidental release of H_2S into the atmosphere. The Contingency Plans are designed to protect persons living and/or working within 3,000 feet (0.6 miles) of the well location and include emergency response procedures and safety precautions to minimize the potential for an H_2S gas leak during drilling activities. Satellite imagery revealed no residences/buildings within 3,000 feet of the proposed well pads. The closest residence is approximately 5,400 feet away from the project.

Hazardous Materials — The EPA specifies chemical reporting requirements under the Superfund Amendments and Reauthorization Act of 1986, as amended. No materials used or generated by this

[18] H_2S is extremely toxic in concentrations above 500 parts per million. H_2S has not been found in measurable quantities in the Bakken Formation. However, before reaching the Bakken, drilling would penetrate the Mission Canyon Formation, which is known to contain varying concentrations of H_2S.

project for production, use, storage, transport or disposal are on either the Superfund list or on the EPA's list of extremely hazardous substances in 40 CFR 355.

The Spill Prevention, Control, and Countermeasure (SPCC) rule includes EPA requirements for oil spill prevention, preparedness and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires specific facilities to prepare, amend, and implement SPCC Plans.

3.16 Cumulative Considerations

Cumulative impacts result from the incremental consequences of an action "when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Effects of an action may be minor when evaluated in an individual context, but these effects can add to other disturbances and collectively may lead to a measureable environmental change. By evaluating the impacts of the proposed action with the effects of other actions, the relative contribution of the proposed action to a projected cumulative impact can be estimated.

3.16.1 Past, Present, and Reasonable Foreseeable Actions

Oil and gas development in western North Dakota has occurred with varying intensity for the past 100 years. Gas development began in the area in 1909 and the first recorded oil well was drilled in 1920. North Dakota's oil production has boomed twice prior to the current boom; first in the 1950s, peaking in the 1960s, and again in the 1970s, peaking in the 1980s. North Dakota is currently experiencing its third oil boom, which has already far surpassed the previous booms in magnitude. This oil boom is occurring both within and outside the Fort Berthold Reservation.

According to the NDIC, as of November 3, 2015 there were approximately 2007 active and/or confidential oil and gas wells within the Fort Berthold Reservation. In addition, there were approximately 1,264 within the 20-mile radius of the proposed well pads. Please refer to ***Figure 21, Existing and Proposed Oil and Gas Wells*** and ***Table 10, Summary of Active and Proposed Wells***.

As mentioned previously, the Bakken Formation covers approximately 25,000 square miles beneath North Dakota, Montana, Saskatchewan and Manitoba, with approximately two-thirds of the acreage beneath North Dakota. The Three Forks Formation lies beneath the Bakken. The North Dakota Department of Mineral Resources estimates that there are approximately two to four billion barrels of recoverable oil within the Bakken Formation and two billion barrels in the Three Forks Formation each of these formations and that there will be 30–40 remaining years of production, or more if technology improves.

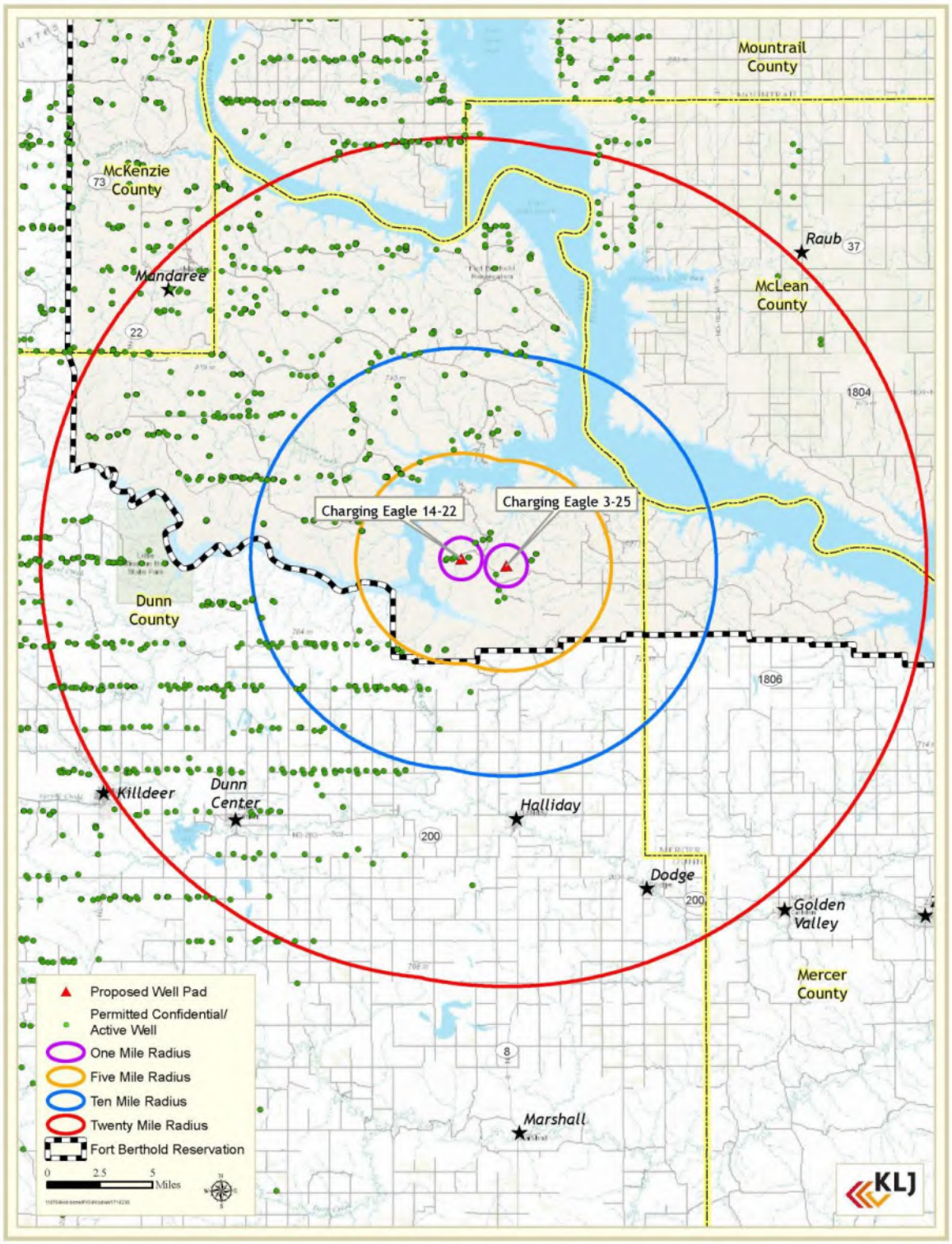


Figure 21, Existing and Proposed Oil and Gas Wells

Table 10, Summary of Active and Proposed Wells

WELL TYPE	1-MILE RADIUS		5-MILE RADIUS		10-MILE RADIUS		20-MILE RADIUS	
Reservation (on/off)	on	off	on	off	on	off	on	off
Active Wells	10	0	42	0	143	64	574	369
Confidential Wells	0	0	12	0	68	5	199	55
Permitted Wells	3	0	9	0	23	0	67	0
Cumulative total active and confidential wells	13		63		303		1264	

Commercial success at any new well can be reasonably expected to result in additional nearby oil/gas exploration/production proposals; however, it is speculative to anticipate the specific details of such proposals. While such developments remain speculative until APDs have been submitted to the BLM or BIA, it is reasonable to assume based on the estimated availability of the oil and gas resources that further development will continue in the area for the next 30–40 years. It is also reasonable to assume that natural gas and oil gathering and/or transportation systems will be proposed and likely built in the future to facilitate the movement of products to market. Currently, natural gas and oil gathering systems are being proposed and approved on the Fort Berthold Reservation and surrounding area, with some mainlines and smaller systems already existing. Whiting has proposed a Charging Eagle Gathering pipeline system that would gather oil and produced water from the proposed well pad locations. Gas gathering may follow along this pipeline corridor as well.

3.16.2 Cumulative Impact Assessment

It is a reasonable generalization that, while oil and gas development proposals and projects vary based on the developer, location, site constraints and other factors, the proposed project is not unique among others of its kind. It would be very difficult to quantify the number and scope of related actions occurring in the same time frame and geographic area as the proposed project because oil and gas development is booming in Western North Dakota, and projects are constantly being completed. Other pipelines, well pads, oil and gas facilities, transportation projects and municipal developments are ongoing in the region. It is a reasonable assumption that, based on regulatory oversight by the BIA, BLM, NDIC, and other agencies, as appropriate, the proposed action is not unique in its attempts to avoid, minimize, or mitigate impacts on the environment through the use of BMPs and site-specific environmental commitments.

The following discussion addresses potential cumulative environmental impacts associated with the proposed project along with other past, present, and reasonably foreseeable actions.

Climate, Geologic Setting and Land Use

As oil and gas exploration and production of the Bakken and Three Forks formations proceed, lands atop these formations are converted from existing uses (often agricultural or vacant) to industrial, energy-producing uses. The practice of installation adjacent to an existing roadway minimizes potential impacts on land use. The proposed project would temporarily disturb hayland and prairie grassland while the project is being constructed. The project area has been selected to avoid or minimize sensitive land uses and maintain the minimum impact footprint possible. In addition, the BIA views these

developments to be temporary in nature, as impacted areas would be restored to preconstruction conditions upon completion of oil and gas activity.

Soils

No cumulative or indirect impacts to soils are anticipated to occur from the proposed project.

Water Resources (Surface Water and Groundwater)

Surface waters and groundwater have the potential to be affected by past, present and future actions within the region of the project. Oil and gas development has the potential to leak or spill wastes into waterbodies or leach into groundwater sources. Single instances of these occurrences may be handled relatively quickly and efficiently by companies, but compounded by multiple events in the same region or timeframe may negatively impact surface and groundwater quality.

Wetlands

Impacts to jurisdictional Waters of the US (WOUS) are required to be permitted and mitigated based on USACE guidelines. One of the primary goals of these guidelines is to mitigate wetland impacts within a landscape that can sustain a wetland ecosystem, preferably in the watershed of the impacted wetlands. In areas that have been heavily disturbed or developed, finding locations for wetland mitigation may become difficult. If areas within the project's watershed are not available for wetland mitigation, off-site locations may have to be used. This option is not as environmentally desirable, although it still meets the USACE's goal of no overall net loss of wetland acreage. While acreage numbers of wetland mitigation occurring within the Southwest Slope Service Area (where the project is located) are not known, it is plausible that the cumulative effect of projects in the area could have an adverse effect on wetlands and the functions they provide within the watershed.

Air Quality

The extent to which construction of the proposed project could occur in the same general area and simultaneously with other projects (such as oil and gas development or transportation projects) or ongoing land use could result in temporary, minor impacts to air quality. Construction activities in close proximity to the proposed build alternative could result in elevated concentrations of air pollutants; however, as the proposed build alternative would be located mainly along existing roadway and oil infrastructure, none of them would contribute to an overall impact on air quality. Short-term concentrations would not be expected to result in a degradation of local or regional air quality, or result in an exceedance of NAAQS.

Threatened and Endangered Species

The potential for cumulative impacts to threatened and endangered species comes to those listed species that may be affected by the proposed project or candidate species that may be impacted by the proposed project. The proposed project occurs within the central flyway through which whooping cranes migrate. Continual development (e.g. agriculture, oil and gas, wind, etc.) within the central flyway has compromised whooping crane habitat both through direct impacts via conversion of potential habitat for other uses and indirect impacts due to disrupting the use of potential stopover habitat, as whooping cranes prefer isolated areas and are known to avoid large-scale development.

However, the proposed action, which would not impact preferred roosting or feeding habitat for the whooping crane, is not anticipated to significantly contribute to cumulative impacts occurring to the whooping crane population.

Habitats for the interior least tern, pallid sturgeon and piping plover are primarily associated with Lake Sakakawea and its shoreline. When added to other past, present and reasonably foreseeable projects, such as oil and gas wells and water intake structures on Lake Sakakawea, the proposed project may have an indirect cumulative impact on potential habitat for these species due to potential leaks or spills, and habitat fragmentation; however, due to the implementation of BMP's for the proposed project, the transfer of accidentally released fluids to Lake Sakakawea and its associated habitats is unlikely. In addition, surface impacts situated back from potential habitat (Lake Sakakawea and its shoreline); lessening any possible cumulative effects of fragmentation. It is unlikely the project would contribute to cumulative impacts to the interior least tern, pallid sturgeon, and piping plover.

The Dakota Skipper's most pressing threat to the species is the loss of high-quality remnant prairies and conserving the remaining patches is critical to Skipper's survival. When added to other past, present and reasonably foreseeable projects such as oil and gas wells and pipelines, these projects may have an indirect or direct cumulative impact on potential habitat for the Dakota Skipper. Best management practices and conservation measures such as avoiding development on the USFWS established Dakota Skipper critical habitat units is essential to limiting cumulative impacts and habitat loss for this species. It is unlikely that the proposed project would contribute to cumulative impacts to the Dakota Skipper as no habitat occurred in the project areas.

Please refer to the discussion below (Eagles, Migratory Birds, Other Wildlife, and Vegetation) for an analysis of potential cumulative impacts to candidate species (Sprague's pipit).

Eagles, Migratory Birds, Other Wildlife, and Vegetation

The proposed project, when added to previously constructed and reasonably foreseeable oil and gas projects, would contribute to habitat loss and fragmentation associated with construction of the project. The North Dakota Parks and Recreation Department notes in its undated publication, "North Dakota Prairie: Our Natural Heritage" that approximately 80 percent of the state's native prairie has been lost to agriculture, with most of the remaining areas found in the arid west; ongoing oil and gas activity has a high potential to threaten remaining native prairie resources. While many species of wildlife may continue to use the project areas for breeding and feeding and continue to thrive, the activities associated with oil and gas development may displace animals from otherwise suitable habitats. As a result, wildlife may be forced to utilize marginal habitats or relocate to unaffected habitats where population density and competition would increase. Consequences may include lower survival, lower reproductive success, lower recruitment and lower carrying capacity leading ultimately to population-level impacts.

Cultural Resources

No cumulative impacts to cultural resources are anticipated to occur from the proposed project.

Socioeconomic

Any impacts are not anticipated to contribute to an overall detrimental cumulative impact to socioeconomic conditions, and would potentially benefit the community, State of North Dakota and the Western North Dakota region.

Environmental Justice

Any impacts are not anticipated to contribute to an overall detrimental cumulative impact to minority or low income populations, and would potentially benefit the minority, low income groups of the Fort Berthold Reservation.

Infrastructure and Utilities

Any impacts are not anticipated to contribute to an overall detrimental cumulative impact to infrastructure or utilities.

Public Health and Safety

Any impacts are not anticipated to contribute to an overall detrimental cumulative impact to public health and safety.

3.17 Irreversible and Irretrievable Commitment of Resources

Removal and consumption of oil or gas from the Bakken and Three Forks Formations would be an irreversible and irretrievable commitment of resources. Other potential resource commitments include soil lost through wind and water erosion, cultural resources inadvertently destroyed, wildlife killed during earth-moving operations or in collisions with vehicles and energy expended during construction and operation.

3.18 Short-term Use of the Environment versus Long-term Productivity

Short-term activities would not significantly detract from long-term productivity of the project areas. The area dedicated to the access road and well pad would be unavailable for livestock grazing, wildlife habitat, or other uses; however, allottees with surface rights would be compensated for loss of productive acreage and project footprints would shrink considerably once the wells were drilled and non-working areas reclaimed and reseeded. Successful and ongoing reclamation of the landscape would reestablish the land's use for wildlife and livestock grazing, stabilize the soil, and reduce the potential for erosion and sedimentation. The primary long-term resource loss would be the extraction of oil and gas resources from the Bakken and Three Forks Formations, which is the purpose of this project.

3.19 Permits

Whiting would be required to acquire the following permits prior to construction:

- Application for Permit to Drill — Bureau of Land Management
- Application for Permit to Drill —North Dakota Industrial Commission
- Synthetic Minor Source Permit — Environmental Protection Agency

On Tribal land in North Dakota, the EPA is responsible for permitting Storm Water Pollution Prevention Plans (SWPPP) through permit NDR1000I using the National Pollutant Discharge Elimination System (NPDES). For NPDES permitting, both the construction and operation activities for oil and gas are subject to permitting if any of the three criteria are met:

- Has had a discharge of storm water resulting in the discharge of a reportable quantity for which notification is or was required pursuant to 40 CFR 117.21 or 40 CFR 302.6 at any time since November 16, 1987;
- Has had a discharge of storm water resulting in the discharge of a reportable quantity for which notification is or was required pursuant to 40 CFR 110.6 at any time since November 16, 1987; or
- Contributes to a violation of a water quality standard.

The proposed project is not expected to meet any of the three criteria so long as proper soil stabilization measures are used during construction and operation activities. Should one or more of these criteria be met during the construction or operation the well pads, a NPDES permit would need to be acquired through coordination with the EPA.

If any of the vehicles used for construction or hauling materials to the proposed project location exceed the ND Legal Vehicle Size and Weight Guide and the ND Weight Limitation Chart, an Oversize Permit would be required from the ND Highway Patrol. Other permits may be required from the ND Highway Patrol depending on the type of vehicles used for construction of the proposed pipelines and what roads those vehicles would be traveling on.

3.20 Environmental Commitments/Mitigation

The following commitments have been made by Whiting:

- Topsoil would be segregated and stored onsite to be used in the reclamation process. All disturbed areas would be re-contoured to original elevations as close as possible as part of the reclamation process.
- Woody vegetation cleared from the site would be chipped onsite, mixed over the topsoil prior to removal, and incorporated into the topsoil stockpile.
- BMPs (including, but are not limited to, erosion mats and biologs) would be implemented to minimize wind and water erosion of soil resources. Soil stockpiles would be positioned to help divert runoff around the well pad.
- The well pad and access road would avoid surface waters to the extent possible. The proposed project would not alter stream channels or change drainage patterns.
- A pit-less drilling system would be used during drilling. Liquids and dry cuttings from drilling would be separated and transported off-site and disposed of at an approved facility or site.
- Whiting would institute density test of soils at the entire well pad to ensure a requirement of > 95% soil compaction for site stabilization. This compaction is to be confirmed by a third party with a Soil Proctor test. This stabilizes fill areas for facilities to alleviate weight concerns that would normally occur in “non-engineered” fills. Fill would be placed in six to eight inch lifts

with documented density tests on each lift. The test results would be provided to BIA upon request.

- All proposed wells would be cemented and cased to isolate aquifers from potentially productive hydrocarbon and disposal/injection zones.
- Wetlands and riparian areas would be avoided to the extent possible.
- Disturbed vegetation would be re-seeded in-kind upon completion of the project, and a noxious weed management plan would be implemented. The re-seeded site would be maintained until such time that the vegetation is consistent with surrounding undisturbed areas and the site is free of noxious weeds. Seed would be obtained from a BIA/BLM approved source.
- The well pad and access road would avoid impacts to cultural resources. If cultural resources are discovered during construction or operation, work shall immediately be stopped, the affected site secured, and BIA and THPO notified. In the event of a discovery, work shall not resume until written authorization to proceed has been received from the BIA.
- Construction would be located at least 75 feet away from the identified cultural resources sites, if present.
- All project workers are prohibited from collecting artifacts or disturbing cultural resources in any area under any circumstances.
- Whiting would ensure all contractors working for the company would adhere to all local, county, tribal, and state regulations and ordinances regarding rig moves, oversize/overweight loads, and frost law restrictions.
- Utility modifications would be identified during design and coordinated with the appropriate utility company.
- H_2S Contingency Plans for the well site would be submitted to the BLM as part of the APD.
- Suitable mufflers would be put on all internal combustion engines and certain compressor components to mitigate noise levels.
- The wells and associated facilities would be painted in earth tones, based on standard colors recommended by the BLM, to allow them to better blend in with the natural background color of the surrounding landscape.
- BMPs would be used during construction to ensure contaminants do not migrate off site. An impervious lined trench would be installed on the downsloping side of the well pad to catch and hold any storm water runoff from the well pad. All storage tanks and heater/treaters would be surrounded by an impermeable berm that would act as secondary containment to guard against possible spills. The berm would be sized to hold 100% of the capacity of the largest storage tank plus one full day's production. A 24-inch high berm would be installed around the well pads, and tied into cut, to prevent runoff from leaving the pad and entering the adjacent drainages.
- A 40 mil liner would be placed under the steel containment and tanks to prevent contaminants from leaking through the soil.
- Interim well pad reclamation would occur within 6 months of final well completion.
- Water diversions would be constructed around the well pads to divert runoff around the pads.
- All efforts will be made to complete construction outside the migratory bird nesting season (February 1 through July 15) in order to avoid impacts to migratory birds during the breeding/nesting season. In the event that a construction activity needs to take place within the migratory bird nesting and breeding season, a pre-construction survey for migratory bird

nests would be conducted by a qualified biologist within five days prior to the initiation of all construction. The findings of these surveys along with the qualifications of the biologist(s) would be reported to the BIA and MHA Energy.

- If a whooping crane is sighted within one-mile of a well site or associated facilities while under construction, all work would cease within one-mile of that part of the project and the USFWS would be contacted immediately. In coordination with USFWS, work may resume after the bird(s) leave the area.
- Wire mesh or grate covers would be placed over barrels or buckets placed under valves and spigots to collect dripped oil.
- Re-seeding of native species shall occur as needed on stockpile areas and slope areas during reclamation.
- Facilities on well pads shall be spaced as close together as design specifications allow.
- Interim reclamation would occur as soon as possible after the production phase.
- If electrical lines are installed, the lines would be buried to prevent the potential for bird strikes.
- Topsoil stockpiles would be placed to assist in diverting runoff.
- Whiting would provide dust control on their haul roads and access roads depending on conditions.
- Whiting would utilize BOPs on all wells that: a drilling rig is on (actively drilling), any completion work is being completed on (fracking the well), or during any routine maintenance work on producing wells.
- Whiting would utilize a hydraulic fracturing string back to surface for completion operations
- Whiting would use a SCADA system to allow for remote monitoring of producing conditions and remote shut down of the well and equipment.
- For gathering pipelines, specialty coatings that are applicable for underground fittings, bore crossings, etc. would be used to provide additional levels of protection in areas that require it. Velocities and pressure drops for the pipeline system would be carefully evaluated and lines are sized so as to prevent erosion velocity. Additionally, lines are designed to be cleaned and inspected via internal tools (e.g., cleaning pigs and smart pigs), which helps in the identification of issues in the pipes
- Following design and installation, the pipeline service provider would immediately conduct a cathodic survey utilizing test stations, rectifier pads and other means designed by cathodic protection specialists or other tests to identify issues in pipelines.
- The pipeline service provider would fully comply with the marking requirements specified in the US Department of Transportation's rules and regulations, specifically contained in 49 CFR Parts 192 and 195.
- The pipeline provider would commit to developing a spill response plan that would be submitted to the BIA prior to the commencement of the construction activities.
- Any proposed pipelines would be sited to avoid direct impacts to surface water and to minimize the disruption of drainage patterns across the landscape. Implementation of BMPs to control erosion would mitigate runoff of sediment downhill or downstream.
- All equipment associated in construction of the well pads, must be either pressure washed or air blasted to remove any existing dirt or vegetation from the machinery in an effort to prevent the transportation of noxious or undesirable vegetation onto Tribal lands. The cleaning of the equipment should be done prior to the equipment entering tribal lands. The same cleaning

requirement should be adhered to for equipment associated with the drilling and production phase of the well also.

- Whiting will implement an Emergency Response Plan detailing preventative measures and response actions to emergencies that may occur during the duration of the proposed project.
- The west corner of the Charging Eagle 3-25 well pad be designed with a 1-1 ½ slopes which are to be matted immediately and have straw wattles placed following grading to hold the soils in place. Per BIA request, KLJ will inspect pad construction to ensure measures are being installed and provide photo documentation back to BIA.
- The north side of the Charging Eagle 14-22 access road will be armored with rock rip rap at the location of the intermittent drainage. The access road will also be matted and have straw wattles placed on it.
- It is recommended that the project areas be chemically treated for noxious weeds (where present) prior to construction, and the topsoil piles be monitored/sprayed for noxious weeds during development of the well pad.
- Whiting will coordinate with the BOR regarding access road improvements in Section 26, Township 147 North, Range 92 West to ensure no impacts occur to water lines.

CHAPTER 4 PREPARERS AND AGENCY COORDINATION

4.1 Introduction

This chapter identifies the names and qualifications of the principal people contributing information to this EA. In accordance with Part 1502.6 of the Council on Environmental Quality regulations for implementing NEPA, the efforts of an interdisciplinary team comprising technicians and experts in various fields were required to accomplish this study.

This chapter also provides information about consultation and coordination efforts with agencies and interested parties, which has been ongoing throughout the development of this EA.

4.2 Preparers

KLJ prepared this EA under a contractual agreement between Whiting and KLJ. A list of individuals with the primary responsibility for conducting this study, preparing the documentation, and providing technical reviews is contained in ***Table 11, Preparers.***

Table 11, Preparers

AFFILIATION	NAME	TITLE	PROJECT ROLE
Bureau of Indian Affairs	Marilyn Bercier	Regional Environmental Scientist	Review of Draft EA and recommendation to Regional Director regarding FONSI or EIS
	Mark Herman	Environmental Engineer	
Whiting Oil and Gas Corp.	Douglas Walton	Vice President and National Drilling Manager	Project development
	Chris Woods	Permitting Coordinator	Permitting Coordinator, alternatives, document review
	Mike Nash	Permit and Regulatory Manager	Field Representative
KLJ	Nute Bishop	Environmental Planner	Principal author
	Tom Naas	Biologist	Field resource surveys
	Mike Huffington	Environmental Planner	Field resource surveys
	Quentin Obrigewitsch	Surveyor	Site Plats
	Kailee Murphy	GIS Analyst	Impact assessment, exhibit creation
	Steve Czeczok	Environmental Planner	Project Manager, agency/client coordination, senior review
Juniper Archeology	John Morrison	Archaeologist	Cultural Resources Surveys

4.3 Agency Coordination

To initiate early communication and coordination, an early notification package to tribal, federal, state, and local agencies and other interested parties was distributed on September 15, 2014. This scoping package included a brief description of the proposed project, as well as a location map. Pursuant to Section 102(2) (D) (IV) of NEPA, a solicitation of views was requested to ensure that social, economic, and environmental effects were considered in the development of this project. ***Appendix A*** contains Scoping Materials.

At the conclusion of the 30-day comment period, 8 responses were received. USFWS did not provide a response letter to this project. Comments from the resource agencies to the scoping and USFWS to the PBA will be considered in the construction of the proposed project. These comments provide valuable insight into the evaluation of potential environmental impacts. The comments were referenced and incorporated where appropriate within the environmental impact categories addressed in this document. ***Appendix B*** contains Scoping Responses.

4.4 Public Involvement

Provided the BIA approves this document and determines that no significant environmental impacts would result from the proposed action, a Finding of No Significant Impact (FONSI) will be issued. The FONSI is followed by a 30-day public appeal period. BIA will advertise the FONSI and public appeal period by posting notices in public locations throughout the Reservation. No construction activities may commence until the 30-day public appeal period has expired.

CHAPTER 5 REFERENCES

Beitisch, R. (2010, April 30). Three Forks Formation to yield lots of oil in North Dakota. The Bismarck Tribune. Retrieved from http://www.bismarcktribune.com/news/state-and-regional/article_368dcb38-53ef-11df-a6c8-001cc4c03286.html.

Coyle, A.M. (2007). Golden eagle nests [Data file]. Retrieved from United States Forest Service — Dakota Prairie Grasslands Region.

Dana, R. P. 1991. Conservation management of the prairie skippers Hesperia dacotae and Hesperia ottoe. Minnesota Agricultural Experiment Station, University of Minnesota, St. Paul, Minnesota. 63 p.

Guadalupe-Blanco River Authority. (2009, April 29). Major research gives insight into the needs of whooping cranes. Retrieved from http://www.gbra.org/news/2009/042901.aspx.

Johnson, S. (2010, February). Nesting in numbers: active bald eagles nests up in North Dakota. North Dakota Outdoors, 14–17. Retrieved from http://gf.nd.gov/multimedia/ndoutdoors/issues/2010/feb/docs/nest-numbers.pdf.

Meine, Curt D. and Archibald, George W. (Eds) 1996. The Cranes: - Status Survey and Conservation Action Plan.IUCN, Gland, Switzerland, and Cambridge, U.K. 294pp

Middick, Andy. (2011). Operations monitoring and spill response plan. Blackshare Environmental Solutions. Oklahoma City, Oklahoma.

National Geographic. (n.d.). Golden eagle. Retrieved September 9, 2011, from http://animals.nationalgeographic.com/animals/birds/golden-eagle.html.

North Dakota Department of Agriculture. (n.d.). Noxious weeds team. Retrieved October 11, 2013, from http://www.agdepartment.com/Programs/Plant/NoxiousWeeds.html.

North Dakota Department of Health. (2013, June). Annual Report: North Dakota Air Quality Monitoring Data Summary 2011. Bismarck, ND: North Dakota Department of Health.

North Dakota Game and Fish Department. 2013. Midwinter Bald Eagle Survey Conducted. North Dakota Game and Fish Department, Bismarck, ND. Retrieved from: <http://gf.nd.gov/news/midwinter-bald-eagle-survey-conducted>.

North Dakota Parks and Recreation Department. (n.d.). North Dakota prairie: our natural heritage. North Dakota Parks and Recreation Department, U.S. Department of the Interior, U.S. Fish and Wildlife Service. Jamestown, ND: Northern Prairie Wildlife Research Center Online. Retrieved from http://www.npwrc.usgs.gov/resource/habitat/heritage/index.htm.

North Dakota State Water Commission. (2012). Query water permits [Data file]. Retrieved June 4, 2013 from http://www.swc.state.nd.us/4dlink7/4dcgi/Permitsearchform /Permits.

North Dakota State Water Commission and U.S. Geological Survey. (2010a). USGS digital elevation models for North Dakota [Data file]. Retrieved from http://www.nd.gov/gis/.

North Dakota State Water Commission and U.S. Geological Survey. (2010b) USGS hydrography dataset for North Dakota [Data file]. Retrieved from http://nhd.usgs.gov/.

Rigney, C. L. (2013). Habitat characterization and biology of the threatened Dakota skipper, Hesperia dacotae. *Manitoba. Dissertation, University of Winnipeg*.

Royer, R. A. and G. M. Marrone. 1992. Conservation status of the Dakota skipper (*Hesperia dacotae*) in North and South Dakota. U.S. Department of the Interior, Denver, CO. 44p.

Royer, R. A., R. A. McKenney, and W. E. Newton. 2008. A characterization of non-biotic environmental feature of prairies hosting the Dakota skipper (*Hesperia dacotae*, Hesperiidae) across its remaining U.S. range. Journal of the Lepidopterists Society **62**:1-17.

Swengel, A. B. and S. R. Swengel. 1999. Observation of prairie skippers (*Oarisma Poweshiek*, *Hesperia dacotae, H. ottoe*, *H. leonardus pawnee*, and *Atrytone arogos iowa*) (Lepidoptera: Hesperiidae) in Iowa, Minnesota, and North Dakota during 1988-1997. The Great Lakes Entomologist **32**(4):267-292.

Three Affiliated Tribes. (2009, August 21). Fort Berthold Reservation: Home of the Three Affiliated Tribes. Fargo Forum. Retrieved from http://legacy.inforum.com/specials/DyingTongues/graphics/demographics.pdf.

United States. (2007, May 30). Whooping crane recovery plan revised. Retrieved from http://www.fws.gov/news/NewsReleases/showNews.cfm?newsId=DD912DFC-CAC2-6024-897401985ACEFFAB.

U.S. Department of Agriculture. (2013). Soil survey for Dunn County, North Dakota. U.S. Department of Agriculture, Soil Conservation Service. U.S. Government Printing Office.

U.S. Department of Agriculture. (2012). Spatial and tabular data of the soil survey for Dunn County, North Dakota. Retrieved from http://soildatamartnrcs.usda.gov/.

US Department of Interior. Fish and Wildlife Service. 2013. Federal Register, 50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Rufa Red Knot (*Calidris canutus rufa*); Proposed Rule. Retrieved January 24, 2014. Available: http://www.fws.gov/policy/library/2013/2013-22700.pdf

US Department of Interior, Fish and Wildlife Service, North Dakota Field Office. 2009 "North Dakota Birding Hotline Reports." Retrieved January 24th, 2014, from <http://www.fws.gov/northdakotafieldoffice/bhotline/nd_birding_hotline_rep_aug09.htm>.

U.S. Fish & Wildlife Service. (2012, May). Piping plover fact sheet. Retrieved May 23, 2012, from http://www.fws.gov/midwest/endangered/pipingplover/pipingpl.html.

U.S. Fish & Wildlife Service. (2007, June). Bald eagle fact sheet: Natural history, ecology, and history of recovery. Retrieved September 23, 2011, from http://www.fws.gov/midwest/eagle/recovery/biologue.html.

U.S. Fish & Wildlife Service. (2011, March). Gray Wolf (Canis lupus) Biologue. Retrieved September 23, 2011, from http://www.fws.gov/midwest/wolf/aboutwolves/biologue.htm.

U.S. Fish & Wildlife Service. (2011, March 9). Least tern (Interior Population). Retrieved September 23, 2011, from http://www.fws.gov/midwest/endangered/birds/tern.html.

U.S. Fish and Wildlife Service. (2010, September). Endangered and threatened wildlife and plants; 12-month finding on a petition to list Sprague's pipit as endangered or threatened throughout its range. Federal Register. Vol. 75, No. 178.

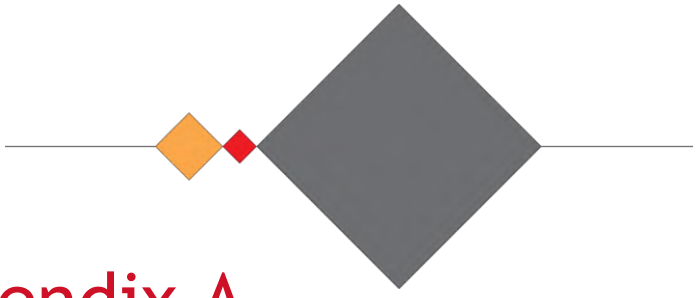
U.S. Fish & Wildlife Service. (2011, March 9). Fact sheet: pallid sturgeon (*Scaphiryhynchus albus*). Retrieved September 23, 2011, from http://www.fws.gov/midwest/Endangered/fishes/palld_fc.html.

U.S. Fish & Wildlife Service. (2012, February). County occurrence of endangered, threatened, and candidate species and designated critical habitat in North Dakota. Retrieved May 15, 2013, from http://www.fws.gov/northdakotafieldoffice/county_list.htm.

U.S. Geological Survey Northern Prairie Wildlife Research Center. (2004, 1 January). North Dakota GAP bird potential habitat maps [Data file]. Retrieved November 30, 2010, from http://www.nd.gov/gis/.

U.S. Geological Survey Northern Prairie Wildlife Research Center. (2006, 24 August). Ecoregions of North Dakota and South Dakota.

Wyoming Game and Fish Department. (2010, March). Recommendations for development of oil and gas resources within important wildlife habitats. Version 5.0. Retrieved from http://gf.state.wy.us/downloads/pdf/og.pdf.



Appendix A

Agency Scoping Materials

Appendix B

Agency Scoping Responses

Appendix C

Well Pad Plats

Appendix D

BIA Conditions of Approval

Appendix E

Programmatic BA Checklist and USFWS Concurrence Letter

Appendix F

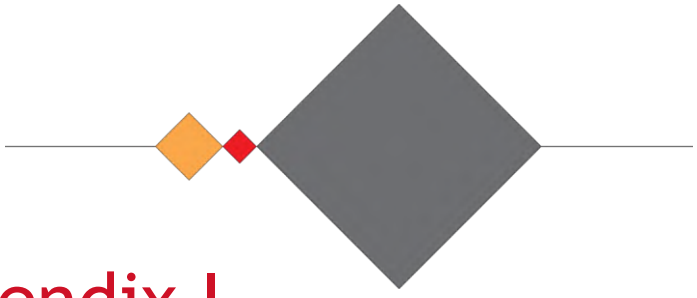
FBIR Noxious Weed Management Plan

Appendix G

Data Sheets

Appendix H

Transect and Plot Photos



Appendix I

PBA Checklist

Appendix C – Screening Tool Results

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Dunn County, North Dakota

Local office

North Dakota Ecological Services Field Office

(701) 250-4481
(701) 355-8513

3425 Miriam Avenue
Bismarck, ND 58501-7926

http://www.fws.gov/northdakotafieldoffice/endspecies/endangered_species.htm

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Piping Plover Charadrius melodus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot Calidris canutus rufa Wherever found There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane Grus americana There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/758	Endangered

Insects

NAME	STATUS
Dakota Skipper Hesperia dacotae Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/1028	Threatened

Monarch Butterfly Danaus plexippus Candidate

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9743

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

THERE ARE NO MIGRATORY BIRDS OF CONSERVATION CONCERN EXPECTED TO OCCUR AT THIS LOCATION.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin

Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

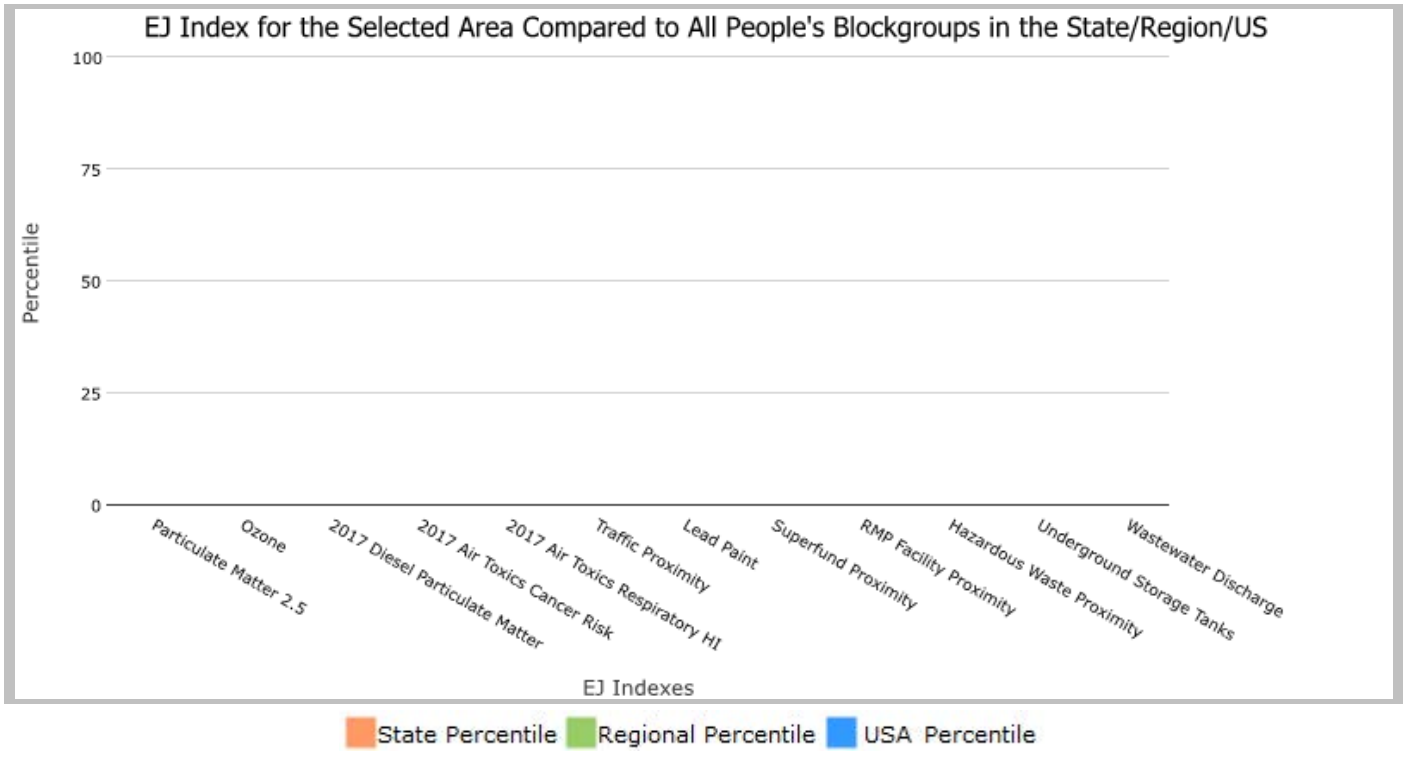
EJScreen Report (Version 2.0)

1 mile Ring around the Area, NORTH DAKOTA, EPA Region 8

Approximate Population: 0

Input Area (sq. miles): 3.23

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for 2017 Diesel Particulate Matter*	N/A	N/A	N/A
EJ Index for 2017 Air Toxics Cancer Risk*	N/A	N/A	N/A
EJ Index for 2017 Air Toxics Respiratory HI*	N/A	N/A	N/A
EJ Index for Traffic Proximity	N/A	N/A	N/A
EJ Index for Lead Paint	N/A	N/A	N/A
EJ Index for Superfund Proximity	N/A	N/A	N/A
EJ Index for RMP Facility Proximity	N/A	N/A	N/A
EJ Index for Hazardous Waste Proximity	N/A	N/A	N/A
EJ Index for Underground Storage Tanks	N/A	N/A	N/A
EJ Index for Wastewater Discharge	N/A	N/A	N/A



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJScreen Report (Version 2.0)

1 mile Ring around the Area, NORTH DAKOTA, EPA Region 8

Approximate Population: 0

Input Area (sq. miles): 3.23

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJScreen Report (Version 2.0)

1 mile Ring around the Area, NORTH DAKOTA, EPA Region 8

Approximate Population: 0

Input Area (sq. miles): 3.23

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 (µg/m^3)	N/A	6.57	N/A	7.07	N/A	8.74	N/A
Ozone (ppb)	N/A	38.9	N/A	52.5	N/A	42.6	N/A
2017 Diesel Particulate Matter* (µg/m^3)	N/A	0.177	N/A	0.211	N/A	0.295	N/A
2017 Air Toxics Cancer Risk* (lifetime risk per million)	N/A	21	N/A	22	N/A	29	N/A
2017 Air Toxics Respiratory HI*	N/A	0.22	N/A	0.3	N/A	0.36	N/A
Traffic Proximity (daily traffic count/distance to road)	N/A	220	N/A	520	N/A	710	N/A
Lead Paint (% Pre-1960 Housing)	N/A	0.26	N/A	0.21	N/A	0.28	N/A
Superfund Proximity (site count/km distance)	N/A	0.005	N/A	0.11	N/A	0.13	N/A
RMP Facility Proximity (facility count/km distance)	N/A	1	N/A	0.64	N/A	0.75	N/A
Hazardous Waste Proximity (facility count/km distance)	N/A	0.58	N/A	0.77	N/A	2.2	N/A
Underground Storage Tanks (count/km^2)	N/A	2	N/A	2.7	N/A	3.9	N/A
Wastewater Discharge (toxicity-weighted concentration/m distance)	N/A	9.1	N/A	3.5	N/A	12	N/A
Socioeconomic Indicators							
Demographic Index	N/A	21%	N/A	26%	N/A	36%	N/A
People of Color	N/A	16%	N/A	25%	N/A	40%	N/A
Low Income	N/A	25%	N/A	27%	N/A	31%	N/A
Unemployment Rate	N/A	3%	N/A	4%	N/A	5%	N/A
Linguistically Isolated	N/A	1%	N/A	2%	N/A	5%	N/A
Less Than High School Education	N/A	7%	N/A	8%	N/A	12%	N/A
Under Age 5	N/A	7%	N/A	7%	N/A	6%	N/A
Over Age 64	N/A	15%	N/A	14%	N/A	16%	N/A

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

Supporting Documentation

Crusoe Energy

VHP - P9394GSI S5

Power Generation

ENGINE SPEED (rpm):	1200	NOx SELECTION (g/bhp-hr):	0.15
DISPLACEMENT (in3):	9388	COOLING SYSTEM:	JW, IC + OC
COMPRESSION RATIO:	9.7:1	INTERCOOLER WATER INLET (°F):	130
IGNITION SYSTEM:	ESM2	JACKET WATER OUTLET (°F):	180
EXHAUST MANIFOLD:	Water Cooled	JACKET WATER CAPACITY (gal):	148
COMBUSTION:	Rich Burn, Turbocharged	AUXILIARY WATER CAPACITY (gal):	16
ENGINE DRY WEIGHT (lbs):	33900	LUBE OIL CAPACITY (gal):	259
AIR/FUEL RATIO SETTING:	ESM2	MAX. EXHAUST BACKPRESSURE (in. H2O):	20
ENGINE SOUND LEVEL (dBA)	105	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	108
FREQUENCY (Hz):	60	PHASE:	3
GENERATOR TYPE:	Synchronous	PHASE ROTATION:	T1-T2-T3
VOLTAGE:	4160		

SITE CONDITIONS:

FUEL:	Natural Gas	ALTITUDE (ft):	2000
FUEL PRESSURE RANGE (psig):	40 - 60	MAXIMUM INLET AIR TEMPERATURE (°F):	80
FUEL HHV (BTU/ft3):	1,035.2	FUEL WKI:	91.8
FUEL LHV (BTU/ft3):	935.8		

SITE SPECIFIC TECHNICAL DATA

POWER RATING	UNITS		MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 80 °F		
				100%	85%	75%
CONTINUOUS ENGINE POWER	BHP		2500	2500	2125	1875
OVERLOAD	% 2/24 hr		0	0	-	-
ELECTRICAL EFFICIENCY (LHV)	%		34.6	34.5	34.4	34.1
GENERATOR OUTPUT	kWe		1784	1784	1516	1338
GENERATOR kVA	kVA		2230	2230	1895	1673
GENERATOR CURRENT	Amps		310	310	263	232
based on 95.7% generator efficiency at 0.8 PF, no auxiliary engine driven equipment						
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr		7044	7064	7076	7139
FUEL CONSUMPTION (HHV)	BTU/BHP-hr		7792	7814	7827	7898
FUEL FLOW *based on fuel analysis LHV*	SCFM		314	315	268	238
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000		5028	4950	4296	3888
LUBE OIL (OC)	BTU/hr x 1000		677	674	630	600
INTERCOOLER (IC)	BTU/hr x 1000		844	761	520	386
EXHAUST	BTU/hr x 1000		4500	4645	3883	3422
RADIATION	BTU/hr x 1000		542	609	590	579
EMISSIONS (CATALYST OUT):						
NOx (NO + NO2)	g/bhp-hr		0.15	0.15	0.15	0.15
CO	g/bhp-hr		0.3	0.3	0.3	0.3
THC	g/bhp-hr		0.37	0.37	0.43	0.48
NMHC	g/bhp-hr		0.04	0.04	0.05	0.05
NM,NEHC (VOC)	g/bhp-hr		0.01	0.01	0.01	0.01
CO2	g/bhp-hr		445	447	447	451
CO2e	g/bhp-hr		453	455	457	462
CH2O	g/bhp-hr		0.001	0.001	0.001	0.001
CH4	g/bhp-hr		0.33	0.33	0.38	0.43
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM		3296	3305	2814	2506
EXHAUST GAS MASS FLOW	lb/hr		15324	15365	13083	11649
EXHAUST GAS FLOW *at exhaust temp, 14.5 psia*	ACFM		10454	10544	8867	7838
EXHAUST TEMPERATURE	°F		1075	1084	1065	1054

HEAT EXCHANGER SIZING[12]			
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000		5702
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000		1724

COOLING SYSTEM WITH ENGINE MOUNTED WATER PUMPS		
JACKET WATER PUMP MIN. DESIGN FLOW	GPM	850
JACKET WATER PUMP MAX. EXTERNAL RESTRICTION	psig	18
AUX WATER PUMP MIN. DESIGN FLOW	GPM	101
AUX WATER PUMP MAX. EXTERNAL RESTRICTION	psig	40

All data provided per the condtions listed in the notes section on page three.

Data Generated by EngCalc Program Version 4.0 INNIO Waukesha Gas Engines, Inc.

6/19/2019 7:59 AM

FUEL COMPOSITION

HYDROCARBONS:		Mole or Volume %
Methane	CH4	93
Ethane	C2H6	4
Propane	C3H8	1
Iso-Butane	I-C4H10	0
Normal Butane	N-C4H10	0
Iso-Pentane	I-C5H12	0
Normal Pentane	N-C5H12	0
Hexane	C6H14	0
Heptane	C7H16	0
Ethene	C2H4	0
Propene	C3H6	0
	SUM HYDROCARBONS	98
NON-HYDROCARBONS:		
Nitrogen	N2	0
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	2
Carbon Monoxide	CO	0
Hydrogen	H2	0
Water Vapor	H2O	0
	TOTAL FUEL	100

FUEL:	Natural Gas
FUEL PRESSURE RANGE (psig):	40 - 60
FUEL WKI:	91.8
FUEL SLHV (BTU/ft3):	919.50
FUEL SLHV (MJ/Nm3):	36.16
FUEL LHV (BTU/ft3):	935.78
FUEL LHV (MJ/Nm3):	36.80
FUEL HHV (BTU/ft3):	1035.15
FUEL HHV (MJ/Nm3):	40.71
FUEL DENSITY (SG):	0.60

Standard Conditions per ASTM D3588-91 [60°F and 14.696psia] and ISO 6976:1996-02-01[25, V(0;101.325)].
Based on the fuel composition, supply pressure and temperature, liquid hydrocarbons may be present in the fuel. No liquid hydrocarbons are allowed in the fuel. The fuel must not contain any liquid water. Waukesha recommends both of the following:
1) Dew point of the fuel gas to be at least 20°F (11°C) below the measured temperature of the gas at the inlet of the engine fuel regulator.
2) A fuel filter separator to be used on all fuels except commercial quality natural gas.
Refer to the 'Fuel and Lubrication' section of 'Technical Data' or contact the Waukesha Application Engineering Department for additional information on fuels, or LHV and WKI* calculations.
* Trademark of INNIO Waukesha Gas Engines Inc.

FUEL CONTAMINANTS

Total Sulfur Compounds	0	% volume
Total Halogen as Cloride	0	% volume
Total Ammonia	0	% volume
Siloxanes		
Tetramethyl silane	0	% volume
Trimethyl silanol	0	% volume
Hexamethyldisiloxane (L2)	0	% volume
Hexamethylcyclotrisiloxane (D3)	0	% volume
Octamethyltrisiloxane (L3)	0	% volume
Octamethylcyclotetrasiloxane (D4)	0	% volume
Decamethyltetrasiloxane (L4)	0	% volume
Decamethylcyclopentasiloxane (D5)	0	% volume
Dodecamethylpentasiloxane (L5)	0	% volume
Dodecamethylcyclohexasiloxane (D6)	0	% volume
Others	0	% volume

Total Sulfur Compounds	0 µg/BTU
Total Halogen as Cloride	0 µg/BTU
Total Ammonia	0 µg/BTU
Total Siloxanes (as Si)	0 µg/BTU

Calculated fuel contaminant analysis will depend on the entered fuel composition and selected engine model.

NOTES

1. All data is based on engines with standard configurations unless noted otherwise.
2. Power rating is adjusted for fuel, site altitude, and site air inlet temperature, in accordance with ISO 3046/1 with tolerance of ± 3%.
3. Fuel consumption is presented in accordance with ISO 3046/1 with a tolerance of -0 / +5% at maximum rating. Fuel flow calculation based on fuel LHV and fuel consumption with a tolerance of -0/+5 %. For sizing piping and fuel equipment, it is recommended to include the 5% tolerance.
4. Heat rejection tolerances are ± 30% for radiation, and ± 8% for jacket water, lube oil, intercooler, and exhaust energy.
5. Emission levels for engines with Waukesha supplied 3-way catalyst are given at catalyst outlet flange. For all other engine models, emission levels are given at engine exhaust outlet flange prior to any after treatment. Values are based on a new engine operating at indicated site conditions, and adjusted to the specified timing and air/fuel ratio at rated load. Catalyst out emission levels represent emission levels the catalyst is sized to achieve. Manual adjustment may be necessary to achieve compliance as catalyst/engine age. Catalyst-out emission levels are valid for the duration of the engine warranty. Emissions are at an absolute humidity of 75 grains H2O/lb (10.71 g H2O/kg) of dry air. Emission levels may vary subject to instrumentation, measurement, ambient conditions, fuel quality, and engine variation. Engine may require adjustment on-site to meet emission values, which may affect engine performance and heat output. NOx, CO, THC, and NMHC emission levels are listed as a not to exceed limit, all other emission levels are estimated. CO2 emissions based on EPA Federal Register/Vol. 74, No. 209/Friday, October 30, 2009 Rules and Regulations 56398, 56399 (3) Tier 3 Calculation Methodology, Equation C-5.
6. Air flow is based on undried air with a tolerance of ± 7%.
7. Exhaust temperature given at engine exhaust outlet flange with a tolerance of ± 50°F (28°C).
8. Exhaust gas mass flow value is based on a "wet basis" with a tolerance of ± 7%.
9. Inlet air restrictions based on full rated engine load. Exhaust backpressure based on 175.76 PSI BMEP and 1200 RPM. Refer to the engine specification section of Waukesha's standard technical data for more information.
10. Cooling circuit capacity, lube oil capacity, and engine dry weight values are typical.
11. Fuel must conform to Waukesha's "Gaseous Fuel Specification" S7884-7 or most current version. Fuel may require treatment to meet current fuel specification.
12. Heat exchanger sizing values given as the maximum heat rejection of the circuit, with applied tolerances and an additional 5% reserve factor.
13. Fuel volume flow calculation in english units is based on 100% relative humidity of the fuel gas at standard conditions of 60°F and 14.696 psia (29.92 inches of mercury; 101.325 kPa).
14. Fuel volume flow calculation in metric units is based on 100% relative humidity of the fuel gas at a combustion temperature of 25°C and metering conditions of 0°C and 101.325 kPa (14.696 psia; 29.92 inches of mercury). This is expressed as [25, V(0;101.325)].
15. Engine sound data taken with the microphone at 1 m (3.3 ft) from the side of the engine at the approximate front-to-back centerline. Microphone height was at intake manifold level. Engine sound pressure data may be different at front, back and opposite side locations. Exhaust sound data taken with microphone 1 meter (3.3 ft) away and 1 meter (3.3 ft) to the side of the exhaust outlet.
16. Due to variation between test conditions and final site conditions, such as exhaust configuration and background sound level, sound pressure levels under site conditions may be different than those tabulated above.
17. Cooling system design flow is based on minimum allowable cooling system flow. Cooling system maximum external restriction is defined as the allowable restriction at the minimum cooling system flow.
18. Continuous Power Rating: The highest load and speed that can be applied 24 hours per day, seven days per week, 365 days per year except for normal maintenance at indicated ambient reference conditions and fuel. No engine overload power rating is available.
19. emPact emission compliance available for entire range of operable fuels; however, fuel system and/or O2 set point may need to be adjusted in order to maintain compliance.
20. In cold ambient temperatures, heating of the engine jacket water, lube oil and combustion air may be required. See Waukesha Technical Data.
21. Available Turndown Speed Range refers to the constant torque speed range available. Reduced power may be available at speeds outside of this range. Contact application engineering.

SPECIAL REQUIREMENTS

Requires option code 1005A for 0.15g/bhp-hr catalyst.

Crusoe-RimRock Gas Purchase Agreement

Gas Purchase Agreement

This Agreement ("***Agreement***") is entered into this 25th day of April, 2022, (the "***Effective Date***") and is by and between Crusoe Energy Systems LLC, a Delaware limited liability company ("***Crusoe***"), and RimRock Oil & Gas Williston, LLC, a Delaware limited liability company ("***Company***"). Each of Crusoe and Company are referred to herein individually as a "***Party***," or collectively as the "***Parties***."

Whereas, Company is a producer of Gas (defined below) and owns and operates oil and gas wells at the Site (defined below).

Whereas, Crusoe designs, supplies and operates proprietary portable facilities consisting of power generation, computing and remote networking systems capable of consuming Gas (the "***Digital Flare Mitigation System***") on the Site.

Whereas, Crusoe wishes to purchase Available Gas (defined below) from Company at the Site and implement a Digital Flare Mitigation System to find a use for Available Gas (defined below) produced at the Site without available capacity on midstream takeaway infrastructure.

Now, Therefore, in consideration of the promises and mutual covenants set forth herein and good and valuable consideration, the receipt and sufficiency of which are hereby agreed to and acknowledged, the Parties hereby agree as follows:

1. **Gas Purchase Timeline**:

   (a) As soon as reasonably practicable after the Effective Date, but no later than October 31, 2022 (also known as the "***In-Service Date***"), Crusoe will complete installation of [redacted] Modules (defined below) at the Site capable of consuming Gas. For purposes of this Agreement, "***Site***" means the Charging Eagle 21-25 pad located in Dunn County, North Dakota (47.527974 N, -102.345321 W), where the Digital Flare Mitigation System will be installed, and/or such other mutually acceptable well pad(s) or site(s) located in North Dakota as designated by Company at any point prior to installation of the Modules, and "***Gas***" means the natural gas as produced in its natural state; *provided* that Company may install a mechanical refrigeration unit or Joule Thomson System at the Site to process Gas prior to delivery at the Delivery Point (defined below).

   (b) The Term of this Agreement shall begin on the In-Service Date and continue in full force and effect thereafter for a period of [redacted] ("***Initial Term***"). After the Initial Term, the Agreement will automatically continue for [redacted] terms (each, a "***Renewal Term***") until terminated by either Party no less than 120 days prior to the expiration of the Initial Term or the current Renewal Term, as applicable (the "***Renewal Notice Deadline***"). The Initial Term and any Renewal Term shall constitute the "***Term***" of the purposes of this Agreement.

   (c) Company shall tender to Crusoe what Company, in its sole determination, deems to be excess Gas available ("***Available Gas***") at the inlet flange to Crusoe's generator tie-in manifold on the Digital Flare Mitigation System installed on the Site ("***Delivery***

[redacted]

Point"), and Crusoe shall purchase and receive the Available Gas delivered by Company to the Delivery Point up to the Provisional Commitment (defined below) and use it to operate the Digital Flare Mitigation System at the Site.

(d) In addition to its rights under *Section 1(b)*, Company may terminate this Agreement at any time prior to the end of the Initial Term upon no less than [redacted] written notice to Crusoe [redacted] Crusoe may terminate this Agreement in the event(s) outlined in *Section 2* hereafter prior to the expiration of the Term with [redacted] prior written notice to Company. Crusoe may terminate this Agreement for any reason prior to the expiration of the Term with [redacted] prior written notice which would require no termination fee or demobilization fee whatsoever.

[redacted]

2. **Provisional Commitment:** Crusoe acknowledges and understands that Company will, on an interruptible basis, deliver Available Gas to Crusoe, however Company is not required to deliver any Available Gas if it is prevented from doing so by reasons of Force Majeure ("***Interruptible Basis***"), and Crusoe further acknowledges and understands that the amount of Available Gas delivered will vary from time to time and may depend on factors outside of Company's reasonable control. [redacted]

[redacted]

[redacted] For the purposes of this Agreement "***Module***" shall mean Digital Flare Mitigation System equipment, consisting of two containerized computing units and associated power generation equipment with aggregate Gas consumption of approximately [redacted] The Parties shall use meter balancing as the volume reconciliation methodology in the determination that Available Gas was offered but not accepted by Company to Crusoe. This volume reconciliation methodology shall incorporate on-site measurement device(s) and/or custody transfer meter(s) and shall conform to industry norms and applicable regulatory requirements.

3. **Gas Purchase and Consumption:**

   (a) Gas purchase: Crusoe will pay Company [redacted] for Gas delivered by Company at the Delivery Point up to the Provisional Commitment, remitted in accordance with *Section 9*, which payment will constitute the basis of any tax for purposes of this Agreement. [redacted]

[redacted]

(b) Gas consumption: Crusoe will provide and operate equipment capable of uniformly consuming approximately the Provisional Commitment at the Site delivered to Crusoe by Company at the Delivery Point to power the Digital Flare Mitigation System. Crusoe will use commercially reasonable efforts to keep the Modules maintained and fully operational, to resolve any maintenance, equipment failures, or operational issues as quickly as possible, and to receive, purchase, and utilize Gas in uniform hourly, daily and monthly flows during the Term.

(c) The Gas supplied by Company to Crusoe at the Delivery Point shall be as is produced in its natural state; *provided* that Company may install a mechanical refrigeration unit or Joule Thomson System at the Site to process Gas prior to delivery at the Delivery Point. Crusoe agrees that the Gas supplied by Company shall be supplied 'As Is', and that Company does not provide any warranty, quality, or representations in connection with Gas supplied under this Agreement aside from Company's commitment to supply Gas that shall not contain in excess of twenty parts per million (20 ppm) of hydrogen sulfide by volume as determined by a method generally acceptable for use in the industry and to the Parties hereto and at temperatures of 120 degrees Fahrenheit or less and the Gas BTU requirement set forth in *Section 2*.

4. **Crusoe Roles and Responsibilities**: Provided that Company has complied with its obligations under *Section 5* and is ready, willing, and able to deliver Available Gas at the Delivery Point, Crusoe will use commercially reasonable efforts to procure, install and operate the Digital Flare Mitigation System and accept and purchase all Available Gas up to the Provisional Commitment tendered by Company.

(a) Crusoe acknowledges and agrees that it is responsible for, and maintains complete and exclusive control over, its compliance with Crusoe's respective permit and regulatory obligations and requirements;

(b) Crusoe shall maintain complete and exclusive operational control over the Crusoe Designated Area/ Company personnel may only access the Crusoe Designated Area in

[redacted]

the event of an emergency or upon Crusoe's granting of access after reasonable notice. Furthermore, Crusoe understands Company is unable to prevent oil and gas field inspection regulators from gaining access to its rights-of-way. Crusoe shall also maintain and operate measures that are effective in precluding access to the Crusoe Designated Area by the general public as long as such measures do not preclude access to any of Company's operations outside of the Crusoe Designated Area. Such measures may include, but are not limited to, signage, video surveillance, fencing, and boundary markers; and

(c) Additionally, Crusoe shall obtain and follow all necessary licenses, permits, rules, and regulations applicable to its operations and activities relating to the Digital Flare Mitigation System.

5. **Company Roles and Responsibilities**: Company will use commercially reasonable efforts to provide the Provisional Commitment of Available Gas on an Interruptible Basis and further use commercially reasonable efforts to provide the following:

(a) Access to a designated area for Modules at the Site including use of Company rights-of-way (the "***Crusoe Designated Area***"). Site selection shall be at Company's discretion in collaboration with Crusoe;

(b) Access to Company operational personnel to discuss matters related to installation and operation of the Digital Flare Mitigation System;

(c) Provide project-related operating information such as Gas analysis, access to Company's electronic Gas flow rate and pressure data for the Gas delivery and relevant operational plans;

(d) Deliver Gas at the Delivery Point at a pressure of at least 40 psig and no more than 150 psig and shall install sufficient overpressure protection to relieve or redirect pressures above 150 psi to outlets upstream of the Delivery Point;

(e) Company shall either bury or lay above ground and insulate and heat trace Gas supply and condensate and other liquids return lines to and from Company's facilities to the Delivery Point, inclusive of any metering facilities. Gas supply and liquid return lines shall be provisioned with appropriate winterization features such as methanol injection ports and knock outs;

(f) Company shall ensure that only single-phase gas is provided to Crusoe by installing an effective liquids knock out separator with liquid level control either upstream or downstream at the Delivery Point or downstream of all underground piping; and

(g) Company acknowledges and agrees that it is responsible for, and maintains complete and exclusive control over, Company's compliance with its respective permit and regulatory obligations and requirements for Company's operations on the Site.

6. **Events of Default:** If either Party (the "***Defaulting Party***") fails to perform any of the terms of this Agreement, excluding due to Force Majeure events (defined below), the other Party (the

[redacted]

"***Non-Defaulting Party***") may treat such default as a material breach of the entire Agreement, except to the extent caused by the Non-Defaulting Party; and, if such default is not cured within ninety (90) days of receipt of written notice by the Defaulting Party (or such shorter cure period set forth below), then the Non-Defaulting Party may immediately terminate this Agreement. In any event, termination of this Agreement by either Party shall not remove Crusoe's obligation to pay in full for Gas received prior to termination. The Parties acknowledge that each of the following, among other things, constitutes an "***Event of Default***":

(a) **Failure to Pay:** Failure by either Party to make payment in full by the due date for any undisputed amounts owed under this Agreement; provided that such Party has received written notice of such failure and has had thirty (30) days to cure such failure.

(b) **Failure to Take Delivery:** Failure by Crusoe to take delivery of at least 75% of the Provisional Commitment of Available Gas delivered by the Company. For the avoidance of doubt, Crusoe cannot default under this provision unless the Company is delivering at least the Provisional Commitment of Gas.

(c) **Material Misrepresentation:** Either Party has made a representation or warranty under this Agreement that proves to be untrue in any material respect.

(d) **Performance:** Failure by either Party to timely perform any other material obligation under this Agreement.

Company Remedies: In addition to Company's rights and remedies under this Agreement, and without modifying or amending the process of termination of the Agreement set forth in the remainder of *Section 6*, if a Crusoe Event of Default occurs, at Company's option and without demand, notice or legal process, Company may exercise any and all of its rights and remedies under this Agreement and/or under applicable law, including without limitation, (i) suspending performance under this Agreement or (ii) accelerating payment obligations such that all amounts owed under this Agreement shall become immediately due and payable.

7. **Title and Ownership**: Upstream of the Delivery Point, Company shall have title, custody, control, and risk of loss of the Gas. Title to the Gas supplied by Company shall transfer to Crusoe upon delivery to the Delivery Point. Crusoe shall have custody, control, and risk of loss of the Gas supplied by Company from and after the moment in time when such Gas is supplied by Company at the Delivery Point.

8. **Fees**:

[redacted]

[redacted]

[redacted]

(d) Other than fees outlined above in *Section 8(a)-(c)*, each Party shall bear its own costs related to the fulfilment of roles and responsibilities outlined in this Agreement, and neither Party shall be liable to the other for any form of cost recovery; provided, however, that nothing in this *Section 8(c)* shall amend, modify, or limit any right of a Party to pursue remedies for material breaches of this Agreement or any of the obligations and rights to indemnification pursuant to *Section 16*.

9. Billing and Payment:

(a) Company shall render to Crusoe on or before the 15th day of the month following the month of delivery of Gas a statement showing the volume of Gas purchased by Crusoe from Company during the prior month. Crusoe shall make payment to Company by wire transfer on or before the 25th day of the month following the month of such delivery.

(b) [redacted]

[redacted]

(c) No adjustment or correction shall be required of any error or inaccuracy occurring in any statement, payment, account, calculation or determination following two years from the making or the rendering of same. Failure of the Parties to make a claim for adjustment within such period shall preclude the filing of exceptions or making claims for adjustment. Each Party expressly agrees that in the event a good-faith disagreement arises as to any amount due hereunder, all non-disputed amounts will be paid in accordance with this *Section 9* and the disputing Party shall provide supporting documentation acceptable in industry practice to support the amount disputed. In the event the Parties are unable to resolve such good-faith dispute, either Party may pursue any remedy available at law or in equity to enforce its rights pursuant to this *Section 9*.

(d) Either Party shall have the right, at its own expense, upon reasonable Notice in writing to the other Party and at reasonable times, to examine, audit or inspect the measurement activities or request a copy of the relevant portion of the books and records of the other Party only to the extent reasonably necessary to verify the accuracy of any statement, charge, payment or computation made relating to this Agreement, and such Party will provide same to the requesting Party within seven (7) days of such request. The scope of any audit under this *Section 9* shall be limited to transactions affecting Available Gas bought and sold hereunder and shall survive for a period of twenty-four (24) months from the termination of this Agreement.

10. Access: [redacted] The Parties agree that any third-party lessors, lenders and security holders of portions of the Modules shall give Company advance written notice of third party's Site access and Company approval for Site access will not be unreasonably withheld, shall observe the access rules, and shall be added to the definition of Crusoe Group for purposes of this Agreement.

11. Taxes: Company as seller shall pay or cause to be paid all taxes, fees, levies, severance payments, penalties, licenses or charges imposed by any government authority ("Taxes") on or with respect to the Available Gas prior to the Delivery Point(s). Crusoe as buyer shall pay or cause to be paid all Taxes on or with respect to Available Gas at the Delivery Point(s) and all Taxes after the Delivery Point(s). If a Party is required to remit or pay Taxes that are the other Party's responsibility hereunder, the Party responsible for such Taxes shall promptly reimburse the other Party for such Taxes upon request. Any Party entitled to an exemption from any such Taxes or charges shall furnish the other Party any necessary documentation thereof. Crusoe shall bear all Taxes levied against its properties or facility(ies). Subject to any change in the law with respect to Taxes under this Agreement, the Parties agree to mutually discuss and cooperate in the optimization or reduction (if legally applicable and in a written opinion of each Party's counsel) of any of the above-mentioned Taxes.

[redacted]

12. EACH PARTY HEREBY RELEASES AND SHALL DEFEND, INDEMNIFY AND HOLD THE OTHER PARTY HARMLESS FROM AND AGAINST ANY AND ALL INDEMNIFIABLE CLAIMS (DEFINED BELOW), ASSESSED AGAINST SUCH PARTY DUE TO THE DISALLOWANCE FOR ANY REASON OF ANY TAX EXEMPTION CLAIMED BY THE INDEMNIFYING PARTY.

13. **Failure to Perform**: The Parties agree that any liability due to the other Party's failure to perform, or breach of any obligation or duty under this Agreement shall be promptly remedied.

14. **Public Relations and Regulatory Support**: [redacted]

15. **Non-Disclosure**:

(a) Confidentiality. "***Confidential Information***" under this Agreement means all technical, business and/or proprietary information that is (i) made available to one or more members of a Party's Group (the "***Non-Disclosing Party's Group***"), directly or indirectly, by the other Party, or developed or acquired by a member of either Party's Group in performance of this Agreement. The Non-Disclosing Party's Group will hold in confidence all Confidential Information. The Non-Disclosing Party's Group may not use Confidential Information for any purpose other than the performance of the Agreement. Crusoe Group may not take any photographs, videos, or other recordings of Company Group's property without Company's prior written consent. Neither Party is permitted to use or make mention in any way of the other Party's or its Affiliates' names or mention the existence of this Agreement or the activities contemplated hereunder, without advance written approval from the other Party. Except with respect to auditing purposes under *Section 9(d)* above, notwithstanding anything in this Agreement to the contrary, the obligations of each Party set forth in this *Section 15(a)* shall survive for two years following termination or expiration of this Agreement.

(b) Use of Name and Marks. The Parties represent, warrant and covenant, that neither Party shall, in any format, without the prior written consent of the other Party, use such other Party's or any of its Affiliate's (expressly including any entity owned or controlled by a Party) names, trade names, or trademarks in any advertising or communication to the public, or make publicity releases or announcements concerning this Agreement or related activities.

[redacted]

[redacted]

16. Indemnification:

(a) Definitions. The following definitions shall be applied throughout this Agreement:

(i) "***Affiliate***" shall mean, with respect to a Party, any individual, partnership, joint venture, firm, corporation, association, trust or other entity directly or indirectly controlling, controlled by, or under common control with, such Party.

(ii) "***Company Group***" shall mean individually or in any combination, Company, its Affiliates, co-owners or co-lessees (whether a fee, lease, mineral lease or otherwise) at a Site, joint interest owners, joint venturers, partners, contractors and subcontractors of any tier (other than Crusoe or its subcontractors of any tier) and all of their respective officers, directors, managers, members, agents, representatives, employees, and insurers.

(iii)"***Consequential Damages***" shall mean any special, indirect, incidental, or consequential damages, costs, or expenses of any kind or character (including but not limited to loss of use, lost income, lost or delayed profits or revenue, loss of business or goodwill, unabsorbed overhead and increased expenses).

(iv)"***Crusoe Group***" shall mean individually or in any combination Crusoe, its Affiliates, any subcontractor of Crusoe (of any tier), and their respective officers, directors, managers, members, agents, representatives, employees, and insurers.

(v) "***Group***" means either the Crusoe Group or the Company Group, as applicable.

(b) Crusoe's Obligations. Crusoe hereby releases and shall defend, indemnify and hold the Company Group harmless from and against any and all claims, awards, demands, judgements, settlements, and causes of action of every kind and character (including without limitation, fines, penalties, remedial obligations, court costs and reasonable attorneys' fees, including attorneys' fees incurred in the enforcement of this indemnity) (collectively the "***Indemnifiable Claims***") arising out of, without limitation, any physical or mental injury, illness and/or death, or any damage to or loss of property, of any one or more members of the Crusoe Group in any manner incident to, connected with or arising out of the performance of this Agreement and/or the Digital Flare Mitigation System. This obligation is without regard to the cause or causes thereof. Crusoe agrees that its indemnity obligations herein will be supported by insurance with at least the minimum amounts provided in *Section 17*, which insurance will be primary to any other insurance provided by or available to any one or more members of the Company Group and shall to the extent of the liabilities assumed in this Agreement

[redacted]

provide waivers of subrogation against all members of Company Group. To the extent that applicable law prohibits the monetary limits of insurance required or the indemnities voluntarily assumed hereunder, the requirements will be automatically revised to conform, to the maximum extent permitted, with applicable law.

(c) Company's Obligations. Company hereby releases and shall defend, indemnify and hold the Crusoe Group harmless from and against any and all Indemnifiable Claims arising out of, without limitation, any physical or mental injury, illness and/or death, or any damage to or loss of property, of any one or more members of the Company Group in any manner incident to, connected with or arising out of the performance of this Agreement. This obligation is without regard to the cause or causes thereof. Company agrees that its indemnity obligations herein will be supported by insurance, which insurance will be primary to any other insurance provided by or available to any one or more members of the Crusoe Group and shall to the extent of the liabilities assumed in this agreement provide waivers of subrogation against all members of Company Group. To the extent that applicable law prohibits the monetary limits of insurance required or the indemnities voluntarily assumed hereunder, the requirements will be automatically revised to conform, to the maximum extent permitted, with applicable law.

[redacted]

(e) Consequential Damages. Except for breach of any provision of *Section 15* (Non-Disclosure), in no event will either Party be liable to the other Party under this Agreement for Consequential Damages.

(f) Unallocated Claims. Any Indemnifiable Claim not otherwise allocated under this Agreement shall, as between the Parties, be borne by each Party in proportion to its breach of contract, negligence, and/or other fault (if any).

(g) Express Negligence. EXCEPT AS OTHERWISE EXPRESSLY LIMITED HEREIN, IT IS THE INTENT OF PARTIES HERETO THAT ALL INDEMNITY OBLIGATIONS AND/OR INDEMNIFIABLE CLAIMS ASSUMED BY SUCH PARTIES UNDER TERMS OF THIS AGREEMENT BE WITHOUT LIMIT AND WITHOUT REGARD TO THE CAUSE OR CAUSES THEREOF, INCLUDING PREEXISTING CONDITIONS, STRICT LIABILITY, FAULT, BREACH OF CONTRACT OR WARRANTY, OR THE NEGLIGENCE OF ANY PARTY OR PARTIES, WHETHER SUCH NEGLIGENCE BE SOLE, JOINT, CONTRIBUTORY, OR CONCURRENT, ACTIVE, PASSIVE, OR ORDINARY OF THE INDEMNITEES. THE PARTIES AGREE THAT THEIR INDEMNITY

OBLIGATIONS WILL BE SUPPORTED BY LIABILITY INSURANCE OBTAINED FOR THE BENEFIT OF THE OTHER PARTY (AND ITS RESPECTIVE GROUP MEMBERS) AS INDEMNITEES WITH MINIMUM LIMITS AND COVERAGES NOT LESS THAN THOSE REQUIRED TO BE MAINTAINED UNDER SECTION 17. THE PARTIES ALSO AGREE THAT THEIR INDEMNITY OBLIGATIONS ARE NOT INTENDED TO BE LIMITED BY ANY INSURANCE REQUIREMENTS EXCEPT TO THE EXTENT MANDATED BY APPLICABLE LAW AND THAT THE INSURANCE REQUIREMENTS AND THE INDEMNITY PROVISIONS SHALL BE SEPARATE AND DISTINCT OBLIGATIONS AND SHALL BE SEPARATELY AND INDEPENDENTLY ENFORCEABLE. IN NO EVENT SHALL A PARTY BE ENTITLED TO INDEMNIFICATION FOR ANY INDEMNIFIABLE CLAIM ARISING FROM THE GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF A MEMBER OF ITS GROUP.

17. Insurance:

(a) Coverages. Subject to the provisions of this *Section 17*, each Party will secure and maintain, and will require its subcontractors to secure and maintain, during the Term of this Agreement the following policies with limits not less than the amounts specified, and with companies reasonably satisfactory to the other Party who are authorized to do business in the jurisdiction where the Digital Flare Mitigation System is operating:

(i) Worker's Compensation Insurance with limits of not less than $1,000,000 or the statutory requirements of State laws (as well as Federal laws, if applicable), whichever is greater, which shall include Employer's Liability Insurance with limits of not less than $500,000 per incident. If the work is to be performed in the states of North Dakota, Ohio, Washington or Wyoming, "Stop-Gap" Employer's Liability Insurance with limits of not less than $500,000 per incident must be procured.

(ii) Commercial General Liability Insurance INCLUDING CONTRACTUAL LIABILITY, with minimum limits of liability for injury, death, or property damage of $1,000,000 combined single limit per occurrence, and an aggregate annual limit of not less than $2,000,000.

(iii) Automobile Liability Insurance covering owned, hired, and non-owned vehicles used by such Party, with minimum limits of liability for injury, death, or property damage of $1,000,000 combined single limit per occurrence.

(iv) Umbrella Insurance (with coverage at least as broad as the underlying policy) over that required in *Section 17(a)(ii)* and *Section 17(a)(iii)* with minimum limits of $10,000,000, and specifically including contractual liability.

(b) Primary Coverage and Additional Insureds. ALL INSURANCE POLICIES AND COVERAGES LISTED IN THIS SECTION 177 WILL EXTEND TO AND PROTECT EACH PARTY'S GROUP TO THE FULL EXTENT AND AMOUNT OF

SUCH COVERAGE, INCLUDING EXCESS OR UMBRELLA INSURANCES. ALL INSURANCE POLICIES LISTED IN THIS SECTION 177 WILL BE PRIMARY TO, AND RECEIVE NO CONTRIBUTION FROM, ANY OTHER INSURANCE PROGRAMS MAINTAINED BY OR ON BEHALF OF OR BENEFITING THE COMPANY GROUP OR CRUSOE GROUP, AS APPLICABLE. THE LIMITS AND COVERAGES OF THE INSURANCES OBTAINED BY A PARTY WILL IN NO WAY LIMIT THE LIABILITIES OR OBLIGATIONS ASSUMED BY SUCH PARTY UNDER THIS AGREEMENT. ALL OF A PARTY'S LIABILITY INSURANCE POLICIES, EXCEPT WORKERS COMPENSATION, EMPLOYER'S LIABILITY AND PROFESSIONAL LIABILITY WILL TO THE EXTENT OF THE LIABILITIES ASSUMED IN THIS AGREEMENT NAME THE OTHER PARTY'S GROUP AS ADDITIONAL INSUREDS. ALL OF A PARTY'S INSURANCE POLICIES WILL TO THE EXTENT OF THE LIABILITIES ASSUMED IN THIS AGREEMENT CONTAIN A WAIVER ON THE PART OF THE INSURER, BY SUBROGATION OR OTHERWISE, OF ALL RIGHTS AGAINST THE OTHER PARTY'S GROUP.

(c) Certificate of Insurance. Each Party or such Party's insurance carrier(s) will upon request furnish certificates of insurance reasonably satisfactory to the other Party, reflecting the insurance requirements of this *Section 177*, as evidence that the required insurance coverage has been obtained and maintained, before commencing the installation of the Digital Flare Mitigation System.

(d) Self-Insured. Notwithstanding the above, the Parties agree for purposes of this *Section 17*, that Company may elect to self-insure all or any part of its insurance requirements to the extent allowed by applicable law. Upon written request, Company will provide Crusoe with a letter of self-insurance evidencing its compliance with this clause.

(e) Waiver. No waiver of the provisions of this *Section 177* will be inferred from any failure on the part of a Party to object or complain about any failure of the other Party or such other Party's insurance carrier to provide such certificate of insurance. Each Party shall provide the other Party notice and evidence of any modification to, or extension or cancellation of, such Party's required insurance coverage.

18. Miscellaneous:

(a) Relationship of Parties. Neither Party shall: (a) act or represent or hold itself out as having authority to act as an agent or partner of the other Party; or (b) in any way bind or commit the other Party to any obligations or agreement. Nothing contained in this Agreement shall be construed as creating a partnership, joint venture, agency, trust, fiduciary relationship or other association of any kind, each Party being individually responsible only for its obligations as set forth in this Agreement. The Parties' respective rights and obligations hereunder shall be limited to the contractual rights and obligations expressly set forth herein on the terms and conditions set forth herein.

(b) Notices. All notices or other communications required or permitted hereunder shall be in writing and shall be deemed given or delivered when delivered personally, by electronic mail or when sent by registered or certified mail (postage prepaid, return

receipt requested) or by an internationally recognized overnight courier service addressed as follows:

[redacted]

(c) Successors and Assigns. The rights and obligations of either Party under this Agreement are not assignable by such Party without the prior written consent of the other Party; provided, however, that either Party may, without the other Party's consent, assign its rights and obligations hereunder (a) to any of its Affiliates; and (b) in connection with a change of control or sale of all or substantially all of the assets of such Party or its Affiliates relating to this Agreement. This Agreement shall be binding upon and inure to the benefit of the Parties and their successors and permitted assigns.

(d) Force Majeure. As used herein, "***Force Majeure***", means an occurrence that is (i) beyond the reasonable control and without the fault or negligence of the Party affected, and (ii) that the affected Party is unable to prevent or provide against by the exercise of reasonable diligence, including, but not limited to the following occurrences to the extent such occurrences meet the requirements of subparts (i) and (ii) of this definition: (a) nationwide or regional strikes or any other nationwide or regional concerted acts of workers; (b) acts of the public enemy, wars, blockades, insurrections, riots, civil disturbances, epidemics, pandemics, terrorism or sabotage; (c) acts of God; (d) floods or unusually severe weather; (e) accidents to equipment, machinery, plants, facilities, or lines of pipe; (f) fires, explosions, or other catastrophes; (g) restraints of or other interference or restrictions imposed by a governmental authority, necessity for compliance with any applicable law or confiscation; and (h) material upstream oil and gas regulations, fracking or flaring bans, or restrictions on oil or gas production on federal or state lands. Notwithstanding anything to the contrary set forth in this Agreement, none of the following shall, under any circumstance, constitute a Force Majeure event: (1) the lack of financial resources, or the inability of a Party to secure funds or make payments as required by this Agreement absent the other Party's material breach of this Agreement which has a material adverse effect on such Party; (2) on its own, adverse market, financial or other economic conditions including changes in market conditions that either directly or indirectly affect this Agreement or the demand for or price of Gas, NGL plant products, or condensate; (3) availability of more attractive markets or gathering, transportation or processing services for Gas, NGL plant products, or condensate; (4) failure to meet minimum flow requirements on any equipment; or (5) late performance or late delivery of equipment or materials by any Party or any of its contractors or subcontractors, unless the event was caused by a Force Majeure of the type set forth above and was beyond the reasonable control and without the fault of the claiming Party or its contractors or subcontractors, and a commercially acceptable alternate source of services, equipment or materials is unavailable. In the

event a Force Majeure event lasts for more than thirty (30) consecutive days, notwithstanding anything to the contrary herein, Crusoe shall have the right but not the obligation to remove any computing equipment affected by the Force Majeure event. Crusoe will reinstall such computing equipment (or equivalent) within seven days of receiving notice that the Force Majeure event ended.

(e) Business Standards. Crusoe will conduct its activities in an ethical manner and will not engage in any activity that could create a conflict of interest, such as making, receiving, or offering substantial gifts, entertainment, payments, loans or anything else of value to personnel or representatives of Company or their families for the purpose of influencing those persons to act contrary to Company's best interests. This obligation shall apply to the activities of the Crusoe Group in their relations with the employees of Company and their families and third parties arising from this Agreement.

(f) Warranties. Each Party warrants to the other that it is legally capable of entering into this Agreement and that there are no other existing agreements or instruments that would impair such Party's ability to perform it obligations hereunder. Company further warrants that it has the right to sell and will transfer good and merchantable title to Available Gas delivered and sold hereunder and that such Available Gas is free from all royalties, liens, encumbrances and/or adverse claims of every nature and kind which would prohibit Company's transfer of clear title to Crusoe.

(g) Disclaimers. Except as set forth in this Agreement, Crusoe disclaims all other warranties or other guarantees of any kind, express, implied or statutory, with respect to Crusoe's Digital Flare Mitigation System.

(h) [redacted]

(i) Entire Agreement; Amendments. This Agreement contains the entire understanding of the Parties with regard to the subject matter contained herein or therein, and supersede all other prior representations, warranties, agreements, understandings. This Agreement may not be amended, modified or supplemented except by a written instrument signed by an authorized representative of each of the Parties.

(j) Waivers. Any term or provision of this Agreement may be waived, or the time for its performance may be extended, by the Party entitled to the benefit thereof. Any such waiver shall be validly and sufficiently authorized for the purposes of this Agreement if, as to either Party, it is authorized in writing by an authorized representative of such Party. The failure of either Party hereto to enforce at any time any provision of this Agreement shall not be construed to be a waiver of such provision, nor in any way to affect the validity of this Agreement or any part hereof or the right of such Party thereafter to enforce each and every such provision. No waiver of any breach of this Agreement shall be held to constitute a waiver of any other or subsequent breach.

[redacted]

(k) Survival. Notwithstanding the suspension or termination of this Agreement or any Force Majeure event, the Parties shall continue to be bound by the provisions of this Agreement that reasonably require some action or forbearance after such termination, including but not limited to those related to warranties, indemnities, and insurance for a period of six (6) months from the end of the Term.

(l) Execution in Counterparts. This Agreement may be executed and delivered in two or more counterparts, each of which when executed and delivered shall be an original, and all of which when executed shall constitute one and the same instrument. The exchange of copies of this Agreement and of signature pages by facsimile or other electronic transmission shall constitute effective execution and delivery of this Agreement as to the Parties and may be used in lieu of the original Agreement for all purposes. Signatures of the Parties transmitted by email or other electronic means shall be deemed to be their original signatures for all purposes.

(m) Governing Law; Submission to Jurisdiction. All issues and questions concerning the construction, validity, interpretation and enforceability of this Agreement shall be governed by, and construed in accordance with, the **laws of the state of Colorado,** without giving effect to any choice of law or conflict of law rules or provisions that would cause the application of the laws of any jurisdiction other than that state. Any action or proceeding seeking to enforce any provision of, or based on any right arising out of, this Agreement or the transactions contemplated hereby may be brought against either of the Parties solely in the federal or state courts located in Denver, Colorado, and each of the Parties consents to the exclusive jurisdiction of such courts (and of the appropriate appellate courts) in any such action or proceeding and expressly and irrevocably waives, to the fullest extent permitted by applicable law, any objection to venue laid therein; agrees and consents to service of process by certified mail, delivered to the Party's registered agent; and knowingly waives, to the fullest extent permitted by applicable law, any right it may have to a trial by jury in respect of any proceedings relating to this Agreement. Nothing in this Agreement precludes either Party from bringing proceedings in any other jurisdiction to enforce any judgment obtained in any proceedings referred to in this section, nor will bringing of such enforcement proceedings in any one or more jurisdictions preclude the bringing of enforcement proceedings in any other jurisdiction.

[redacted]

[*Signature page follows.*]

[redacted]

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date first set forth above:

CRUSOE

CRUSOE ENERGY SYSTEMS LLC.

DocuSigned by:
By: Cully Cavness
D1FC18EB2142454...
Name: Cully Cavness
Title: President & COO

COMPANY

RIMROCK OIL AND GAS WILLISTON, LLC

By: James B FRASER
Name: JAMES B FRASER
Title: President + CEO

NH

[redacted]

Exhibit A

Tier Schedule

Tier	Expected Term*	Expected Months in Term Tier	Provisional Commitment	Number of Modules
[redacted]				