BLM

United States Department of the Interior
Bureau of Land Management
Royal Gorge Field Office
3028 E. Main Street
Cañon City, CO 81212

ENVIRONMENTAL ASSESSMENT

Bulleit Federal LG04-62HN, Ptasnik Federal LC21-76HN, and Timbro Federal LC24-72HN APDs

DOI-BLM-CO-200-2013-082 EA

November 2013

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

AO	Authorized Officer
APCD	Air Pollution Control Division
APD	Application for Permit to Drill
BLM	Bureau of Land Management
BMP	Best Management Practice
°C	Degrees Celsius
CAA	Clean Air Act
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
COA	Conditions of Approval
COGCC	Colorado Oil and Gas Conservation Commission
dBA	decibel
EA	Environmental Assessment
EFM	Electronic flow meter
EIS	Environmental Impact Statement
ESA	Endangered Species Act
°F	Degrees Fahrenheit
FLPMA	Federal Land Policy and Management Act
GHG	Greenhouse gas
GPM	Gallons per minute
HAP	Hazardous air pollutant
ID	Interdisciplinary
IM	Instruction Memorandum
MBTA	Migratory Bird Treaty Act
mcf	Million cubic feet
MSDS	Material Safety Sheet
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
N_2O	Nitrous oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxide
NRCS	Natural Resources Conservation Service
O_3	Ozone
Pb	Lead
PILT	Payments in lieu of taxes
PFYC	Potential Fossil Yield Classification
PSD	Prevention of Significant Deterioration
RGFO	Royal Gorge Field Office
ROD	Record of Decision
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur dioxide
T&E	Threatened and Endangered
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile organic compound

This page intentionally left blank.

CHAPTER 1 - INTRODUCTION

1.1 Identifying Information

CASEFILE/PROJECT NUMBER: DOI-BLM-CO-200-2013-082 EA

PROJECT TITLE: Bulleit Federal LG04-62HN, Ptasnik Federal LC21-76HN, and Timbro Federal LC24-72HN APDs

PLANNING UNIT:

LEGAL DESCRIPTION: Weld County Township 8N, Range 59W, Section4 (Bulleit)
Township 9N, Range 59W, Section21 (Ptasnik)
Township 9N, Range 59W, Section24 (Timbro)

APPLICANT: Noble Energy, Inc.

1.2 Introduction and Background

Background: The Royal Gorge Field Office (RGFO) of the Bureau of Land Management (BLM) has received three Applications for Permits to Drill (APDs) from Noble Energy, Inc. This Environmental Assessment (EA) has been prepared by the BLM to analyze environmental impacts of the construction of well pads, access roads, pipelines, and the drilling of three horizontal oil wells. All wells would be drilled on private surface estates over private minerals in order to produce federal and private minerals (fee/fee/fed). The proposed well pads are located in the central part of Weld County within 20 miles of the Town of Keota, Colorado. The federal mineral estate within the project boundary is leased and subject to oil and gas development.

1.3 Purpose and Need

The purpose of the action is to provide the applicant the opportunity to develop their leases for the production of oil and gas. The need for the action is to develop oil and gas resources on Federal Leases COC65489, 75063, and 70902 consistent with existing federal lease rights provided for in the Mineral Leasing Act of 1920, as amended, the Onshore Oil and Gas Leasing Reform Act of 1987, and the Energy Policy Act of 2005.

1.4 Decision to be Made

The BLM will decide whether, and under what terms and conditions, to approve the proposed Bulleit, Ptasnik, and Timbro APDs project based on the analysis contained in this Environmental Assessment (EA). This EA will analyze the construction of well pads, access roads, pipelines, and drilling of three horizontal oil wells on private surface estates over private mineral estates in order to produce federal and private minerals (fee/fee/fed). Access to the proposed well pads would be primarily on existing county and rural roads, with short access roads to each of the three well sites. Refer to Chapter 2 for more detailed information about the Proposed Action.

BLM Washington Office Instruction Memorandum (IM) No. 2009-078 established policy and procedures for processing federal APDs for horizontal drilling into federal mineral estate on non-federal locations (applicable to this EA). Drilling and producing the subject wells would penetrate federal mineral estate,

which is the federal nexus requiring the preparation of this EA. Construction, operation, and reclamation of infrastructure on non-federal land are not federal actions because they are proposed on private lands. This EA addresses the potential effects of anticipated construction, operation, abandonment, and removal of all wells and other facilities associated with oil and gas exploration.

1.5 Plan Conformance Review

PLAN CONFORMANCE REVIEW: The Proposed Action is subject to and has been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

Name of Plan: Northeast Resource Area Plan and Record of Decision as amended by the Colorado Oil and Gas Final Environmental Impact Statement (EIS) and Record of Decision (ROD)

Date Approved: 09/16/86 amended 12/06/91

Decision Number: O&G Resources, Issue 21

Decision Language: "These 210,410 acres of surface and subsurface may be leased and developed for oil and gas with the standard stipulations included in the leases and standard site-specific stipulations included in any use authorization."

1.6 Scoping, Public Involvement and Issues

NEPA regulations (40 CFR §1500-1508) require that the BLM use a scoping process to identify potential significant issues in preparation for impact analysis. The principal goals of scoping are to allow public participation to identify issues, concerns, and potential impacts that require detailed analysis.

Persons/Public/Agencies Consulted: The federal mineral estate parcels being accessed with this action were scoped and made available for public comment during the leasing process. Scoping for the current action occurred through posting on the BLM NEPA website.

Issues Identified: No issues were identified during public scoping.

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

The BLM received three Applications for Permits to Drill (APDs) from Noble Energy, Inc. These APDs propose the construction of a three separate well pads, access roads, pipelines, and the drilling of three horizontal oil wells on private surface estates over private mineral estates in order to produce federal and private minerals (fee/fee/fed) in the central part of Weld County, within 20 miles of Keota, Colorado. The federal mineral estate that would be accessed from the proposed surface locations is leased and subject to oil and gas development.

The project area is generally rural ranchland and located in the northern portion of the South Platte River Basin. The area is primarily used for livestock grazing and oil and gas production. There are few county roads in the project area and a state highway nearby. Most access is limited to private landowner or petroleum field roadways. Extensive oil and gas development has occurred in the nearby Wattenberg field, mostly on private mineral estate.

The Bulleit well is proposed within an ozone nonattainment area; therefore, a general conformity analysis for ozone has been completed for the proposed activity. Potential emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx) have been calculated and analyzed in order to determine their conformity with the applicable laws and statutes.

2.2 Alternatives Analyzed in Detail

2.2.1 Proposed Action

The Proposed Action is to construct three well pads and associated infrastructure in order to directionally drill three wells and develop private minerals from a private surface, with penetration and reach into federal minerals. All three pads require construction of new access roads and natural gas gathering lines. The proposed pads would have a maximum cut of four feet and a maximum fill of two feet. Construction of the well pads and associated infrastructure would result in approximately 22 acres of temporary surface disturbance, which would be reduced to approximately 3.7 acres after interim reclamation. Leftover top and sub soil piles not used in the interim reclamation will be stabilized in order to prevent erosion.

The Proposed Action would include well pad preparation, drilling and completion operations, production operations, and interim reclamation measures and is expected to take approximately 50 days for each well location. The APD for each well includes a drilling program and a multi-point surface use and operations plan that describe details of well pad construction and interim and final reclamation. The Proposed Action would be implemented consistent with the terms of Federal Leases COC65489, 75063, and 70902 and with Conditions of Approval (COAs) attached to the APDs by the Colorado Oil and Gas Conservation Commission (COGCC) and the BLM.

Water for all three wells would be delivered by truck from an existing approved water source; no new water wells would be drilled for this project. The proposed drilling and completion will utilize a closed loop system; no reserve or storage pit is being proposed. Produced water will be disposed of at High Sierra Waste disposal, and drill cuttings will be disposed of at Miller Mud Farm. All oil produced from the three wells will be trucked and transported daily to a centralized delivery facility.

Interim reclamation would entail backfilling, leveling, re-contouring, and seeding of areas not needed for production activities. In the event of a dry hole, the well would be plugged and abandoned, pads and access roads would be graded to original contour, topsoil replaced, and the entire area reseeded for final reclamation. Upon final abandonment of the wells at the end of its production life, all facilities and surfacing materials would be removed, and all road and pad areas would be re-countered and reseeded. The wells would also be plugged and abandoned per COGCC and BLM regulations.

Bulleit

The Bulleit Federal PC LG04-62HN (Bulleit) well is located in the southeast corner of T8 R59W Section 4 in Weld County. The temporary disturbance associated with the pad would be approximately 6.9 acres. After reclamation, the permanent surface disturbance would be approximately 1.6 acres and would allow space for four oil tanks, two separator/dehydrator units, one EFM meter, one pump jack, two VOC combustors, one small compressor, and one well head.

Access to the proposed pad is from County Road 115 and an existing access road to the west. Noble would use 300 feet of that existing access road and would construct a new 400-foot access road to the Bulleit well pad location. The proposed access road would have a temporary construction disturbance of 30 feet, and a permanent 20-foot wide running surface with 2.5-foot wide ditches on both sides (0.23 acres). A pipeline would be installed parallel and adjacent to the proposed access road ditch. The estimated length of the proposed gas pipeline would be approximately 1,320 feet from the proposed pad to a connection with an existing natural gas gathering system. The pipeline would be collocated along the proposed ditch to the extent possible to minimize disturbance. Following installation, the entire pipeline construction right-of-way would be reclaimed; therefore, there would be no permanent surface disturbance associated with installation of the pipeline.

The anticipated construction start date for the Bulleit well is December 2013, with production to commence in February 2014. Drilling is anticipated to last 10 days.

Ptasnik

The Ptasnik Federal PC LC21-76HN (Ptasnik) well is located in the north central portion of T9 R59W Section 21 in Weld County. The temporary surface disturbance associated with the pad would be approximately 7.6 acres. After reclamation, the permanent surface disturbance would be approximately one acre and would allow space for five oil tanks, one water tank, one water vault, two separator/dehydrator units, one EFM meter, one pump jack, one VOC combustor, two compressors, and one well head.

Access to the proposed pad is from County Road 104 from which there is a proposed new access road for approximately 90 feet to the Ptasnik well pad location. The proposed access road would have a temporary construction disturbance of 30 feet, and a permanent 20-foot wide running surface with 2.5-foot wide ditches on both sides (0.05 acre). A proposed gas pipeline would be installed parallel and adjacent to the access road for approximately 40 feet to a connection with an existing natural gas gathering system. The pipeline would be collocated along the ditch to the extent possible to minimize disturbance. Following installation, the entire pipeline right-of-way would be reclaimed; therefore, there would be no permanent surface disturbance associated with installation of the pipeline.

The anticipated construction start date for the Ptasnik well is early January 2014, with production to commence in early March 2014. Drilling is anticipated to last 10 days.

Timbro

The Timbro Federal PC LC24-72HN (Timbro) well is located in the northeast corner of T9 R59W Section 24 in Weld County. The temporary surface disturbance associated with construction of the pad would be approximately 6.7 acres. After reclamation, the permanent surface disturbance would be approximately 1.1 acres and would allow space for four production tanks, one VOC combustor, two water tanks, two water vaults, two separators, two flow lines, one pump jack, one EFM, and one well head.

Access to the proposed pad is from County Road 119 and other existing roads to a proposed access road that would be approximately 208 feet in length to the Timbro well pad location. The proposed access road would have a temporary construction disturbance of 30 feet, and a permanent 20-foot wide running surface with 2.5-foot wide ditches on both sides (0.12 acres). A proposed gas pipeline would be installed parallel and adjacent to the proposed access road for approximately 116 feet to a connection with an existing natural gas gathering system. The pipeline would be collocated along the ditch to the extent possible to minimize disturbance. Following installation, the entire pipeline right-of-way would be reclaimed; therefore, there would be no permanent surface disturbance associated with installation of the pipeline.

The anticipated construction start date for the Timbro well is late January 2014, with production to commence in late March 2014. Drilling is anticipated to last 10 days.

Figure 2-1. Regional Map

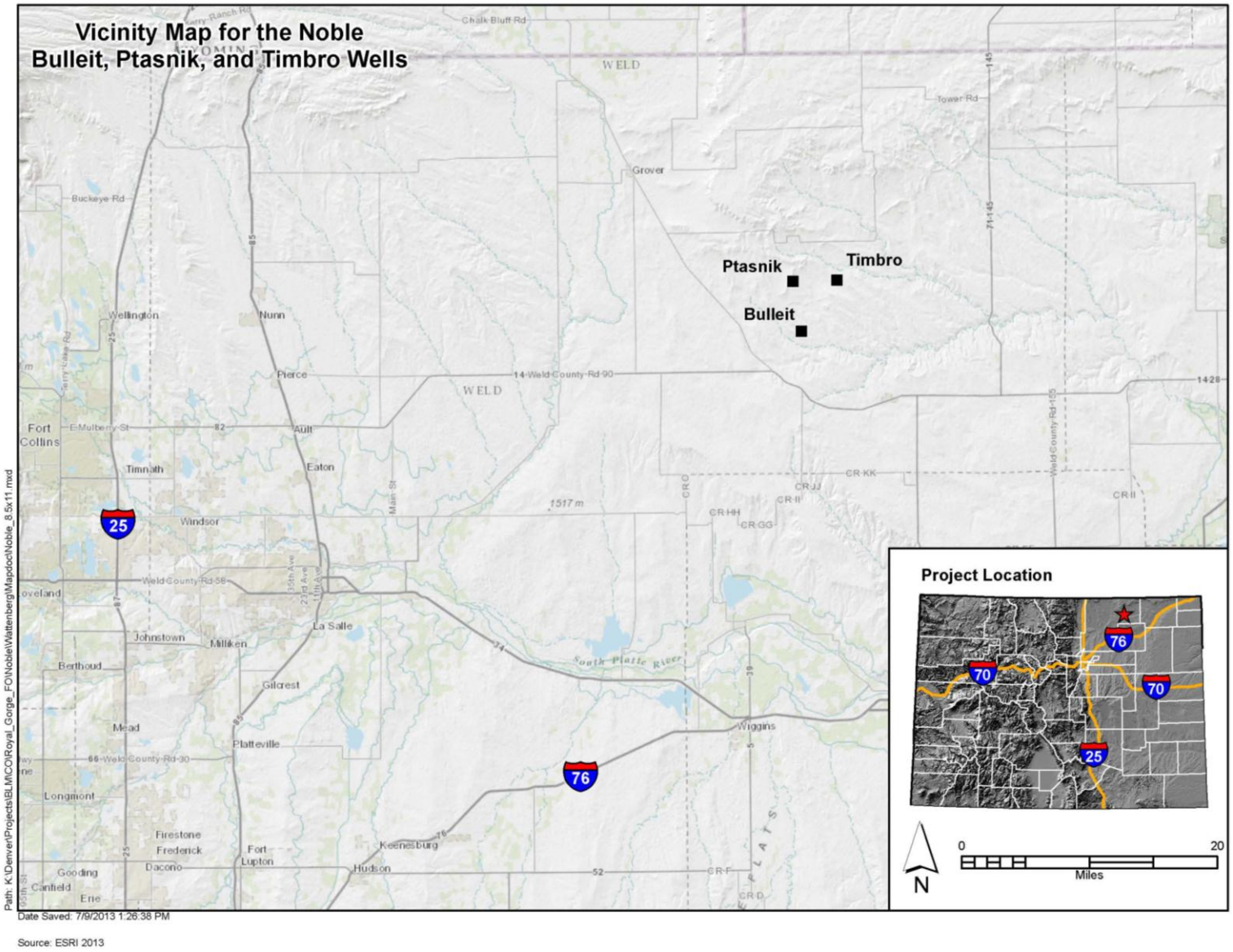


Figure 2-2. Site-specific Topographic Map

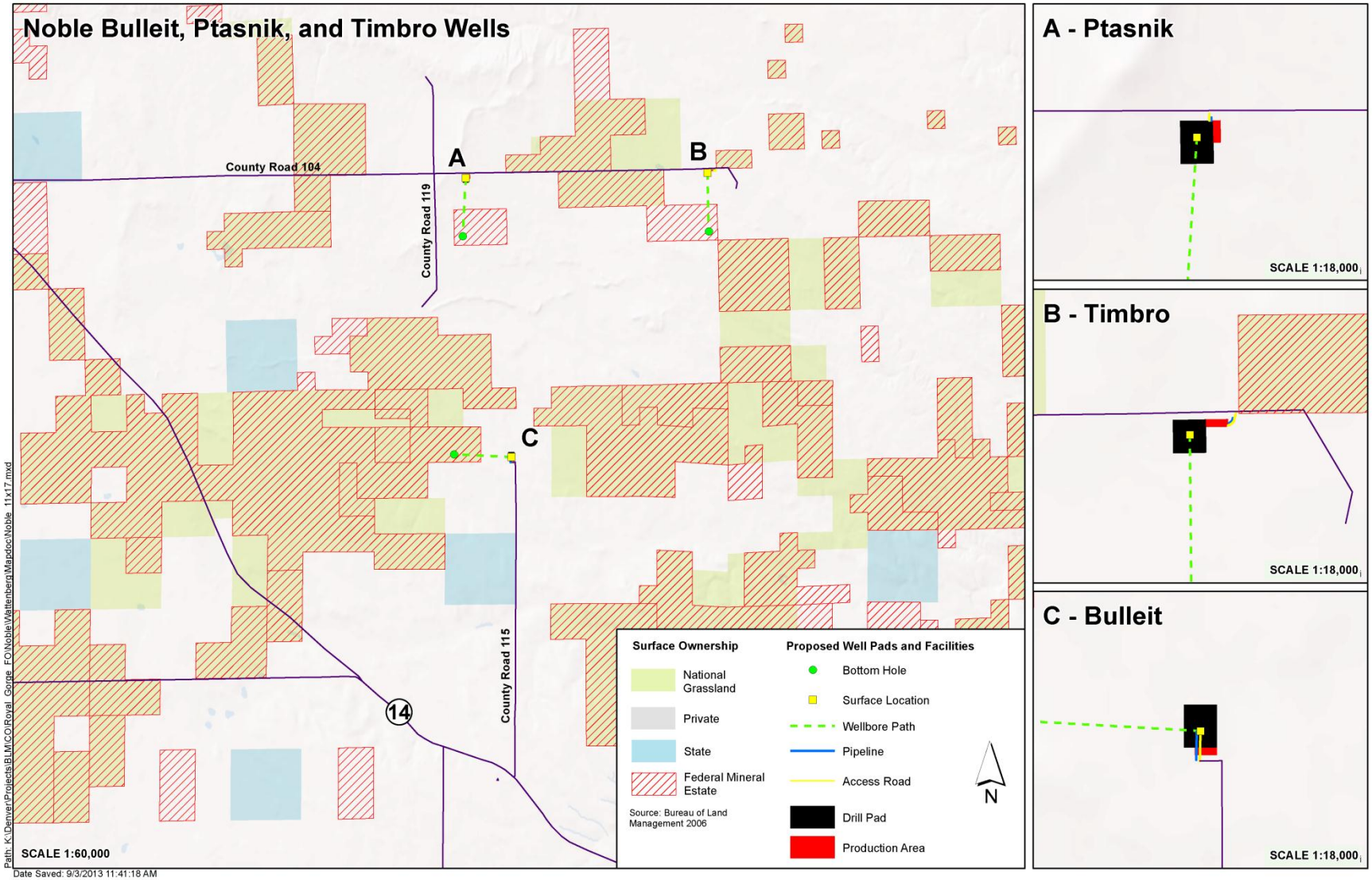


Figure 2-3. Aerial Photograph Map of the Proposed Bulleit Well Site

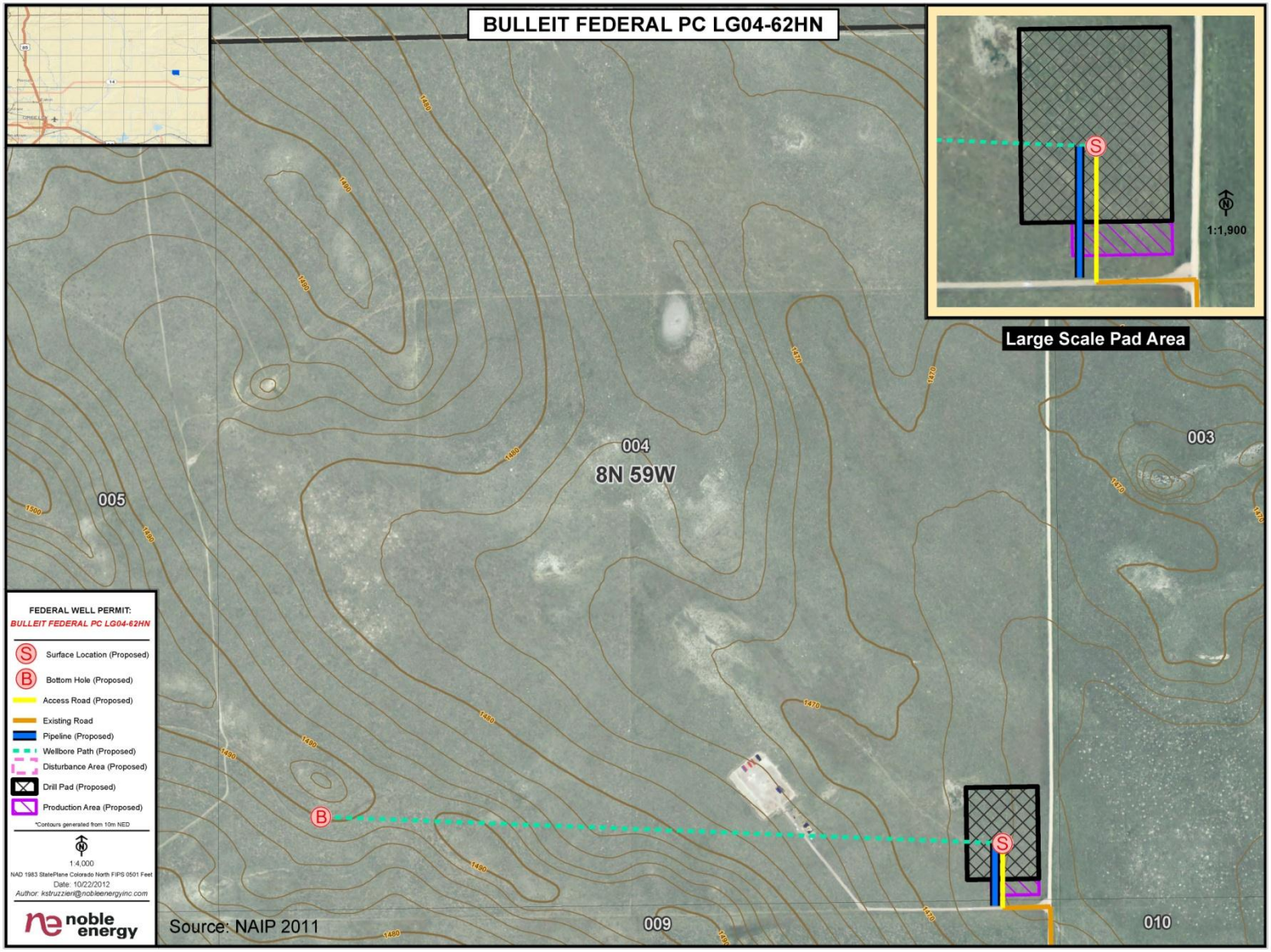


Figure 2-4. Aerial Photograph Map of the Proposed Ptasnik Well Site

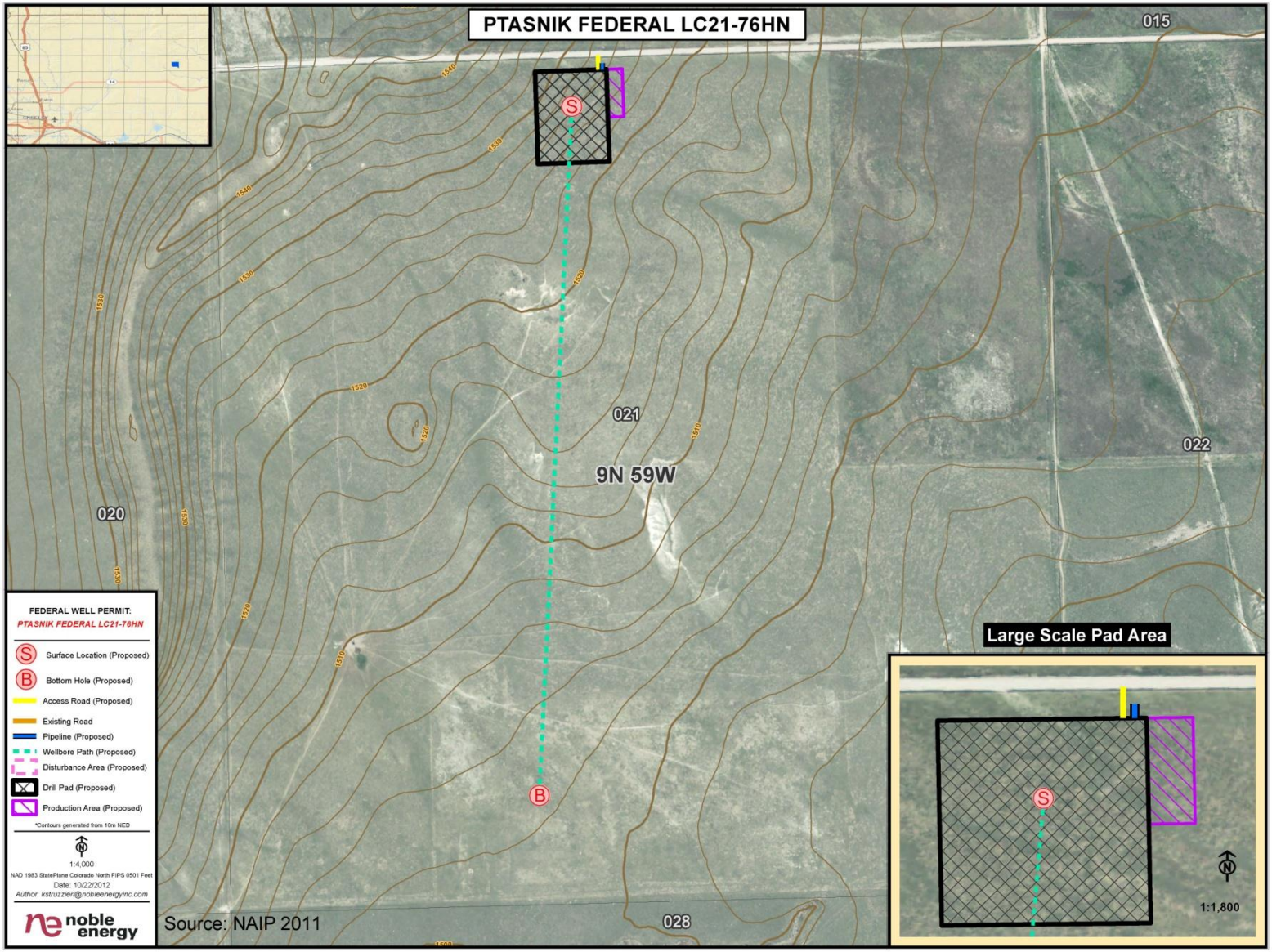
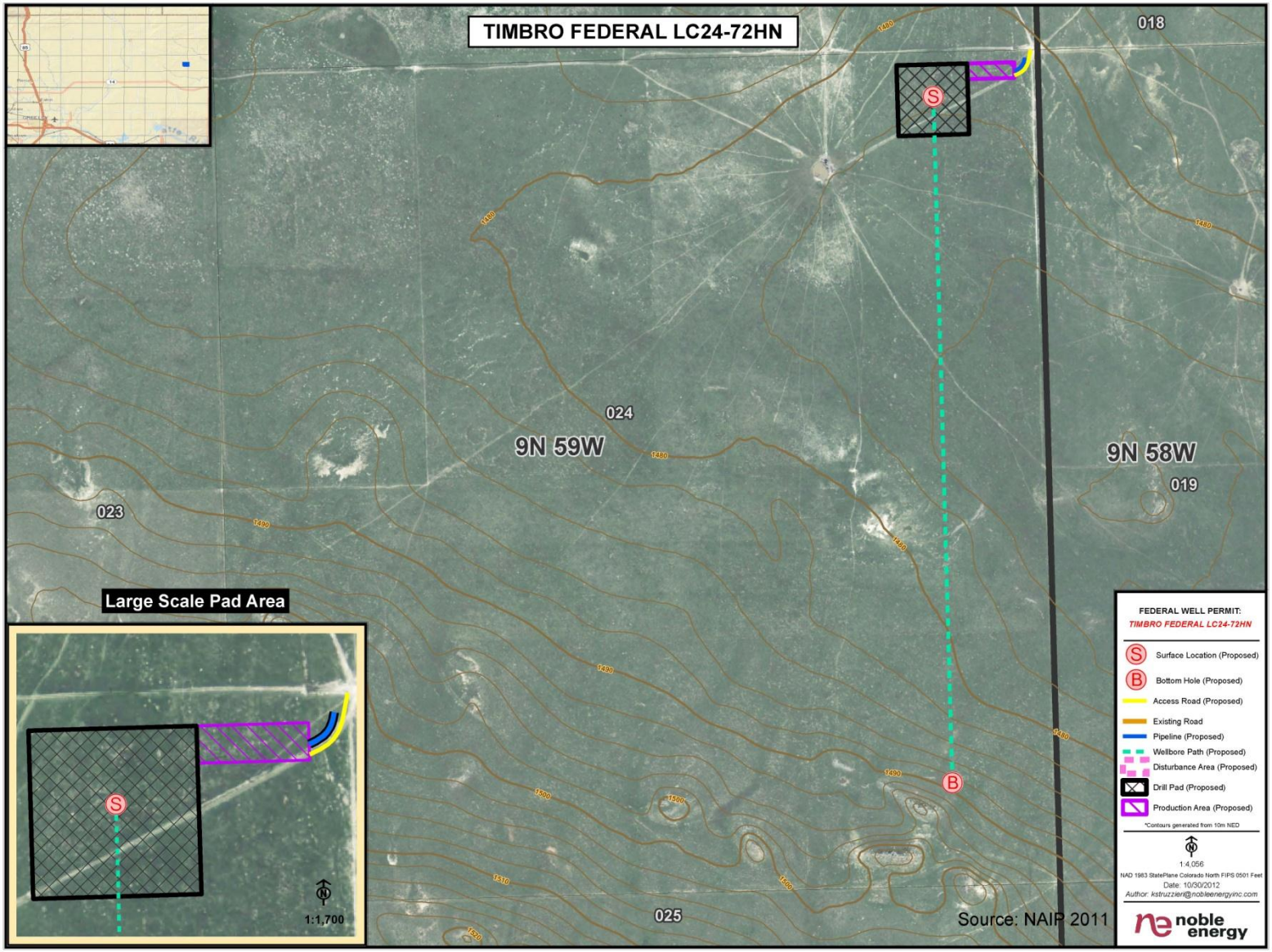


Figure 2-5. Aerial Photograph Map of the Proposed Timbro Well Site



2.2.2 No Action Alternative

The Proposed Action involves federal subsurface minerals that are encumbered with federal oil and gas leases, which grant the lessee a right to explore and develop the leases. Although the BLM cannot deny the right to drill and develop the leasehold, individual APDs can be denied to prevent unnecessary and undue degradation. The No Action alternative constitutes denial of the APDs associated with the Proposed Action. However, under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals.

2.3 Alternatives Considered but not Analyzed in Detail

No other alternatives were considered; the proposed project is proposed on private surface.

This page intentionally left blank.

CHAPTER 3 - AFFECTED ENVIRONMENT AND EFFECTS

3.1 Introduction

This section provides a description of the human and natural environmental resources that could be affected by the Proposed Action and No Action and presents comparative analyses of the direct, indirect, and cumulative effects on the affected environment stemming from the implementation of the actions under the Proposed Action and No Action alternatives. The Project Area is defined as the area on which construction and operation of the proposed access roads, pipelines, and well pads would occur. The area of proposed activities comprises approximately 22 acres in total. The Proposed Action Project Area is depicted on Figure 2-2.

3.1.1 Interdisciplinary Team Review

The BLM RGFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposal, its location, and a resource (issue) list (see administrative record [AR]), to identify potentially affected resources, land uses, resource issues, regulations, and site-specific circumstances. This EA does not discuss resources and land uses that are not present. This EA briefly addresses those resources that are present but not managed by the BLM due to the private surface over private mineral estate ownership for the Proposed Action.

The following issues are analyzed in detail in this EA:

- Air quality
- Geologic and mineral resources
- Water resources
- Migratory birds
- Threatened, Endangered, and Candidate species
- Cultural resources
- Native American religious concerns
- Paleontological resources
- Wastes, hazardous and solid

The following resources that are present but not managed by the BLM due to the private surface over private mineral estate ownership; therefore, they are addressed briefly in this EA:

- Soils
- Vegetation
- Invasive Plants
- Terrestrial wildlife
- Socioeconomics
- Noise

The following issues are not present or are not managed by the BLM on private surface; therefore, they are not included in this EA:

- Visual resources
- Recreation
- Environmental justice
- Farmlands, prime and unique
- Lands and realty
- Wilderness areas
- Range management
- Forest management
- Cadastral survey
- Fire
- Law enforcement

3.2 Physical Resources

3.2.1 Air Quality and Climate

Affected Environment

The Clean Air Act (CAA), which was last amended in 1990, requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS), codified at 40 Code of Federal Regulations (CFR) Part 50, for criteria pollutants. Criteria pollutants are air contaminants that are commonly emitted from the majority of emissions sources and include carbon monoxide (CO), lead (Pb), sulfur dioxide (SO_2), particulate matter smaller than 10 and 2.5 microns (PM_{10} and $PM_{2.5}$, respectively), ozone (O_3), and nitrogen dioxide (NO_2). Ambient air quality standards must not be exceeded in areas where the general public has access.

The CAA established two types of NAAQS:

> **Primary standards:** Primary standards set limits to protect public health, including the health of "sensitive" populations (such as asthmatics, children, and the elderly).
>
> **Secondary standards:** Secondary standards set limits to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings.

The EPA regularly reviews the NAAQS (every five years) to ensure that the latest science on health effects, risk assessment, and observable data such as hospital admissions are evaluated, and can revise any NAAQS if the data supports a revision. The Colorado Air Pollution Control Commission can establish state ambient air quality standards for any criteria pollutant, and those standards must be at least as stringent as the federal standards. Table 3-1 lists the federal and Colorado ambient air quality standards.

Table 3-1. Ambient Air Quality Standards

Pollutant [final rule citation]		Standard Type	Averaging Period	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		Primary	8-hour	9 ppm[a]	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		Primary and secondary	Rolling 3-month average	0.15 $\mu g/m^3$	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		Primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		Primary and secondary	Annual	53 ppb	Annual mean
Ozone [73 FR 16436, Mar 27, 2008]		Primary and secondary	8-hour	0.075 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particulate Matter [73 FR 3086, Jan 15, 2013]	$PM_{2.5}$	Primary	Annual	12 $\mu g/m^3$	Annual mean, averaged over 3 years
		Secondary	Annual	15 $\mu g/m^3$	Annual mean, averaged over 3 years
		Primary and secondary	24-hour	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10}	Primary and secondary	24-hour	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		Primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm[b]	Not to be exceeded more than once per year

Source: National – 40 CFR 50, Colorado – 5 CCR 1001-14.

[a] mg/m^3 = milligrams per cubic meter, $\mu g/m^3$ = micrograms per cubic meter, ppb = parts per billion, ppm = parts per million.
[b] Colorado Ambient Air Quality Standard for 3-hour SO_2 is 0.267 ppm.

For areas that do not meet the NAAQS (these are designated by EPA as nonattainment areas), the CAA establishes timetables for each region to achieve attainment of the NAAQS. The State (Colorado Department of Public Health and Environment [CDPHE]) must prepare a State Implementation Plan (SIP), which documents how the region will reach attainment by the required date. A SIP includes inventories of emissions within the area and establishes emission budgets (targets) and emission control programs that are designed to bring the area into compliance with the NAAQS. In maintenance areas (nonattainment areas that have achieved attainment), SIPs document how the State intends to maintain compliance with NAAQS.

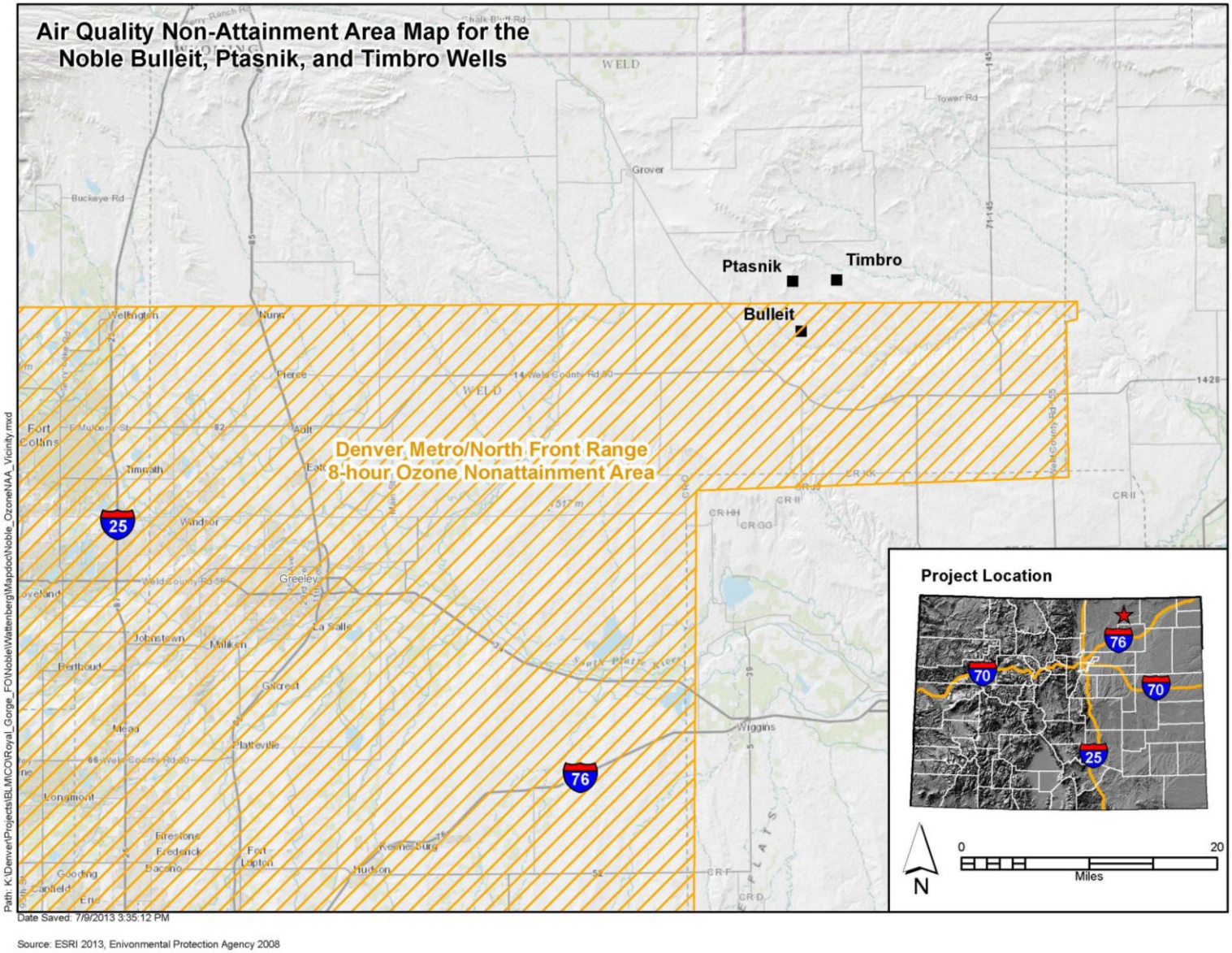
The CAA and the Federal Land Policy and Management Act of 1976 (FLPMA) require the BLM and other federal agencies to ensure actions taken by the agency comply with federal, state, tribal, and local air quality standards and regulations. FLPMA further directs the Secretary of the Interior to take any action necessary to prevent unnecessary or undue degradation of the lands [Section 302 (b)], and to manage the public lands "in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values" [Section 102 (a)(8)].

Section 176(c) of the CAA prohibits Federal entities from taking actions in nonattainment or maintenance areas that do not "conform" to the SIP. The purpose of this conformity requirement is to ensure that Federal activities: (1) do not interfere with the budgets in the SIPs; (2) do not cause or contribute to new violations of the NAAQS; and (3) do not impede the ability to attain or maintain the NAAQS. To implement CAA Section 176(c), EPA issued the General Conformity Rule (40 CFR Part 93,

Subpart B), which applies to all Federal actions not funded under U.S.C. Title 23 or the Federal Transit Act (BLM actions are not funded by U.S.C. Title 23 or the Federal Transit Act). The General Conformity Rule established emissions thresholds (40 CFR 93.153), known as *de minimis* levels, for use in evaluating the conformity of a project. If the net emissions increases due to the project are less than these thresholds, the project is presumed to conform and no further conformity evaluation is required. If the emissions increases exceed any of these thresholds, a conformity determination is required. The conformity determination can entail air quality modeling studies, consultation with EPA and state air quality agencies, and commitments to revise the SIP or to implement measures to mitigate air quality impacts. The BLM, as the federal entity with jurisdiction for the proposed action, must demonstrate that the proposed action meets the requirements of the General Conformity rule.

The project area straddles the boundary between two air quality designated areas. The Ptasnik and Timbro well sites are located in an area EPA has designated as attainment (in compliance) for the NAAQS. The Bulleit well site is located within the EPA-designated Denver-Boulder-Greeley-Fort Collins ozone nonattainment area. Because the General Conformity rule applies only to actions in nonattainment or maintenance areas, only the Bulleit well is subject to the conformity requirements. Figure 3-1 depicts the well site locations with respect to the nonattainment area.

Figure 3-1. Well locations and Ozone Nonattainment Area



The Prevention of Significant Deterioration (PSD) provision of the CAA established Class I areas in which very little degradation of air quality is allowed (e.g., national parks and large wilderness areas) and Class II areas (all non-Class I areas). The PSD Class II designation allows for moderate degradation of air quality within certain limits above baseline air quality. The lease area is designated as a Class II area. The closest Class I area to the proposed well site locations is Rocky Mountain National Park, which lies approximately 75 miles to the west.

Land Use in the Project Region

The vicinity of the Project Area (northern Weld County) is predominantly used for agriculture. Approximately 75% of the available land area of Weld County is linked to the agricultural sector of the economy. Oil and gas development is another major economic driver for the area, and Weld County has some 17,000 active wells within its boundaries. The population density of Weld County within the vicinity of the Project Area is generally dispersed, with less than 25 people per square mile. Activities occurring within the area that affect air quality include exhaust emissions from motor vehicles, agricultural equipment, drilling rigs and other oil and gas development activities, as well as fugitive dust from roads, agriculture, and energy development (BLM, 2012a).

Meteorology in the Project Region

Mean temperatures in the area range from 15.6 degrees Fahrenheit (°F) in January to 88.7° F in July. The area receives average annual precipitation of approximately 14.22 inches. Frequent winds in the area provide excellent dispersion characteristics for anthropogenic emissions (BLM, 2012a).

Existing Air Quality Measured in the Region

The Air Pollution Control Division (APCD) of the Colorado Department of Public Health and Environment measures ambient air quality at a number of locations throughout the state. The nearest APCD air monitors to the project are the Weld County West Annex (CO), County Tower (O_3), and Hospital (PM_{10} and $PM_{2.5}$) sites located in Greeley, and one site in Briggsdale (O_3). Table 3-2 provides the measured concentrations of criteria pollutants at these monitors for the most recent three years. There are no lead, NO_2, or SO_2 monitors near the project area. Table 3-2 indicates that no violations of the NAAQS have occurred in the project region in the last three years.

Table 3-2. Measured Ambient Concentrations in the Region

Monitor Location	Pollutant (Averaging Period – Unit, Form)	Measured Concentration		
		2010	2011	2012
Weld County West Annex, Greeley	CO (1 Hour - ppm, maximum)	4.2	2.7	3.2
	CO (8 Hour - ppm, maximum)	2.5	2.0	2.3
Weld County Tower, Greeley	O_3 (8 Hour - ppm, 4th maximum)	0.073	0.077	0.080
Briggsdale	O_3 (8 Hour - ppm, 4th maximum)	–	0.066	–
Weld County Health Dept. (Hospital), Greeley	PM_{10} (24 Hour - µg/m^3, maximum)	44	46	102
	$PM_{2.5}$ (24 Hour - µg/m^3, 98th percentile)	20	23	32
	$PM_{2.5}$ (Annual - µg/m^3, annual mean)	7.3	6.7	7.9

Source: EPA 2013

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Direct and Indirect Impacts of Criteria Pollutants: The Proposed Action will have a temporary, localized negative impact to air quality during the construction phase. Surface disturbance, utilization of the access road, and construction activities such as drilling, hydraulic fracturing, well completion, and equipment installation all will impact air quality through the generation of dust related to earthmoving, travel, transport, and general construction. This phase will also produce short-term emissions of criteria pollutants, hazardous air pollutants (HAPs), and greenhouse gases (GHGs) from vehicle and construction equipment exhaust. The primary GHGs are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Once construction is complete the daily activities at the site will be reduced to operational and maintenance checks which may be as frequent as daily visits. Emissions will result from vehicle exhaust from the maintenance and process technician visits, as well as oil and produced water collection or load out trips. The pads can be expected to produce fugitive emissions of well gas and liquid flashing gases, which contain a mixture of methane, volatile organic compounds (VOCs), HAPs, and inert or non-regulated gases. Fugitive emissions are emissions that are not associated with a stack, exhaust vent, or other defined point. Fugitive emissions may result from pressure relief valves and working and breathing losses from any tanks located at the sites, as well as any flanges, seals, valves, or other infrastructure connections used at the sites. Liquid product load-out operations will also generate fugitive emissions of VOCs.

Ozone is not directly emitted like other criteria pollutants. Ozone is formed in the atmosphere via chemical reactions of ozone precursors, primarily oxides of nitrogen (NOx) and VOCs, in the presence of the ultraviolet component of sunlight. Ozone concentrations are the result of these complex reactions involving VOC and NOx emissions from all sources within a region. Ozone concentrations change over time as these reactions continue while sunlight is present, and additional sources contribute emissions as air is transported across long ranges (as much as hundreds of miles). Therefore, prediction of potential impacts on ozone levels from individual projects like the Proposed Action is impractical, and potential ozone impacts are evaluated based on the project's emissions of VOCs and NOx.

Emissions from construction and operation (production) of the proposed wells were estimated by the applicant and are given in Table 3-3 below. The following pollutants were inventoried where an appropriate basis, methodology, and sufficient data exists: CO, NOx (includes NO_2), $PM_{2.5}$, PM_{10}, SO_2, VOCs, HAPs, CO_2, CH_4, and N_2O. The emissions estimates were developed using reasonable scenarios for each activity. Production emissions were calculated based on full production activity for the entire year. Potential emissions were calculated for each well assuming the legally required control measures, operational parameters, and equipment configurations data that were provided by the applicant. Construction of pipelines and electric lines, traffic on paved roads, workovers/restimulation, and reclamation were not included in the emissions calculations because these activities are likely to contribute only a small proportion of the total emissions.

The following assumptions were used in estimating project emissions:

- The disturbed surface area per well pad was assumed to be 8 acres.
- Construction was assumed to occur for 14 work days per well.
- An access road 1 mile long and 25 feet wide was assumed to be constructed for each pad.
- All disturbed surfaces (pads and access roads) would receive appropriate application of water (during construction) or dust palliatives (during operations). The dust control effectiveness was assumed to be 50 percent.

- Drilling was assumed to occur for 10 days per well.
- Drill rig engines would meet EPA Non-road Tier 2 emissions standards.
- All diesel fuel would be standard transportation grade (500 ppm sulfur).
- The well pad equipment would include tanks, separation equipment, and well head compression, but no dehydration or desulfurization units.
- The applicant would perform 'Green Completions' for all wells.
- Condensate was estimated at 200,000 barrels per year per well, and produced water at 50,000 barrels per year per well.
- Flowback would not be vented. Fugitive well emissions would be controlled by flaring as necessary.
- The production lifetime of the project was assumed to be 20 years.

For further details on the emissions calculations, see Appendix A.

Table 3-3. Estimated Emissions from the Proposed Action

Description	NO_x	CO	VOC	PM_{10}	$PM_{2.5}$	SO_x	CO_2	CH_4	N_2O
One-Time Emissions (tons[a])									
Construction	1.085	0.302	0.105	1.53	0.239	0.118	158	0.0017	0.0022
Rig Move & Drilling	4.77	4.97	0.58	0.68	0.053	0.0014	2,611	0.0092	0.0095
Completion	0.37	0.73	0.254	0.40	0.040	2.47×10^{-4}	381	0.0041	7.37×10^{-4}
Total 1-Time Emissions	6.22	6.00	0.93	2.60	0.33	0.12	3,150	0.015	0.012
Annual Emissions (tons/year)									
Production	55.86	112.27	79.96	5.32	0.532	0.0029	58,944	1.279	0.112
Annual Emissions per Well Compared to CDPHE Modeling Guideline Thresholds (tons/year)									
Production (per well)	18.62	37.42	26.65	1.77	0.18	9.76 × 10-4	19,648	0.426	0.037
CDPHE Thresholds (CDPHE, 2011)	40	100	No threshold	15	5	40	No threshold	No threshold	No threshold
Total One-Time GHG Emissions plus Life-of-Well (20 years) GHG Emissions									
GHGs (tons)							1,182,037	35.6	2.2
Total CO_2e [b] emissions (metric tons)									1,073,415

Source: Noble Energy, 2013

Note: Sum of individual values may not equal summary value due to rounding.

[a]Short tons (1 ton = 2,000 lb) unless metric tons are specified.
[b]CO_2e = CO_2 equivalent, based on 100-year Global Warming Potentials of CO_2 = 1, CH_4 = 21, and N_2O = 298 (Forster *et al.* 2007).

Air quality impacts in the near-field area were assessed in terms of potential pollutant concentrations that could result from the Proposed Action emissions. The near field is the area within a radius of approximately 1 kilometer (0.621 mile or 3,281 feet) from the well pad (BLM, 2012a). As shown in Figure 2-1 of this EA, the proposed wells are distributed spatially (approximately 3 to 5 miles apart) such that near-field air quality impacts due to one well are not likely to contribute substantially to pollutant concentrations in the near-field area associated with another proposed well (BLM, 2013). For this reason, it is reasonable to address near-field concerns for each proposed well separately. The emissions estimates for an individual well, as shown in Table 3-3, are less than the thresholds above which CDPHE

requires air quality modeling for minor sources (CDPHE, 2011). For these reasons, near-field air quality modeling was not conducted for the proposed oil and gas development and operations.

The land around the Proposed Action wells is mostly in agricultural and industrial use, and no residences are located within the 1-kilometer radius corresponding to the near-field area of each well. The nearest residence is located approximately 3,900 feet (1.2 kilometers) northeast of the Ptasnik well. Potential air quality impacts at this residence were assessed based on the results of a near-field air quality modeling study conducted for an oil and gas development project (BLM, 2012a) that was proposed to be located Weld County. The modeled project would have four pads spaced relatively closely together (about 1,000 feet apart), as well as additional facilities, and thus would present a more intense emissions source than would the more widely spaced pads of the Proposed Action. The BLM (2012a) modeling study estimated maximum air quality impacts in terms of pollutant concentrations within 1 kilometer of the four pads. The modeling study concluded that near-field concentrations would not be expected to exceed the NAAQS. Due to increased pollutant dispersion with distance from the source, concentrations beyond 1 kilometer would be less than concentrations within the near-field area. Consequently, any air quality impacts of the Proposed Action, including potential impacts at the nearest residence, would not be expected to lead to exceedances of the NAAQS.

Table 3-4 below compares the project emissions to total Weld County emissions as inventoried by the Colorado Department of Public Health and Environment (CDPHE) for 2008 (the most recent year available). It also shows Weld County's oil and gas area and point source emissions for the same period. (Point sources are larger individual sources that have a definable stack or other emission point. Area sources are smaller sources that are inventoried in aggregate by CDPHE.)

Table 3-4. Comparison of Proposed Action and Weld County Emissions

Pollutant	Emissions (tons per year)				
	3 Noble Wells (Production)	Noble Wells Percent of Total Weld County Emissions	Weld County Total (2008)	Weld County Oil & Gas Area Sources (included in county total)	Weld County, Oil & Gas Point Sources (included in county total)
NOx	55.86	0.18%	30,365	9,514	5,503
CO	112.27	0.12%	91,338	6,088	5,155
VOC	79.96	0.059%	135,941	37,762	65,035
PM_{10}	5.32	0.018%	29,948	460	134
$PM_{2.5}$	0.53	ND	ND	ND	ND
SOx	0.0029	5.3×10^{-4} %	545	70	43
HAPs	ND	ND	354	ND	151

Source for Weld County emissions: CDPHE 2013. ND = No Data. CDPHE HAP inventory is for benzene only.

The project emissions are relatively small compared to the Weld County emissions: less than 0.2 percent for each pollutant. The project one-time and annual emission levels and their small percentage of Weld County emissions indicate that the Proposed Action is unlikely to cause or contribute to an exceedance of an ambient air quality standard.

General Conformity Evaluation: As noted above, under the General Conformity rule the portion of project emissions that occurs in a nonattainment or maintenance area must be compared to the applicable thresholds. Because the area is nonattainment for ozone, the applicable thresholds are for

the ozone precursors NOx and VOC. Only the Bulleit well would be located in the ozone nonattainment area. Table 3-5 provides the estimated NOx and VOC emissions for the Bulleit well and compares them to the conformity thresholds. The table provides emissions estimates for a worst-case year, corresponding to a hypothetical scenario in which well construction, drilling, and completion occur at the beginning of a year, followed by one year of production. The production emissions in Table 3-5 exclude emissions from sources that are anticipated to require air quality (new source review) permits from the CDPHE because emissions permitted under new source review are exempt from the conformity requirements. Table 3-5 shows that the emissions are less than the conformity thresholds for a worst-case year. Even if emissions permitted under new source review are included, the total emissions still are less than the thresholds. Accordingly, the Bulleit well conforms to the Denver region ozone SIP.

Table 3-5. NOx and VOC Emissions and Conformity Evaluation for Bulleit Well

Description	NO_x	VOC
One-Time Emissions (tons)		
Construction	0.36	0.035
Rig Move & Drilling	1.59	0.19
Completion	0.12	0.085
Total One-Time Emissions	2.07	0.31
Annual Emissions (tons/year)		
Production[a]	18.49	10.44
Worst-Case Year: Total One-Time Emissions plus 1 Year of Production Emissions (tons)	20.56	10.75
General Conformity threshold (40 CFR 93.153) (tons/year)	100	100

Source: Noble Energy, 2013

Note: sum of individual values may not equal summary value due to rounding.

[a]Does not include emission sources that are subject to CDPHE air quality (new source review) permits and are exempt from conformity requirements. The estimated emissions anticipated to be subject to new source review permitting are 0.13 tons per year of NO_x and 16.21 tons per year of VOCs.

Greenhouse Gas Emissions and Climate Change: According to the U.S. Global Change Research Program (2009), global warming is unequivocal, and the global warming that has occurred over the past 50 years is primarily human-caused. Moreover, specific thresholds of significance for GHG emissions have not been established by regulatory agencies. Predicting the degree of impact any single emitter of GHGs may have on global climate, or on the changes to biotic and abiotic systems that accompany climate change is highly complex, has considerable uncertainty, and requires substantial computer modeling resources. This analysis is therefore limited to presenting project GHG emissions in context through comparisons to Colorado and national GHG emissions. The total project GHG emissions do not account for the ultimate use or consumption of any products of the project (i.e., life cycle GHG analysis) because any additional processing and ultimate uses for the products cannot be known. The analysis also summarizes readily available information regarding expected changes to the global climatic system and empirical evidence of climate change that has occurred to date.

Table 3-6 compares project GHG emissions to Colorado and national emissions. Table 3-6 shows that the GHG contribution associated with the Proposed Action is extremely small in this context.

Table 3-6. Greenhouse Gas Emission Comparisons

Inventory Description	CO_2e Emissions (10^6 metric tons per year)	Proposed Action Percentage
Proposed Action (one-time emissions plus one year of production emissions)	0.056	–
Colorado GHGs (2010)[a]	129	0.044%
Total U.S. GHGs (2011)[b]	6,702	8.4×10^{-4} %

[a]Source: CDPHE 2007.
[b]Source: EPA 2013b.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action Alternative the BLM would not authorize any of the Proposed Action elements. However, because the project sites are privately owned surface the same well construction and operation would occur as under the Proposed Action, provided that the wells were drilled to stop short of draining Federally-owned oil and gas. Consequently, the air quality and GHG impacts described above for the Proposed Action would occur, except that drilling emissions under the No Action Alternative might be slightly less if avoidance of Federally-owned oil and gas necessitates shorter well shafts. As a result, there could be little or no difference in air quality impacts between the Proposed Action and the No Action Alternative.

Protective/Mitigation Measures

Noble would comply with Colorado Oil and Gas Commission (COGCC) Rule 805 which requires control of VOC emissions, odors, and fugitive dust. Noble would use industry best practices, including watering, graveling, and reseeding to reduce fugitive dust emissions from vehicular traffic and disturbed surfaces. Interim reclamation and existing agricultural practices will be implemented in order to stabilize the site and prevent fugitive dust from being generated. In addition the following BLM requirements will apply:

- Process equipment will be permitted by CDPHE in accordance with applicable requirements and required emissions standards to limit the facility's potential to emit and provide appropriate operating, monitoring, and recordkeeping requirements.
- VOC emissions from storage tanks will be controlled using control technology that will reduce VOC emissions by at least 95 percent relative to uncontrolled conditions.
- The operator will control fugitive emissions of particulate matter (dust) during construction and production, using procedures and control technology that will reduce dust emissions by at least 50 percent relative to uncontrolled conditions.
- All pump engines will be required to meet EPA Non-Road Tier II emissions standards.
- All drill rig engines will be required to meet EPA Non-Road Tier II emissions standards.
- The operator will perform 'Green Completions' for all wells, as required by COGCC Rule 805.b(3).

The BLM will include these requirements as Conditions of Approval of the APD. The BLM expects that the operator will comply with these requirements and make every effort to minimize emissions through good engineering and operating practices to the maximum extent practical.

3.2.2 Geologic and Mineral Resources

Affected Environment

The proposed wells are located within the Wattenberg gas field in the Denver Basin, where the primary target is the Codell/Niobrara oil and gas. Most oil and gas in the Denver Basin has been produced from Cretaceous sandstones: J-Sandstone, Codell Sandstone, Niobrara Formation, Hygiene Sandstone, and Terry Sandstone (also known informally as the Sussex and Shannon Sandstones). The Project Area is surrounded by privately owned producing gas wells on a Colorado state spacing order of 20 acres per well.

Groundwater resources in the area include the Laramie-Fox Hills aquifer, the lowermost of the Denver Basin aquifer system. The aquifer underlies approximately 6,700 square miles and marks the areal extent of the basin for economic ground water development. The Laramie-Fox Hills aquifer is from 250 to 300 feet thick, and includes about 150 to 200 feet of fine-grained and medium-grained sandstone. Water is also present in the Upper Pierre Shale at depths of up to 1,500 feet (CDWR, 2013). Water from the aquifer is used extensively throughout the area for domestic and agricultural purposes; however, it typically yields water in quantities sufficient for commercial development. Well yields may be as high as 100 gallons per minute (GPM), but are generally somewhat lower. Both the Laramie-Fox Hills and Arapahoe aquifers are under artesian pressure at the present time.

In addition to oil and gas, uranium and coal resources are also found in Weld County. Uranium resources are found in the Upper Laramie Formation north of Greeley. Coal resources are found throughout the Denver Basin in the Denver Formation and the upper Laramie Formation in the Denver Basin, although most of the coal resources in the Denver Basin have come from Laramie Coals. Sand and gravel resources are also located throughout Weld County; several sand and gravel pits have also been developed within five miles of the proposed wells.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

The Proposed Action would drill through the Laramie-Fox Hills aquifer to produce hydrocarbons from underlying formations. The Laramie formation contains important coal and uranium deposits. During drilling operations on parcels, loss of circulation or problems cementing the surface casing could directly affect freshwater aquifer and mineral zones encountered. Known water-bearing zones in the APD areas would be protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the APDs would be denied, and no federal action would occur. Not approving the APDs could result in a situation in which reservoirs are not adequately developed, and public minerals could be drained by nearby private or state wells. The applicant could explore and develop the private land and private minerals and not access the federal minerals. Drainage cases commonly occur in northeastern Colorado, where land and mineral ownership patterns are complex.

Protective/Mitigation Measures

Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones. At this stage, geologic and engineering reviews have been done to ensure that cementing and casing programs are adequate to protect all downhole resources. Known water bearing zones in the APD area are protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely. Casing along with cement would be extended well beyond fresh-water zones to ensure that drilling fluids remain within the well bore and do not enter groundwater.

3.2.3 Soils (includes a finding on Standard 1)

Affected Environment

Slopes in the Project Area range from less than 1% to 6%, which means erosion potential is low to moderate.

Using Natural Resources Conservation Service (NRCS) data, two soil types have been identified in the Project Area.

> **Ascalon fine sandy loam**, 0 to 6 percent slopes. The Ascalon fine sandy loam is a well-drained, moderately sloping (1% to 6% slopes) soil found on terraces, alluvial fans and mesas with elevations ranging from 5,000 to 6,500 feet. This soil is formed in alluvium derived from sandstone and shale. The permeability is moderately rapid, runoff is moderately rapid and erosion hazard is moderate. This soil is generally used for farmland (if irrigated), grazing and wildlife habitat.
>
> **Peetz gravelly sandy loam**, 5percent slopes. The Peetz component makes up 80%of the map unit. The Peetz series consists of deep, somewhat excessively drained soils that formed in gravelly, calcareous, coarse textured Ogallala deposits. Peetz soils are on knob-like areas and ridges in gravelly upland and terrace breaks. Slopes are 0 to 30%. The mean annual precipitation is about 41 centimeters (16 inches), and the mean annual temperature is about 10 degrees Celsius (50° F).

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Surface disturbance from new well pads, access roads, and pipelines would result in the initial temporary disturbance of soils and vegetation on up to 22 acres. Well pad construction (for all three wells) would require a total of approximately 26,274 cubic yards of top soil stripped (at 6 inch depth). The amount of long term disturbance would be less than 5 acres total for the three pads and access roads following successful interim reclamation including re-contouring and seeding. All areas of disturbance associated with pipelines would be reclaimed fully. Indirectly, the increased runoff from the disturbed soils could result in increased erosion and gullying down gradient. Due to the gentle slopes and construction standards being proposed, the impacts to soils off-site would be minimal.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to soils would be the same as those described for the Proposed Action.

Protective/Mitigation Measures

Noble has committed to building all infrastructure (road, drill pads, etc.) to BLM Gold Book standards on these private surface wells. If the proposed project plans to utilize federal minerals in the construction of roads, pad building, or for any other construction needs, then compliance with 43 CFR 3600 is required. The proponent will need to submit an application for a mineral materials disposal with the BLM, prior to any disturbance being initiated. Federal mineral materials regulations also apply to split estate (i.e., a private surface landowner could not dispose of federal mineral materials for this project, surface or subsurface, without prior authorization from the BLM).

3.2.4 Water (Surface and Groundwater, Floodplains)

Affected Environment

The proposed wells are located on dry, upland native grazing lands. The area is tributary to the South Platte River (Hydrologic Unit Code 10190012). Wild Horse Creek is the nearest perennial water body, which is located more than one mile south of the proposed Bulleit well. Groundwater in this area consists of the Laramie Fox-Hills aquifer, which is used for domestic and agricultural purposes and is generally produced from artesian wells. This aquifer can be up to 350 feet thick, although total thickness of water yielding material rarely exceeds 200 feet. The Lower Fox Hills and upper Pierre Aquifer or upper transition zone of the Pierre shale are also important water resources; this interval occurs at depths of about 600 to 1,500 feet. Underlying the Fox Hills aquifer is nearly 5,000 feet of Pierre Shale. There are many water wells within a one mile radius of the proposed wells. The deepest water well in this area is 1,060 feet. There are four wells that exist within a one mile radius of Ptasnik. There are two wells that exist within a one mile radius of Timbro, and 6 that exist within a one mile radius of Bulleit (CDWR, 2013).

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

As stated previously, the Proposed Action would drill through the Laramie-Fox Hills aquifer to produce hydrocarbons from underlying formations. During drilling operations on the parcels, loss of circulation or problems cementing the surface casing may affect freshwater aquifer and mineral zones encountered.

Due to the flat nature of the topography, infiltration rates of the soils in this area, and distance from nearby surface waters, impacts to surface water quality would be minimal from construction of roads and well pads and drilling the proposed wells. For the same reasons, impacts to surface waters from chemicals or other hazardous substances accidentally spilled or leaked during the development process would also be minimal.

The drilling of the proposed wells would pass through usable groundwater. Groundwater in this area is relied on for agricultural and domestic use. Potential impacts to groundwater resources could occur if

proper cementing and casing programs are not followed. This could include loss of well integrity, surface spills, or loss of fluids in the drilling and completion process. Chemical additives used in drilling activities can be introduced into the water producing formations without proper casing and cementing of the well bore. A closed loop drilling mud system would prevent any shallow groundwater contamination.

Geologic and engineering reviews have been done to ensure that cementing and casing programs are adequate to protect all downhole resources. Known water bearing zones in the APD area are protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely. Casing along with cement would be extended beyond fresh-water zones to insure that drilling fluids remain within the well bore. Compliance with the drilling and completion plans and Onshore Oil and Gas Orders Nos. 2 and 7 would also help avoid adverse impacts on groundwater.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to water resources would be similar to those described for the Proposed Action depending on the depth of the federal minerals avoided.

Protective/Mitigation Measures

No additional mitigation is required to protect water resources.

3.3 Biological Resources

3.3.1 Vegetation

Affected Environment

The project is located within the High Plains of the Great Plains Physiographic Province. The well pads are located on the southeast slope of a ridge with little vegetation. The elevation for the proposed well sites is approximately 5,010 feet above mean sea level. The dominant vegetation community type in the project area is shortgrass prairie, which is primarily dominated blue grama and buffalo grass. Onsite observations also confirmed mixed grasslands with scattered yucca at all proposed well pad locations.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Surface disturbance from new and expanded well pads would result in the initial disturbance of soils and vegetation on up to 22 acres, and the potential for invasive and noxious weed establishment or expansion. Over the long term, the three pads and associated access roads would be reclaimed to less than 5 acres according to interim reclamation plans submitted with the APDs. These reclaimed areas would be revegetated with native vegetation and controlled for invasive plant species.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action Alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to vegetation and invasive plant species would be the same as under the Proposed Action alternative.

Protective/Mitigation Measures

N/A.

3.3.2 Invasive Plants

Affected Environment

The dominant vegetation community type in the project area is shortgrass prairie. Colorado maintains a list of noxious weeds, which is posted on the NRCS website. No state-listed noxious weeds or invasive/exotic plant infestations (Class A and B) are known to be present within the Project Area; however, some of these species may be found in the general areas surrounding the Project Area.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Surface disturbance from new and expanded well pads would result in the initial disturbance of soils and vegetation on up to 22 acres, and the potential for invasive and noxious weed establishment or expansion. Invasive plant species may be introduced as a result of natural dispersal or from various land-disturbing activates on surrounding area. Increases in the numbers or extent of invasive plant species would be restricted by control measures proposed in the interim reclamation plan.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to invasive plant species would be the same as under the Proposed Action.

Protective/Mitigation Measures

Best Management Practices (BMPs) for weed control include an annual monitoring schedule during and after construction and will likely be required by the private landowners. Noxious weed control guidance is also available from the Weld County Public Works Department.

3.3.3 Terrestrial Wildlife

Affected Environment

The shortgrass prairies of eastern Colorado are often used for grazing livestock. In the past they have supported an array of wildlife species including black-tailed prairie dog, American bison, elk, deer, and Pronghorn. Livestock production continues throughout much of the region where nonrenewable resource development and production is occurring. The private lands on which the three wells are proposed are used for livestock grazing and oil and gas development supported by various infrastructure, including roads and well pads. Wildlife in the area is limited to species that have adapted to the increased development activity in the area; these include pronghorn, small mammals, mesocarnivores, raptors, and herpetofauna.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

The Proposed Action would initially result in conversion of approximately 22 acres of shortgrass prairie to well pads and associated infrastructure. The majority of these areas would be reclaimed and revegetated, with less than 5 acres of permanent surface disturbance associated with the three pads and their access roads. There would be a minor direct loss of suitable wildlife habitat in the area. Indirect impacts to wildlife could result from the increase in human activity during the drilling phase, causing an increase in stress to wildlife or limiting movement throughout the Project Area. Decreased human activity during the production phase would reduce these potential indirect impacts to wildlife as well.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to terrestrial wildlife would be the same as under the Proposed Action alternative.

Protective/Mitigation Measures

N/A.

3.3.4 Migratory Birds

The Migratory Bird Treaty Act (MBTA) includes guidance for the protection of native passerines (songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. Within the context of the MBTA, "migratory" birds include non-migratory "resident" species as well as true migrants, essentially encompassing most native bird species. The nesting time period is of special importance as the ability to create a nest, incubate, and rear chicks to fledging is a vulnerable time period for birds, and disturbances to nesting activities can lead to larger consequences for individual birds. In addition, because birds are generally territorial during the nesting season, their ability to access and utilize sufficient food is limited by the quality and availability of the territory occupied. During non-breeding seasons, birds are generally non-territorial and able to feed across a larger area and wider range of habitats.

Affected Environment

The Proposed Action is located in the shortgrass prairie ecosystem in private fields used for livestock grazing. The following species are on the U.S. Fish and Wildlife Service's "Birds of Conservation Concern-2008 List" for BCR-18 (Shortgrass Prairie) and might occur in the project area based on their habitat requirements: ferruginous hawks, prairie falcons, mountain plovers, upland sandpiper, Sprague's pipit, lark buntings, and Cassin's sparrow.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

The Project Area and surrounding area is already disturbed by oil and gas development. Some birds have adapted to and currently use habitat patches within well fields for reproduction and growth. Surface disturbing activities associated with implementation of the Proposed Action would occur during the winter months of December, January, and February, which is outside nesting season for these birds. Noise generated during construction, drilling, and production phases will likely result in a larger impact footprint then the disturbance footprint alone.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to migratory birds would be the same as described for the Proposed Action.

Protective/Mitigation Measures

To be in compliance with the Migratory Bird Treaty Act (MBTA) and the Memorandum of Understanding between the BLM and USFWS required by Executive Order 13186, the BLM must avoid actions, where possible, that result in a "take" of migratory birds. Under the MBTA, "take" means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. All mortality or injury to species protected by the MBTA shall be reported immediately to the BLM project lead and to the USFWS representative.

Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern (BCC), no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 - July 15, during the breeding and brood rearing season for most Colorado migratory birds. An exception to this TL will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate no nesting within 30 meters (100 feet) of the area to be disturbed. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 15 and continue into the 60-day period.

Any secondary containment system will be covered in a manner to prevent access by migratory birds. The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, and in-line units. Any action that may result in a "take" of individual migratory birds or nests that are protected by MBTA will not be allowed.

3.3.5 Threatened, Endangered, and Candidate Species

Affected Environment

The U.S. Fish and Wildlife Service (USFWS) lists threatened, endangered, and candidate species per the Endangered Species Act (ESA). The USFWS periodically posts a list of species having threatened (T), endangered (E), and candidate (C) status and with the potential to occur in the area. The USFWS 2012 list for Weld County includes Mexican spotted owl (T), piping plover (T), least tern (E), black-footed ferret (E), Preble's meadow jumping mouse(T), Ute ladies'-tresses orchid (T), and Colorado butterfly plant (T). There are no candidate species listed for Weld County.

Suitable habitat does not exist for the threatened and endangered species with the potential to occur in the project area. There is no suitable habitat in the project area for Mexican spotted owl, which resides in old growth or mature forests, nor is there any nearby water to support for piping plover or least tern. There is no suitable habitat for Preble's meadow jumping mouse and the two listed plants due to the lack of riparian and wetland communities within the Project Area. The U.S. Fish and Wildlife Service (USFWS), in coordination with the Colorado Division of Wildlife, has block-cleared all black-tailed prairie dog habitat in eastern Colorado, including Weld County. They have determined that these areas no longer contain any wild free-ranging black-footed ferrets (USFWS 2009).

Environmental Effects

Because there is no suitable habitat within the Project Area, there would be no effect to threatened or endangered species are anticipated under the Proposed Action or the No Action alternative.

Protective/Mitigation Measures

N/A.

3.4 Heritage Resources and Human Environment

3.4.1 Cultural Resources

Affected Environment

Both prehistoric and historic sites are present in the vicinity of the three areas of potential effect (APEs) [see Reports CR-RG-13-84 N and CR-RG-13-139 L]; however, a cultural resources inventory was not performed in the proposed Bulleit and Timbro APEs because the private landowners denied access.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Because a cultural resources inventory was conducted in the Ptasnik APE, the BLM determined that no historic properties are present; therefore, construction, operation, and maintenance of the Ptasnik well and associated infrastructure would have no effect on historic properties.

The Bulleit and Timbro APEs are near areas of high site density. Because no field inventory of the APEs was allowed, the BLM was not able to collect any precise data; therefore, the BLM assessed that the

direct and indirect effects on historic properties is likely to be adverse, and the Colorado State Historic Preservation Officer (SHPO) concurred with the BLM's assessment.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to historic properties would likely be the same as described for the Proposed Action. If the undertakings did not occur, there would be no direct or indirect effects on historic properties.

Protective/Mitigation Measures

No protective or mitigation measures are required for the Ptasnik APE. In order to resolve the finding of adverse effect to historic properties in the Bulleit and Timbro APEs, the BLM negotiated a Memorandum of Agreement (MOA) with the SHPO, with the operator as an invited signatory, which was executed on November 4, 2013 (see Appendix B). The MOA stipulates completion of a cultural resources inventory on other BLM-administered lands to substitute for the inventory that was denied in the Bulleit and Timbro APEs. The MOA also stipulates that this resolution does not set a precedent for future undertakings.

3.4.2 Native American Religious Concerns

Affected Environment

Although aboriginal sites are present in Weld County, there are no identified properties of traditional religious and cultural significance in the APEs. The cultural resources inventory of the Ptasnik APE produced no other evidence that suggests the APE holds special significance for Native Americans, nor did the literature reviews conducted for the Bulleit and Timbro APEs.

The BLM conducted a consultation with the following tribes: Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Sioux Tribe, Comanche Tribe of Oklahoma, Crow Creek Sioux, Eastern Shoshone, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, the Ute Tribe, Oglala Sioux Tribe, Pawnee Tribe, Rosebud Sioux Tribe, Southern Ute Tribe, Standing Rock Lakota Tribe, and the Ute Mountain Ute Tribe.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

No properties of traditional religious and cultural significance were identified by the tribes; therefore, no direct or indirect impacts to properties of concern to the tribes are anticipated with implementation of the Proposed Action.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to properties of traditional religious and cultural significance would be the same as described for the Proposed Action. If the undertakings did not occur, there would be no direct or indirect effects on properties of traditional religious and cultural significance.

Protective/Mitigation Measures

N/A.

3.4.3 Paleontological Resources

Affected Environment

The proposed wells are geographically located in a cultivated field overlying part of the geologic feature that is the eastern flank of the Denver Basin. The Basin consists of a large asymmetric syncline of Paleozoic, Mesozoic, and Cenozoic sedimentary rock layers, trending north to south along the east side of the Front Range from about Pueblo north to Wyoming. The basin is deepest near Denver and ascends gradually to its eastern outcrop in central Kansas. The White River Formation underlies the proposed well locations. The White River formation is a Class 5 geologic formation, according to the BLM's Potential Fossil Yield Classification (PFYC) System, which was created to assist in determining proper mitigation approaches for surface disturbing activities (WO IM2008-009). This is a Class 5 formation because it is highly fossiliferous and indicates the highest potential for paleontologic resources. The potential for this proposed project to be sited on or impact a significant fossil locality is high.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Potential impacts to fossil localities would be both direct and indirect. Direct impacts to or destruction of fossils would occur from unmitigated activities conducted on formations with high potential for important scientific fossil resources. Indirect impacts would involve damage or loss of fossil resources due to the unauthorized collection of scientifically important fossils by workers or the public due to increased access to fossil localities in the Project Area. Adverse impacts to important fossil resources would be long-term and significant since fossils removed or destroyed would be lost to science. Adverse significant impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the proposed project would have the beneficial impact that ground disturbance activities might result in the discovery of important fossil resources.

The BLM recommends that a field inventory be performed prior to any surface disturbing activity. Depending on the results of the inventory, monitoring during construction may be recommended. If any significant fossils are found, development of a research design and data recovery may also be recommended before the project proceeds. Any fossils recovered on private land belong to the private landowner; however, the BLM recommends the use of a federally approved repository for storage of any fossils recovered in these efforts.

In many instances where the surface estate is not owned by the federal government, the mineral estate is, and is administered by the BLM. Paleontological resources are considered to be part of the surface estate. If the BLM is going to approve an action involving the mineral estate that may affect the paleontological resources, the action should be conditioned with appropriate paleontological mitigation recommendations to protect the interests of the surface owner. The surface owner may elect to waive these recommendations; such a waiver must be documented in the casefile.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to paleontological resources would be the same as those described for the Proposed Action.

Protective/Mitigation Measures

The proposed construction of the well pads, access to the well pads, and pipelines may penetrate the protective soil layer impacting the bedrock unit below. Because a highly fossiliferous (Class 5) formation is present and susceptible to adverse impacts, mitigation measures are required. The BLM recommends that a field inventory be performed prior to any surface disturbing activity. Depending on the results of the inventory, monitoring during construction may be recommended. If any significant fossils are found, development of a research design and data recovery may also be recommended before the project proceeds. Any fossils recovered on private land belong to the private landowner; however, the BLM recommends the use of a federally approved repository for storage of any fossils recovered in these efforts.

In many instances where the surface estate is not owned by the federal government, the mineral estate is, and is administered by the BLM. Paleontological resources are considered to be part of the surface estate. If the BLM is going to approve an action involving the mineral estate that may affect the paleontological resources, the action should be conditioned with appropriate paleontological mitigation recommendations to protect the interests of the surface owner. The surface owner may elect to waive these recommendations; such a waiver must be documented in the casefile.

3.4.4 Socioeconomic Resources

Affected Environment

The Proposed Action is located entirely within Weld County. Weld County's population was 263,691 in 2012, representing a 45.7% increase from 2000, compared to statewide Colorado population growth of 20.6% during the same period (USCB 2013). Weld County is comprised of a 28.4% Hispanic or Latino population, and an additional 2.1% minority population comprised primarily of Native Americans, African Americans and Asians (USCB 2012).

Weld County's economy is based on agriculture, construction, and natural resource production. Weld County's labor force totaled 2,710,732 people in 2011. Weld County's unemployment rate was 7.6%, which is lower than Colorado's June 2010 unemployment rate of 8.3% (USBLS 2010). Median household income was $57,685 in 2011. Weld County's poverty rate was 12.5% in 2011 (USBLS 2013).

In the past ten years, oil and gas development has increased steadily in Weld County. In 2002, gas production for all of Weld County was 184,047,870 million cubic feet (mcf), with sales of 180,176,671mcf. In 2012, gas production was 270,859,277mcf, with sales of 262,337,093mcf (COGIS 2013).

The federal government makes payments in lieu of taxes (PILT) to County governments to help offset property tax revenue lost on nontaxable federal lands within County boundaries (BLM 2006). The PILT distributions are based on acres for all Federal land management agencies (e.g., approximately 197,320 acres in Weld County). The amount may also be adjusted based on population and as appropriated by Congress. By formula, payments are decreased as other federal funds, such as mineral royalty payments, increase. PILT received by Weld County in the last five years are shown in Table 3-7.

Table 3-7. Federal Payments in Lieu of Taxes to Weld County

Year	PILT Amounts
2013	$341,191
2012	$67,022
2011	$65,048
2010	$65,053
2009	$83,351

Source: USDI NBC, 2013

In addition to PILT payments, the BLM shares revenue generated by commercial activities on public lands with state and county governments (BLM 2006). Federal mineral royalties are collected on oil and gas production from federal mineral leases. Half of the royalty receipts are distributed to Colorado; the $2,292,174 received by Weld County in 2012 was allocated to fund county services, schools, and local communities (DOLA 2012).

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Direct impacts from the Proposed Action would include payments received from the leasing of federal mineral estate and potentially a minor increase in employment. Indirect impacts could include increased employment opportunities in industries related to oil and gas and economic benefit to federal, state, and county governments related to lease payments, royalty payments, severance taxes, and property taxes.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. There would be no direct impacts to socioeconomic resources because there would be no payments received from leasing of federal mineral estate; however, indirect impacts from the exploration and development of private land and private minerals would be the same as under the Proposed Action.

Protective/Mitigation Measures

N/A.

3.4.5 Noise

Affected Environment

Sound levels have been calculated for areas that exhibit typical land uses and population densities. In rural recreational and agricultural lands, ambient sound levels are expected to be approximately 30 to 40 decibels (dBA) (EPA 1974, Harris 1991). These typical noise levels result primarily from equipment operations during ranching and farming activities and vehicular traffic on rural roads. In comparison, the noise level during normal conversation of two people 5 feet apart is approximately 60 dBA.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Primary sources of noise during the drilling/development phase would be equipment (bulldozers, drill rigs, and diesel engines). The movement of heavy vehicles and drilling could result in frequent-to-continuous noise. Noise-producing activities occur near a residential area, noise levels from blasting, drilling, and other activates could exceed Weld County maximum permissible noise levels for non-specified areas are 55 dBA between 7:00 a.m. to 9:00 p.m. and 50 dBA from 9:00 p.m. through 7:00 a.m. The distance from well pad to nearest property lines for Bulleit, Ptasnik, and Timbro are 325, 328, and 280 feet, respectively, although residences are not necessarily located directly on the property lines. Sound decibels reduced over distance and impacts from noise to surrounding residents would be minimal.

No Action Alternative (Direct and Indirect Impacts

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to noise would be the same as those described for the Proposed Action.

Protective/Mitigation Measures

Mitigation would not be required. Provisions of the Weld County Noise Ordinances do not apply to any noise produced in the course of normal mining operations or oil and gas exploration and production (Sec. 14-9-60/L).

3.4.6 Wastes, Hazardous or Solid

Affected Environment

The BLM assumes that conditions associated with the proposed project site, both surface and subsurface, are currently clean and that there is no known contamination. A determination will be made by the operator prior to initiating the project, if there is evidence that demonstrates otherwise (such as solid or hazardous wastes have been previously used, stored, or disposed of at the project site).

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Contamination of soil or groundwater could occur as a result from an accidental spill or release of hazardous materials during construction and production phases. Spills or releases could result in contamination to soil and/or groundwater and exposure of maintenance workers and the public to hazardous materials. Runoff of contaminants into surface water could impact surface water quality. All hazardous substances brought to and stored on location will have a Material Safety Data Sheet (MSDS) and will be properly handled so as to not cause harm to the environment of people. MSDS will be kept on location until the hazardous material is properly disposed of in accordance with federal law. All undesirable events (fires, accidents, blowouts, spills, discharges) will be reported to the Royal Gorge Field Office.

Possible contaminant sources associated with the drilling operations are:

- Storage, use and transfer of petroleum, oil and lubricants

- Produced fluids
- General hazardous substances, chemicals and/or wastes
- Concrete washout water
- Drilling water, mud and cuttings

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts from hazardous or solid wastes would be the same as those described for the Proposed Action.

Protective/Mitigation Measures

Impacts from hazardous or solid wastes would be avoided or reduced by the implementation of the mitigation measures outlined in Noble's 10-Point Drilling Program, which is included with the APD packages. Federal and state operating and reporting requirements include provisions to clean up and mitigate spills or releases of chemicals, products, or wastes. The BLM requires identification of the chemicals that would be used, stored, and produced during construction and operations. The Hazardous Substances Management Plan has been developed to prevent spills and illegal dumping of hazardous substances, and wastes. Storage, use, and transport of these materials and the disposal of generated wastes would comply with all pertinent federal regulations.

3.5 Cumulative Impacts

Cumulative impacts are those impacts that result from the incremental impact of a proposed project when added to other past, present, and reasonably foreseeable actions, regardless of which agency or person undertakes such actions. Past, present, and reasonably foreseeable future development in the project area primarily includes oil and gas development and livestock grazing, but it also includes oil shale, gilsonite, tar sands, sand and gravel, and other projects.

The proposed project will incrementally add approximately 22 acres of initial surface disturbance, which would be reclaimed to less than 5 acres total of permanent surface disturbance, to the current disturbance. Past, present, and reasonably foreseeable future oil and gas development in the project area has resulted and will continue. Approximately 13,041 (12,355 conventional and 686 coalbed natural gas wells) exploratory and development wells are projected to be drilled in the RGPA for the next twenty years (through 2030) resulting in approximately 44,440 acres of new short-term surface disturbance (BLM, 2012b).

3.5.1 Air Quality and Greenhouse Gases

The project region currently contains various emission sources including agricultural fields, roads, houses, and oil and gas production. The addition of the infrastructure needed to construct and drill the additional pads and wells associated with the Proposed Action would have a cumulative impact to the area's air quality; however, given the project's relatively low emissions levels, the proposed wells' impact would be minor. In the long term, if economical quantities of oil and gas are found, additional wells can be expected to be drilled in the region. This could result in a larger cumulative impact to air quality in the future. Any development that would occur within the ozone nonattainment area must comply with the additional emission control measures required by CDPHE for oil and gas activities in nonattainment areas.

Due to the spatial extent of oil and gas development, a regional-scale modeling analysis usually is warranted to determine the impacts associated with expansive cumulative increases in oil and gas development and operations. The BLM Colorado State Office is currently conducting a Colorado-wide cumulative oil and gas modeling study (the Colorado Air Resources Management Modeling Study or CARMMS) that will include analyses for each BLM Field Office, including the RGFO. For this study, oil and gas emissions increases projected out 10 years from year 2011 according to projected reasonably foreseeable development in the region as well as recent oil and gas development data will be modeled and impacts will be determined for each Field Office. Regional ozone and other pollutants and air quality related values (AQRVs) including visibility impacts will be evaluated in CARMMS. The study should be completed in spring 2014. As future oil and gas development occurs in the RGFO region, the BLM Colorado State Office plans to compare project-specific permitted levels of emissions to the RGFO oil and gas emissions rates modeled in CARMMS along with the corresponding modeling results to ensure that activities for which the BLM Colorado State Office grants permits cumulatively will stay within the acceptable emissions levels analyzed in CARMMS.

With respect to GHG emissions, the EPA identified a number of climate change predictions for the Mountain West and Great Plains region including but not limited to warmer temperatures, less snowfall, earlier snowmelt, and more frequent droughts (based on BLM 2012). If these predictions are realized, as mounting evidence suggests is already occurring, there could be impacts to natural resources within the region. The construction, operation, and maintenance of the three proposed wells would have a cumulative impact to GHG emissions; however, the proposed wells' impact would be minor.

3.5.2 Geologic and Mineral Resources

Drilling the three proposed wells would cumulatively and incrementally affect the area's geologic and mineral resources. The Proposed Action would drill through the Laramie-Fox Hills aquifer to produce hydrocarbons from underlying formations and would cumulatively contribute to the eventual depletion of such hydrocarbons. During drilling operations on parcels, loss of circulation or problems cementing the surface casing could cumulatively affect freshwater aquifer and mineral zones encountered. These impacts are avoided by following proper cementing and casing.

3.5.3 Soils

Drilling the three proposed wells would cumulatively and incrementally affect erosion and sedimentation rates in this area, land uses, vegetation, and reclamation success, soil productivity, and the potential introduction and/or spread of noxious weeds and invasive species. Surface disturbing activities that compact soil, increase soil erosion and sediment yield, and increase fugitive dust may also cumulatively and incrementally affect general vegetation, as such changes to the landscape may decrease plant productivity and composition in the project area. However, given the project's relatively small footprint, the proposed wells' impact would be minor.

3.5.4 Vegetation

Construction of the three well pads and associated infrastructure would result in initial surface disturbance of 22 acres, removing all vegetation present. The successful reclamation of wells would result in less than 5 acres of permanent surface disturbance for the entire project. Although this project would cumulatively reduce vegetation in the project area, the impact would be minor with respect to

the past, present, and reasonably foreseeable future total area of disturbance due to oil and gas activity in the RGPA of approximately 44,440 acres (BLM, 2012b).

3.5.5 Invasive Plants

Construction of the three well pads and associated infrastructure would result in initial surface disturbance of 22 acres, removing all vegetation present and potentially facilitating the spread of invasive plants. The successful reclamation of wells would result in less than 5 acres of permanent surface disturbance for the entire project. Although this project would cumulatively reduce vegetation in the project area and increase the potential for invasive plants to spread, the impact would be minor with respect to the past, present, and reasonably foreseeable future total area of disturbance due to oil and gas activity in the RGPA of approximately 44,440 acres (BLM, 2012b).

3.5.6 Water (Surface and Groundwater, Floodplains)

Construction of the three well pads and associated infrastructure would result in initial surface disturbance of 22 acres and could cumulatively and incrementally affect groundwater resources in the RGPA; however, adherence to practices detailed in Noble's 10-Point Drilling Plans (submitted with the APD packages) and any additional conditions of approval required by the BLM for individual wells, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and using proper cementing procedures should protect fresh water aquifers above the drilling target zone, including the Laramie Fox-Hills aquifer system, which serves as the primary fresh water resource underlying the Project Area.

3.5.7 Terrestrial Wildlife

Construction of the three well pads and associated infrastructure would initially result in the direct loss of 22 acres of wildlife habitat in the area. Over the long term, the permanent surface disturbance would be less than 5 acres. Although this project would cumulatively reduce wildlife habitat in the project area, the impact would be very minor with respect to the past, present, and reasonably foreseeable future total area of disturbance due to oil and gas activity in the RGPA of approximately 44,440 acres (BLM, 2012a). Cumulatively, indirect impacts to wildlife could result from the increase in human activity could limit wildlife movement throughout the Project Area.

3.5.8 Migratory Birds

Construction of the three well pads and associated infrastructure would initially result in the direct loss of 22 acres of available cover, habitat, breeding and nesting areas, and foraging opportunities for migratory birds until successful final reclamation. Although this project would cumulatively reduce migratory bird habitat in the project area, the impact would be very minor with respect to the past, present, and reasonably foreseeable future total area of disturbance due to oil and gas activity in the RGPA of approximately 44,440 acres (BLM, 2012b). Cumulatively, human activities would also likely result in short-term or long-term site avoidance, or would preclude migratory birds from using areas of more intensive human activity.

3.5.9 Socioeconomic Resources

Past, present, and reasonably foreseeable future actions from oil and gas exploration and production would result in increased payments received from the leasing of federal mineral estate. Indirect impacts associated with larger present and future development could include increased employment opportunities in industries related to oil and gas and economic benefit to federal, state, and county governments related to lease payments, royalty payments, severance taxes, and property taxes.

3.5.10 Noise

Past, present, and reasonably foreseeable future actions from oil and gas exploration and production would result in an increase in noise, but given the project's small footprint and adherence to noise ordinances should result in no significant noise increases within the RGPA.

3.5.11 Cultural Resources

Because no historic properties were found in the Ptasnik APE, there would be no cumulative impact to historic properties from this undertaking. Because the private landowner denied access to the Bulleit and Timbro APEs, the effect of past, present, and reasonably foreseeable future actions from oil and gas exploration and production on historic properties could not be definitively determined. As a result, the BLM assessed that the direct and indirect effects on historic properties are likely to be adverse, and the same assessment would necessarily apply to any potential cumulative effects.

3.5.12 Paleontological

Past, present, and reasonably foreseeable future actions associated with surface disturbing activities from oil and gas exploration and production and other land uses in conjunction with the Proposed Action could cumulatively impact common fossils, but they are unlikely to result in significant effects to surficial and subsurface paleontological resources.

3.5.13 Wastes, Hazardous or Solid

Past, present, and reasonably foreseeable future actions from oil and gas exploration and production and other land uses would result in an increase in wastes, but adherence to regulatory guidance and best management practices should result in no significant effects within the RGPA. Impacts from hazardous or solid wastes would be avoided or reduced by the implementation of the mitigation measures outlined in Noble's 10-Point Drilling Program, which is included with the APD packages. Federal and state operating and reporting requirements include provisions to clean up and mitigate spills or releases of chemicals, products, or wastes. The BLM requires identification of the chemicals that would be used, stored, and produced during construction and operations. The Hazardous Substances Management Plan has been developed to prevent spills and illegal dumping of hazardous substances, and wastes. Storage, use, and transport of these materials and the disposal of generated wastes would comply with all pertinent federal regulations.

This page intentionally left blank.

CHAPTER 4 - CONSULTATION AND COORDINATION

4.1 Interdisciplinary Team Reviewers and List of Preparers

The following list of ID Team members participated in the project kickoff meeting; only those with resources analyzed in the EA participated in the review and completion of the document.

BLM ID Team Reviewers

ID Team Member	Resource Reviewed/Position
Jay Raiford	Assistant Field Manager, Nonrenewable Resources
Martin Weimer	District NEPA Coordinator
Aaron Richter	Acting NRS, BLM Project Manager
Matt Rustand	Wildlife
John Lamman	Range and Invasive Plants
Dave Gilbert	Riparian/Wetlands and Aquatic Wildlife
Jeff Covington	Cadastral Survey
Marvin Hendricks	Fluid Minerals
Monica Weimer	Cultural and Native American Resources
Melissa Smeins	Geology, Minerals, Paleontology
Melissa Garcia	Assistant Field Manager, Renewable Resources
Kalem Leonard	Recreation

List of Preparers

Name	Company	Area(s) of Participation
Lisa Sakata	ICF International	Project Manager, EA preparation, NEPA review Wildlife, Vegetation, Invasive Species, T&E Species, and Migratory Birds
David Ernst	ICF International	Air quality
Merin Swenson	ICF International	Geology, Soils, Water, Paleontology, Wastes, Range, and Noise
Nate Wagoner	ICF International	QA/QC
Karen DiPietro	ICF International	Document preparation
Danielle and Phil Hoefer	Cultural Resource Analysts, Inc.	Cultural resources

4.2 Tribes, Individuals, Organizations, and Agencies Consulted

- Apache Tribe of Oklahoma
- Cheyenne and Arapaho Tribes of Oklahoma
- Cheyenne River Sioux Tribe
- Comanche Tribe of Oklahoma
- Crow Creek Sioux
- Eastern Shoshone
- Jicarilla Apache Nation
- Kiowa Tribe of Oklahoma
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- The Ute Tribe
- Oglala Sioux Tribe
- Pawnee Tribe
- Rosebud Sioux Tribe
- Southern Ute Tribe
- Standing Rock Lakota Tribe
- Ute Mountain Ute Tribe

- State Historic Preservation Office, Colorado
- Advisory Council on Historic Preservation

CHAPTER 5 - REFERENCES

Bureau of Land Management (BLM). 1986. Northeast Resource Area Management Plan and Record of Decision. Lakewood, Colorado.

BLM. 1991. Colorado Oil and Gas Leasing Environmental Impact Statement. Lakewood, Colorado.

BLM. 2006. Final Roan Plateau Resource Management Plan Amendment and Environmental Impact Statement, Volume III, Appendix C. Glenwood Springs Field Office, Colorado.

BLM. 2008. H-1790-1 National Environmental Policy Handbook. Washington, D.C.

BLM. 2012a. Environmental Assessment, USA Federal APDs. DOI-BLM-CO-200-2012-0087 EA. September. Available online: http://www.blm.gov/co/st/en/BLM_Information/nepa/rgfo.html.

BLM. 2012b. Reasonable Foreseeable Development Scenario for Oil and Gas, Royal Gorge Field Office, Colorado. Final. Prepared by: Wyoming State Office Reservoir Management Group.

BLM. 2013. Personal communication. Forrest Cook (BLM) e-mail to David Ernst (ICF). October 28.

Colorado Department of Local Affairs (DOLA). 2001. Payments Accessed July 12, 2013. Available online: http://www.colorado.gov.cs/Satellite/DOLA-Main/CBON/1251593265220.

Colorado Department of Public Health and Environment (CDPHE). 2007. Final Colorado Greenhouse Gas Inventory and Reference Case Projections 1990-2020. Prepared by Center for Climate Strategies. October. Available online: http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline;+filename%3D%22Colorado+Greenhouse+Gas+Inventory+and+Reference+Case+Projections:+1990-2020.pdf%22&blobheadervalue2=application/pdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251808871667&ssbinary=true.

CDPHE. 2013. 2010 Air Pollutant Emissions Inventory. Available online: http://www.colorado.gov/airquality/inv_maps_2010.aspx.

CDPHE. 2011. Colorado Modeling Guideline for Air Quality Permits. Updated Tables to Address $PM_{2.5}$ PSD Program Implementation. Available at: http://www.colorado.gov/airquality/permits/guide.pdf. Accessed: July 3, 2013.

COGIS. 2013. Available online: http://cogcc.state.co.us/cogis/ProductionSearch.asp. Accessed August 1, 2013.

Cultural Resource Analysts. 2012a. Class III Cultural Resource Survey of the Ptasnik Federal L 21-76HN Well Pad, Weld County, Colorado.

Cultural Resource Analysts. 2012b. Summary of Records Reviews for the Bulleit, Pierson, Pronghorn, and Timbro Well Pads, Weld County, Colorado.

Department of Natural Resources Colorado Division of Reclamation, Mining, and Safety (CDRMS). 2013. Available online: http://mining.state.co.us/Reports/MiningData/Pages/SearchbyCounty.aspx.

Department of Natural Resources Colorado Division of Water Resources (CDWR). 2013. Aquamap. Available online: http://water.state.co.us/DataMaps/GISandMaps/AquaMap/Pages/default.aspx. Accessed August 1, 2013.

Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz and R. Van Dorland. 2007. Changes in Atmospheric Constituents and in Radiative Forcing. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Available online: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf.

National Cooperative Soil Survey. Accessed on July 12, 2013. Available online: https://soilseries.sc.egov.usda.gov/OSD_Docs/P/PEETZ.html.

Noble Energy, Inc. 2013. Air emissions inventory spreadsheets.

Tweto, Ogden. 1979. Geologic map of Colorado. U.S. Geological Survey.

U.S. Census Bureau. 2012. Accessed on July 12, 2013. Available online: http://quickfacts.census.gov/qfd/states/08/08123lk.html.

U.S. Department of Interior. 2013. Fiscal Year 2013 Payments In Lieu of Taxes, National Summary.

U.S. Environmental Protection Agency (EPA). 1974. EPA Noise Levels Document. Washington, DC.

U.S. Environmental Protection Agency (EPA). 2013a. AirData. Monitor Values Report. Available online: http://www.epa.gov/airdata/ad_rep_mon.html.

U.S. Environmental Protection Agency (EPA). 2013b. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011. EPA 430-R-13-001. April. Available online: http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf.

U.S. Fish and Wildlife Service. 2009. Colorado Statewide Block Clearance Map. Available online: http://www.fws.gov/mountain-prairie/species/mammals/blackfootedferret/BlockClearanceMap2009SeptemberColoradoState.pdf. Accessed: August 1, 2013.

U.S. Global Change Research Program. 2009. Global Climate Change Impacts in the United States. Available online: http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

DOI-BLM-CO-200-2013-0082 EA

Based on review of the EA and the supporting documents, I have determined that the project is not a major federal action and will not have a significant effect on the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects from any alternative assessed or evaluated meet the definition of significance in context or intensity, as defined by 43 CFR 1508.27, therefore, an environmental impact statement is not required. This finding is based on the context and intensity of the project as described below:

RATIONALE:

Context: The BLM has received three (3) Application Permits to Drill (APDs), proposing the construction of three well pads, associated access roads, connecting pipelines, and the drilling of three horizontal oil wells on private surface estates/over private mineral estates, in order to develop private and federal minerals (fee/fee/fed) in the central part of Weld County approximately 20 miles from the town of Keota, Colorado. The federal mineral estate is leased and subject to oil and gas development.

The general area description would be defined as rural rangeland located in the northeastern plains of Colorado, used primarily for livestock production and oil and gas development. There are a few county roads in the project area. Access is limited to private or petroleum field roads over private surface. The roadways vary in development but most are dirt/primitive roads.

Extensive oil and gas development has occurred in the area, mostly on private mineral and surface estate.

Intensity: I have considered the potential intensity/severity of the impacts anticipated from the proposed Bulleit Federal PC LG04-62HN, Ptasnik Federal PC LC21-76HN, and Timbro Federal PC LC24-72HN APDs. The project decision relative to each of the ten areas suggested for consideration by the CEQ is documented below:

1. **Impacts that may be beneficial and adverse:**

   There would be minor impacts to air quality from the proposed wells. Most of this would occur during the construction and drilling phases. Potential impacts might occur to ground water; however such impacts should not occur if strict drilling requirements are followed. Other minor impacts might occur to wildlife and migratory birds but would be mitigated through the use of timing stipulations. Minor impacts to soils and vegetation would be addressed with production and post-production mitigation. Positive impacts include benefits in royalties and revenue generated to the federal government from productive wells. Other indirect effects could include economic benefits to state and county governments related to royalty payments and severance taxes. Other beneficial impacts from the action would be the potential for productive wells being created that would add, albeit in a small way, to national energy independence.

2. **Public health and safety:**

   The Proposed Action will have a temporary, localized negative impact to air quality during the construction phase. Surface disturbance, utilization of the access road, and construction activities such as drilling, hydraulic fracturing, well completion, and equipment installation all will impact air quality through the generation of dust related to earthmoving, travel, transport,

and general construction. This phase will also produce short-term emissions of criteria pollutants, hazardous air pollutants (HAPs), and greenhouse gases (GHGs) from vehicle and construction equipment exhaust. The primary GHGs are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Once construction is complete the daily activities at the site will be reduced to operational and maintenance checks which may be as frequent as daily visits. Emissions will result from vehicle exhaust from the maintenance and process technician visits, as well as oil and produced water collection or load out trips. The pads can be expected to produce fugitive emissions of well gas and liquid flashing gases, which contain a mixture of methane, volatile organic compounds (VOCs), HAPs, and inert or non-regulated gases. Fugitive emissions are emissions that are not associated with a stack, exhaust vent, or other defined point. Fugitive emissions may result from pressure relief valves and working and breathing losses from any tanks located at the sites, as well as any flanges, seals, valves, or other infrastructure connections used at the sites. Liquid product load-out operations will also generate fugitive emissions of VOCs. In addition, to protect freshwater aquifers casing and cementing would be extended beyond fresh-water zones to insure that drilling fluids remain within the well bore.

3. **Unique characteristics of the geographic area:**

   The EA evaluated the area of the proposed action and determined that no unique geographic characteristics were present. These areas include wild and scenic rivers, prime or unique farmlands, Areas of Critical Environmental Concern, designated wilderness areas, Wilderness Study Areas, and Lands with Wilderness Characteristics.

4. **Degree to which effects are likely to be highly controversial:**

   The potential for controversy associated with the effects of the proposed action is low. The action is proposed on private surface over private minerals, with penetration into federal minerals. There is no disagreement or controversy among ID team members or reviewers over the nature of the effects on the relevant resources.

5. **Degree to which effects are highly uncertain or involve unique or unknown risks:**

   The drilling of oil and gas wells has occurred in the area over the past century; although the potential risks involved can be controversial, they are neither unique nor unknown. Numerous other well locations have been successfully drilled in this area of Weld County.

6. **Consideration of whether the action may establish a precedent for future actions with significant impacts:**

   The proposed APDs will be limited to standard construction procedures associated with pad/road construction and drilling in Weld County and have occurred historically on split and private mineral estate. There are no aspects of the current proposal that are precedent setting.

7. **Consideration of whether the action is related to other actions with cumulatively significant impacts:**

   The action is a continuation of oil and gas activities that have historically occurred in the area. Continued oil and gas activity in the area will have minor but additive impacts to air and the production greenhouse gas emissions. The project area has been subject to historic drilling activity and will continue to experience gradual depletion of the recoverable oil and gas products as anticipated in the RFD (BLM, 2012b). Although past cattle grazing had contributed

to cumulative impacts, there have been no other recent activities besides oil and gas that has contributed to cumulative impacts.

8. **Scientific, cultural or historical resources, including those listed in or eligible for listing in the National Register of Historic Places:**

   Construction and operation of the Ptasnik well and associated infrastructure will have no effect on historic properties; however, the Bulleit and Timbro APEs are near areas of high site density. Because no field inventory of the APEs was allowed, the BLM assessed that the direct and indirect effects on historic properties is likely to be adverse, and the Colorado State Historic Preservation Officer (SHPO) concurred with the BLM's assessment. In order to resolve the finding of adverse effect to historic properties in the Bulleit and Timbro APEs, the BLM negotiated a Memorandum of Agreement (MOA) with the SHPO, along with the operator as an invited signatory. The MOA stipulates completion of cultural resources inventory on other BLM-administered lands to substitute for the inventory that was denied in the Bulleit and Timbro APEs. The MOA also stipulates that this resolution does not set a precedent for future undertakings.

9. **Threatened and endangered species and their critical habitat:**

   No threatened, endangered, or candidate species or their habitats are located within the action area.

10. **Any effects that threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment:**

    The proposed action conforms with the provisions of NEPA (U.S.C. 4321-4346) and FLPMA (43 U.S.C. 1701 et seq.) and is compliant with the Clean Water Act and The Clean Air Act, the National Historic Preservation Act, Migratory Bird Treaty Act (MBTA) and the Endangered Species Act.

BLM PROJECT LEAD:	/s/ Aaron Richter
NAME OF PREPARER:	Lisa Sakata – ICF International
SUPERVISORY REVIEW:	/s/ Jay Raiford
SIGNATURE OF ENVIRONMENTAL COORDINATOR:	/s/ Martin Weimer
	Martin Weimer
DATE:	11/22/13
SIGNATURE OF AUTHORIZED OFFICIAL:	/s/ Keith E. Berger
	Keith E. Berger, Field Manager
DATE SIGNED:	11/25/13

United States Department of the Interior
Bureau of Land Management
Royal Gorge Field Office

DECISION RECORD

DOI-BLM-CO-200-2013-0082-EA

DECISION:

It is my decision to authorize the proposed action as described in the attached EA. The proposed action is to construction three well pads, associated access roads, connecting pipelines, and the drilling of three horizontal oil wells on private surface estates/over private mineral estates, in order to develop private and federal minerals (fee/fee/fed). Access to the proposed Bulleit Federal PC LG04-62HN, Ptasnik Federal PC LC21-76HN, and Timbro Federal PC LC24-72HN projects would primarily be gained by traveling on existing state, county and petroleum field roads.

The proposed project is located in Northwest Weld County approximately 20 miles from the town of Keota, Colorado. The federal mineral estate within the project boundary is leased and subject to oil and gas development.

The proposed action was analyzed in the Environmental Assessment (EA) DOI-BLM-CO-200-2013-082 and a Finding of No Significant Impact was reached; an EIS will not be prepared.

RATIONALE:

This APD will develop oil and gas resources on Federal minerals Leases COC65489, 75063, and 70902 consistent with existing Federal lease rights provided for in the Mineral Leasing Act of 1920, as amended. Extensive oil and gas development has occurred throughout the project area, mostly on private mineral estate.

The project area currently has a high degree of alteration in the form of agricultural fields, roads, houses, and oil and gas production. The addition of the infrastructure needed to construct and drill the three proposed wells would have mostly temporary and overall minor impacts on resources present in the project area.

MITIGATION MEASURES/MONITORING:

Air Quality: Noble will comply with Colorado Oil and Gas Commission (COGCC) Rule 805 which requires control of VOC emissions, odors, and fugitive dust. Noble will use industry best practices, including watering, graveling, and reseeding to reduce fugitive dust emissions from vehicular traffic and disturbed surfaces. Interim reclamation and existing agricultural practices will be implemented in order to stabilize the site and prevent fugitive dust from being generated. In addition the following BLM requirements will apply:

- Process equipment will be permitted by CDPHE in accordance with applicable requirements and required emissions standards to limit the facility's potential to emit and provide appropriate operating, monitoring, and recordkeeping requirements.
- VOC emissions from storage tanks will be controlled using control technology that will reduce VOC emissions by at least 95 percent relative to uncontrolled conditions.
- The operator will control fugitive emissions of particulate matter (dust) during construction and production, using procedures and control technology that will reduce dust emissions by at least 50 percent relative to uncontrolled conditions.
- All pump engines will be required to meet EPA Non-Road Tier II emissions standards.
- All drill rig engines will be required to meet EPA Non-Road Tier II emissions standards.
- The operator will perform 'Green Completions' for all wells, as required by COGCC Rule 805.b(3).

Geology and Mineral Resources: If the proposed project plans to utilize federal minerals in the construction of roads, pad building or for any other construction needs, then compliance with 43 CFR 3600 is required. The project proponent will need to submit an application for a mineral materials disposal with the BLM, prior to any disturbance being initiated. Federal mineral materials regulations also apply to split estate (i.e., a private surface landowner could not dispose of federal mineral materials for this project, surface or subsurface, without prior authorization from the BLM).

BLM Onshore Order #2 (OO#2) requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. A review at the APD stage includes a geologic evaluation of the potential subsurface formations that will be penetrated by the wellbore, followed by an engineering analysis of the drilling program to ensure the well construction design is adequate to protect the surface and subsurface environment, including the potential risks identified by the geologist, and all known or anticipated zones with potential risks.

Geologic and engineering reviews have been done to ensure that cementing and casing programs are adequate to protect all downhole resources. Known water bearing zones in the APD area are protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely. Casing along with cement would be extended beyond fresh-water zones to insure that drilling fluids remain within the well bore.

Migratory Birds: To be in compliance with the Migratory Bird Treaty Act (MBTA) and the Memorandum of Understanding between the BLM and USFWS required by Executive Order 13186, the BLM must avoid actions, where possible, that result in a "take" of migratory birds. Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern (BCC), no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 - July 15, during the breeding and brood rearing season for most Colorado migratory birds. An exception to this timing limitation will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate no nesting within 30 meters (100 feet) of the area to be

disturbed. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 15 and continue into the 60-day period.

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, and in-line units. Any action that may result in a "take" of individual migratory birds or nests that are protected by MBTA will not be allowed.

Paleontological Resources: The BLM recommends that a field inventory be performed prior to any surface disturbing activity. Depending on the results of the inventory, monitoring during construction may be recommended. If any significant fossils are found, development of a research design and data recovery may also be recommended before the project proceeds.

In many instances where the surface estate is not owned by the federal government, the mineral estate is, and is administered by the BLM. Paleontological resources are considered to be part of the surface estate. If the BLM is going to approve an action involving the mineral estate that may affect the paleontological resources, the action should be conditioned with appropriate paleontological mitigation recommendations to protect the interests of the surface owner. The surface owner may elect to waive these recommendations; such a waiver must be documented in the casefile.

Cultural Resources: In order to resolve the finding of adverse effect to historic properties in the Bulleit and Timbro APEs, the BLM negotiated a Memorandum of Agreement (MOA) with the SHPO, along with the operator as an invited signatory. The MOA stipulates completion of cultural resources inventory on other BLM-administered lands to substitute for the inventory that was denied in the Bulleit and Timbro APEs. The MOA also stipulates that this resolution does not set a precedent for future undertakings. The MOA is included as Appendix B to the EA.

Wastes, Hazardous or Solid: Impacts from hazardous or solid wastes would be avoided or reduced by the implementation of the mitigation measures outlined in Noble's 10-Point Drilling Program, which is included with the APD packages.

PROTEST/APPEALS:

This decision shall take effect immediately upon the date it is signed by the Authorized Officer, and shall remain in effect while any appeal is pending unless the Interior Board of Land Appeals issues a stay (43 CFR 2801.10(b)). Any appeal of this decision must follow the procedures set forth in 43 CFR Part 4. Within 30 days of the decision, a notice of appeal must be filed in the office of the Authorized Officer at the Royal Gorge Field Office, 3028 E. Main, Cañon City, Colorado, 81212. If a statement of reasons for the appeal is not included with the notice, it must be filed with the Interior Board of Land Appeals, Office of Hearings and Appeals, U.S. Department of the Interior, 801 North Quincy St., Suite 300, Arlington, VA 22203 within 30 days after the notice of appeal is filed with the Authorized Officer.

SIGNATURE OF AUTHORIZED OFFICIAL: /s/ Keith E. Berger

Keith E. Berger, Field Manager

DATE SIGNED: 11/25/13

APPENDIX A. AIR QUALITY

This appendix provides the air pollutant emission inventory prepared by Noble Energy, Inc. to support the EA for the proposed Bulleit, Ptasnik, and Timbro wells and associated infrastructure. Emissions of the following pollutants were inventoried: CO, NOx (including NO_2), $PM_{2.5}$, PM_{10}, SO_2, and VOC. For combustion sources, greenhouse gas emissions were calculated for CO_2, CH_4, and N_2O. Development of the lease could lead to surface disturbance from the construction of well pads, access roads, pipelines, and power lines, as well as associated air pollutant emissions from windblown dust and equipment and vehicle exhaust. The analysis includes construction emissions (well pad and access road construction), drilling emissions, completion emissions, and production emissions (vehicle traffic and on-site equipment). It was assumed that each well pad would contain a single well. The emission inventory was developed using reasonable but conservative scenarios developed by Noble for each activity. Production emissions were calculated based on full production activity. This appendix presents the inventory in the following sections: project (3 wells) summary, per-well summary, construction, drilling and drill rig moving, completion, and production. Relevant assumptions are provided in each section.

NOBLE ENERGY -- ENVIRONMENTAL ASSESSMENT FOR BULLEIT, PTASNIK, & TIMBRO WELLS -- AIR QUALITY ANALYSIS

Overall Inputs

Description	Prop. Action
Total no. of wells	3
Production years	20

Note: emissions unit is US short ton (2,000 lb) unless metric tons (tonnes) are specified.

Emissions Summary for Proposed Action (3 wells)

	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	CO_2	CH_4	N_2O	CO_2e	
One-Time Emissions (tons)										tons	tonnes
Construction	1.085	0.302	0.105	1.53	0.239	0.1181	158.39	0.0017	0.0022	159.1	144.3
Rig Move & Drilling	4.767	4.972	0.576	0.68	0.053	0.0014	2,611	0.0092	0.0095	2,613.6	2,371.0
Completion	0.365	0.726	0.254	0.40	0.040	0.0002	381	0.0041	0.0007	381.4	346.0
Total One-Time Emissions	6.217	6.000	0.935	2.60	0.333	0.1197	3,150	0.0150	0.0124	3,154.1	2,861.3
Annual Emissions (tons/year)											
Production	55.862	112.275	79.957	5.32	0.532	0.0029	58,944	1.2793	0.1117	59,004.5	53,527.7
Total One-Time GHG Emissions plus 1 year production (tons)							62,094	1.2943	0.1242	62,158.6	56,389.0
Total One-Time GHG Emissions plus Life-of-Well (20 years) GHG Emissions (tons)							1,182,037	25.6012	2.2469	1,183,244	1,073,415
Global Warming Potentials for CO2e calculation							1	21	298		

Emissions Summary for Proposed Action - Conformity Evaluation: Bulleitt Well Only

	NO_X	VOC
One-Time Emissions (tons)		
Construction	0.362	0.035
Rig Move & Drilling	1.589	0.192
Completion	0.122	0.085
Total One-Time Emissions	2.072	0.312
Annual Emissions (tons/year)		
Production	18.488	10.440
Worst-Case Year: Total One-Time Emissions plus 1 Year of Production Emissions (tons)	20.561	10.751
General Conformity threshold (tons/year)	100	100

Excludes CDPHE-permitted emissions*

* Production: CDPHE-permitted emissions only	0.132	16.213

Source for analysis: Noble Energy Inc. File <Noble EA air quality appendix 08-06-13 - emission calculations 11-06-13.xlsx>

NOBLE ENERGY -- ENVIRONMENTAL ASSESSMENT FOR BULLEIT, PTASNIK, & TIMBRO WELLS -- AIR QUALITY ANALYSIS

Type	Generic 1-Well Pad
Location	Bulleit/Ptasnik/Timbro well sites
County	Weld County, CO

Site Information

Number of wells on pad	1
Type of Well	Horizontal
Days drilling per well (days)	10
New well pad disturbed area (acres)	8
Length of new road (feet)	5,280
Road width (ft)	25
Total acres disturbed	11.0
Type of Drill Rig	Diesel
Estimated Condensate (bbl/yr)	200,000
Condensate VOC (#/bbl)	3.00
Estimated Water (bbl/yr)	50,000
Water VOC (#/bbl)	0.001

Includes low flash condensate storage and truck loading controls

Emissions Summary (1 Pad)

	tons/year						GHG Estimates (tons/yr)		
	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	CO_2	CH_4	N_2O
Construction	0.3617	0.1006	0.0349	0.5086	0.0797	0.0394	52.80	0.0006	0.0007
Rig Move & Drilling	1.5889	1.6575	0.1919	0.2258	0.0178	0.0005	870	0.0031	0.0032
Completion	0.1218	0.2420	0.0847	0.1336	0.0134	0.0001	127	0.0014	0.0002
Production	18.6207	37.4250	26.6524	1.7718	0.1772	0.0010	19,648	0.4264	0.0372
Total	**20.6932**	**39.4250**	**26.9639**	**2.6397**	**0.2880**	**0.0409**	**20,698**	**0.4314**	**0.0414**
						CO2e (mtpy)	20,698	9.06	12.33
						Total CO2e (mtpy)			20,720

Note: mtpy = metric tons per year

GHG Calculation Method (BLM 2011)	co2 = 525 x co			
	ch4 = 0.016 x voc	20,698	9.06	12.33
	n2o = 0.002 x nox			

Project CO_2e Comparison to States and U.S.

	10^6 metric tons/yr	(tpy)	(mtpy)	Project CO_2e (10^6 mtpy)		Project % of Inventory	
				1 Well	3 Wells	1 Well	3 Wells
Colorado (DPHE 2007)	129	20,720	18,796	0.0188	0.0564	0.0146	0.0437
Utah	80					0.0235	0.0705
Wyoming	90					0.0209	0.0627
US EPA (2013)	6,702					0.0003	0.0008
US fossil fuel combustion	5,573					0.0003	0.0010

References

U.S. Environmental Protection Agency (EPA). 2013b. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011. EPA 430-R-13-001. April. http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf

Colorado Department of Public Health and Environment (CDPHE). 2007. Final Colorado Greenhouse Gas Inventory and Reference Case Projections 1990-2020. Prepared by Center for Climate Strategies. October. http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline;+filename%3D%22Colorado+Greenhouse+Gas+Inventory+and+Reference+Case+Projections:+1990-2020.pdf%22&blobheadervalue2=application/pdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251808871667&ssbinary=true

Bureau of Land Management (BLM) 2011. Environmental Assessment, J&L Farms Federal 1-20, 2-20, and 8-20 Application to Drill. DOI-BLM-CO-2011-0058 EA.

NOBLE ENERGY -- ENVIRONMENTAL ASSESSMENT FOR BULLEIT, PTASNIK, & TIMBRO WELLS -- AIR QUALITY ANALYSIS

Construction activities: Build new roads and well pads

Emissions Summary for Construction

(ton/yr)

NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
0.3617	0.1006	0.0349	0.5086	0.0797	0.0394

Duration

Activity	No. of Days
Days of construction (12 hr ea)	14
Days of bulldozer work (10 hr ea)	14

Earth Moving

			Emissions (ton/yr)		
			TSP	PM-2.5	PM-10
Per EPA AP-42 sec. 13.2.3	1.2	tons TSP/acre/mo			
Per EPA AP-42 sec. 13.2.4	0.35	ton PM10/ton TSP			
	0.1	ton PM2.5/ton PM10	1.286869	0.04504	0.450404
	50%	Control efficiency for watering			

Vehicle Road dust

Per EPA AP-42 sec. 13.2.2-2

Equation 1(a)

	PM-2.5	PM-10
k (lb/VMT)	0.15	1.50
a	0.90	0.90
b	0.45	0.45
s (silt content %)	5.10	

W = mean vehicle weight (tons)

E = k (s/12)^a (W/3)^b

E = size specific factor (lb/VMT)

			Factor (lb/VMT)		Emissions (lb/yr)		Emissions (ton/yr)	
Vehicle	GVW (tons)	# of round trips	PM-2.5	PM-10	PM-2.5	PM-10	PM-2.5	PM-10
Low boy hauler	42.500	1	0.2289	2.2893	0.2289	2.2893	0.0001	0.0011
Gravel hauler	27	1	0.1867	1.8666	0.1867	1.8666	0.0001	0.0009
100 bbl water truck	27	14	0.1867	1.8666	2.6132	26.1323	0.0013	0.0131
work truck	4	28	0.0790	0.7904	2.2132	22.1321	0.0011	0.0111
Total							0.0026	0.0262

Control efficiency for watering 50%

Equipment Exhaust

			Factors (g/hp-hr)*						Emissions (ton/yr)					
Equipment	hp	hrs	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
Diesel bulldozer	300	140	7.81	2.15	0.75	0.692	0.692	0.851	0.3613	0.0994	0.0347	0.0320	0.0320	0.0394

* Factors from AP-42 Volume II (EPA 1985)

Vehicle Exhaust

			Factors (g/VMT)*						Emissions (ton/yr)					
Vehicle	Round Trips	VMT	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
Low boy hauler	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.00003	0.00003	0.00001			0.00000
Gravel hauler	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.00003	0.00003	0.00001			0.00000
100 bbl water truck	14	28	11.44	14.74	5.69	n/a	n/a	0.32	0.00035	0.00045	0.00018			0.00001
work truck	28	56	0.65	9.66	0.56	n/a	n/a	n/a	0.00004	0.00060	0.00003			
total									0.00044	0.00112	0.00024			0.00001

* Factors from AP-42 Volume II (EPA 1985)

NOBLE ENERGY -- ENVIRONMENTAL ASSESSMENT FOR BULLEIT, PTASNIK, & TIMBRO WELLS -- AIR QUALITY ANALYSIS

Rig Move & Drilling Activities

Emissions Summary for Rig Move & Drilling

(ton/yr)

NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
1.59	1.66	0.19	0.23	0.02	0.00

Vehicle Road dust

Per EPA AP-42 sec. 13.2.2-2 Equation 1(a)

	PM-2.5	PM-10
k (lb/VMT)	0.15	1.50
a	0.90	0.90
b	0.45	0.45
s (silt content %)	5.10	

W = mean vehicle weight (tons)

E = k (s/12)^a (W/3)^b

E = size specific factor (lb/VMT)

Vehicle	GVW (tons)	# of round trips	Factor (lb/VMT) PM-2.5	Factor (lb/VMT) PM-10	Emissions (lb/yr) PM-2.5	Emissions (lb/yr) PM-10	Emissions (ton/yr) PM-2.5	Emissions (ton/yr) PM-10
Rig Movers	40	75	0.223	2.228	16.708	167.080	0.0084	0.0835
Fuel Tanker	20	5	0.163	1.631	0.815	8.154	0.0004	0.0041
Logging truck	20.000	1	0.163	1.631	0.163	1.631	0.0001	0.0008
Cementer truck	30.000	1	0.196	1.957	0.196	1.957	0.0001	0.0010
Cement supply truck	40.000	2	0.223	2.228	0.446	4.455	0.0002	0.0022
130 bbl water truck	40	3	0.223	2.228	0.668	6.683	0.0003	0.0033
100 bbl water truck	30.0000	20	0.196	1.957	3.914	39.145	0.0020	0.0196
gas LDV - bits	2.000	20	0.058	0.579	1.157	11.573	0.0006	0.0058
gas LDV - employee	2	200	0.058	0.579	11.573	115.726	0.0058	0.0579
Total							0.0178	0.1782

50% Control efficiency for watering

Vehicle Exhaust

Vehicle	Round Trips	VMT	Factors (g/VMT)* NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	Emissions (ton/yr) NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
Rig Hauler	75	150	11.44	14.74	5.69	n/a	n/a	0.32	0.001890	0.002435	0.000940			0.000053
Fuel Tanker	5	10	11.44	14.74	5.69	n/a	n/a	0.32	0.000126	0.000162	0.000063			0.000004
Logging truck	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.000025	0.000032	0.000013			0.000001
Cementer truck	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.000025	0.000032	0.000013			0.000001
Cement supply truck	2	4	11.44	14.74	5.69	n/a	n/a	0.32	0.000050	0.000065	0.000025			0.000001
130 bbl water truck	3	6	11.44	14.74	5.69	n/a	n/a	0.32	0.000076	0.000097	0.000038			0.000002
100 bbl water truck	20	40	11.44	14.74	5.69	n/a	n/a	0.32	0.000504	0.000649	0.000251			0.000014
gas LDV - bits	20	40	0.65	9.66	0.56	n/a	n/a	n/a	0.000029	0.000426	0.000025			
gas LDV - employee	200	400	0.65	9.66	0.56	n/a	n/a	n/a	0.000286	0.004256	0.000247			
Total									0.003011	0.008155	0.001612			0.000075

* Factors from AP-42 Volume II (EPA 1985)

Drill Rig

Equipment	Fuel	hp	hr/day	Factors (g/hp-hr)** NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	Emissions (ton/yr) NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
Drill Rig Engines	Diesel	2400	24	2.5	2.6	0.3	0.075	0.075	0.0006	1.586	1.649	0.190	0.048		0.000

** Tier 2 Levels

NOBLE ENERGY -- ENVIRONMENTAL ASSESSMENT FOR BULLEIT, PTASNIK, & TIMBRO WELLS -- AIR QUALITY ANALYSIS

Completion Activities

Emissions Summary for Completion

(ton/yr)

NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
0.12	0.24	0.08	0.13	0.01	0.00

Vehicle Road dust

Per EPA AP-42 sec. 13.2.2-2

Equation 1(a)

	PM-2.5	PM-10
k (lb/VMT)	0.15	1.50
a	0.90	0.90
b	0.45	0.45
s (silt content %)	5.10	

W = mean vehicle weight (tons)

E = k (s/12)^a (W/3)^b

E = size specific factor (lb/VMT)

Vehicle	GVW (tons)	# of round trips	Factor (lb/VMT) PM-2.5	Factor (lb/VMT) PM-10	Emissions (lb/yr) PM-2.5	Emissions (lb/yr) PM-10	Emissions (ton/yr) PM-2.5	Emissions (ton/yr) PM-10
casing hauler	50	1	0.246	2.463	0.246	2.463	0.0001	0.0012
completion rig	42.5	1	0.229	2.289	0.229	2.289	0.0001	0.0011
logging truck	17.500	1	0.154	1.536	0.154	1.536	0.0001	0.0008
cementer truck	27.000	1	0.187	1.867	0.187	1.867	0.0001	0.0009
sand truck	42.500	2	0.229	2.289	0.458	4.579	0.0002	0.0023
frac pumper	42.5	1	0.229	2.289	0.229	2.289	0.0001	0.0011
frackmaster deliver	42.5000	1	0.229	2.289	0.229	2.289	0.0001	0.0011
130 bbl water truck	42.500	100	0.229	2.289	22.893	228.935	0.0114	0.1145
100 bbl water truck	27	5	0.187	1.867	0.933	9.333	0.0005	0.0047
gas LDV - employee	2	20	0.058	0.579	1.157	11.573	0.0006	0.0058
Total							0.0134	0.1336

50% Control efficiency for watering

Vehicle Exhaust

Vehicle	Round Trips	VMT	Factors (g/VMT)* NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	Emissions (ton/yr) NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
casing hauler	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.00003	0.00003	0.00001			0.000001
completion rig	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.00003	0.00003	0.00001			0.000001
logging truck	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.00003	0.00003	0.00001			0.000001
cementer truck	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.00003	0.00003	0.00001			0.000001
sand truck	2	4	11.44	14.74	5.69	n/a	n/a	0.32	0.00005	0.00006	0.00003			0.000001
frac pumper	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.00003	0.00003	0.00001			0.000001
frackmaster deliver	1	2	11.44	14.74	5.69	n/a	n/a	0.32	0.00003	0.00003	0.00001			0.000001
130 bbl water truck	100	200	11.44	14.74	5.69	n/a	n/a	0.32	0.00252	0.00325	0.00125			0.000070
100 bbl water truck	5	10	11.44	14.74	5.69	n/a	n/a	0.32	0.00013	0.00016	0.00006			0.000004
gas LDV - employee	20	40	0.65	9.66	0.56	n/a	n/a	n/a	0.00003	0.00043	0.00002			
total									0.00288	0.00409	0.00144			0.000080

* Factors from AP-42 Volume II (EPA 1985)

Frac Pump Emissions

12 hrs/well

Equipment	# of pumps	hp	hrs	Factors (g/hp-hr) NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	Emissions (ton/yr) NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
Frac Pumps	6	1500	12	1	2	0.7	n/a	n/a	n/a	0.11894	0.23789	0.08326			

Flowback Venting

No venting.

Green completions with gas going to sales as soon as possible. Likley flared prior to sales if necessary.

NOBLE ENERGY -- ENVIRONMENTAL ASSESSMENT FOR BULLEIT, PTASNIK, & TIMBRO WELLS -- AIR QUALITY ANALYSIS

Production Activities

Emissions Summary for Production

(ton/yr)

NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
18.62	37.42	26.65	1.77	0.18	0.00098

Production Facilities

Source	Size	Units	Hours/Year	Emission Factors (g/hp-hr or lb VOC/bbl) NOx	CO	VOC	Control Efficiency Assumed (Flare)	Emissions (tons/yr) NOx	CO	VOC	Comments	General Conformity Status for Bulleit Well
Condensate Tanks	200,000	bbl				3.000	95%	0.06	0.32	15.00	A, B	Exempt (has CDPHE air permit)
Truck Loading	200,000	bbl				0.242	95%	0.06	0.32	1.21	C	Exempt (has CDPHE air permit)
Water Tanks	50,000	bbl				0.001	95%	0.01	0.08	0.00125	A	Exempt (has CDPHE air permit)
					Subtotal conformity exempt emissions (Bulleit well only)			0.13	--	16.21		
Separator Heater	0.75	MMBtu/hr	8760					0.22	0.18	0.01	D	Included in conformity analysis
Fugitive Emissions								--	--	1.29	E	Included in conformity analysis
Compressor Engine	265	hp	8760	2.0	4.0	1.0		5.11	10.23	2.56		Included in conformity analysis
Compressor Engine	265	hp	8760	2.0	4.0	1.0		5.11	10.23	2.56		Included in conformity analysis
Compressor Engine	415	hp	8760	2.0	4.0	1.0		8.01	16.01	4.00		Included in conformity analysis
					Subtotal conformity included emissions (Bulleit well only)			18.45	--	10.42		
Total								18.59	37.37	26.63		

Flare Combustion Emission Factors	Per AP-42 Ch 13.5 Table 13.5-1			
0.068	lb/MMBtu NOX			
0.370	lb/MMBtu CO	1,500	btu/scf heat value	
Heater Combustion Emission Factors	Per AP-42 Ch 1.4 Table 1.4-1			
100	lb NOX/MMscf			
84	lb CO/MMscf	1,500	btu/scf heat value	
5.5	lb VOC/MMscf			

Production Facilities Table Comments

A. Emissions from the condensate and water storage tanks are controlled using an enclosed flare as required by CDPHE. NOx & CO are calculated based on combusting the gas; VOC is calculated as 5% of what goes to the flare.

B. Condensate VOC emission factor is for representative well with a site-specific emission factor of 0.34 lb VOC/bbl. Value of 3.0 lb VOC/bbl used in table is a conservative estimate. Documentation of the site-specific emission factor is provided in the Administrative Record for the EA (file <Ptasnik LC29-72HN Emission Factor Package.pdf>).

C. Truck loading emissions are routed to the storage tanks and then through the vent system to the enclosed flare. Calculated as above.

D. Added as requested by BLM -- CDPHE APEN exempt source (non-reportable)

E. Added as requested by BLM -- CDPHE APEN reportable/Permit Exempt source. Calculated from Fugitives tab.

Vehicle Road Dust

Per EPA AP-42 sec. 13.2.2-2

Equation 1(a)		PM-2.5	PM-10
	k (lb/VMT)	0.15	1.50
	a	0.90	0.90
	b	0.45	0.45
	s (silt content %)	5.10	
	W = mean vehicle weight (tons)		

E = k (s/12)^a (W/3)^b

E = size specific factor (lb/VMT)

Vehicle	GVW (tons)	# of round trips	Factor (lb/VMT) PM-2.5	PM-10	Emissions (lb/yr) PM-2.5	PM-10	Emissions (ton/yr) PM-2.5	PM-10
130 bbl water truck	42.5	385	0.229	2.289	88.140	881.399	0.0441	0.4407
200 bbl oil truck	37.5	1000	0.216	2.164	216.397	2163.968	0.1082	1.0820
gas LDV - employee	2	365	0.058	0.579	21.120	211.200	0.0106	0.1056
Total							0.1628	1.6283

50% Control efficiency for watering

NOBLE ENERGY -- ENVIRONMENTAL ASSESSMENT FOR BULLEIT, PTASNIK, & TIMBRO WELLS -- AIR QUALITY ANALYSIS

Production Activities (Continued)

Vehicle Exhaust

			Factors (g/VMT)*						Emissions (ton/yr)					
Vehicle	Round Trips	VMT	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
130 bbl water truck	385	770	11.44	14.74	5.69	n/a	n/a	0.32	0.010	0.012	0.0048			0.0003
200 bbl oil truck	1000	2000	11.44	14.74	5.69	n/a	n/a	0.32	0.025	0.032	0.0125			0.0007
gas LDV - employee	365	730	0.65	9.66	0.56	n/a	n/a	n/a	0.001	0.008	0.0005			
total									0.035	0.053	0.0178			0.0010

* Factors from AP-42 Volume II (EPA 1985)

Wind Erosion Emissions

EPA-450/3-98-008 "Control of Fugitive Dust Sources"

TSP (lb/acre/month) = 1.7 x (s/1.5) x ([365-p]/235) x (f/15)	6.19	TSP (lb/acre/mo)
s = silt content = 5.1%	5.1	
p = # of days with >0.001" precipitation = assumed zero (0)	0	
f = percent of time wind speed > 5.4 m/s (12 mph) = 20.7%	20.7	
50% controlled by watering	0.5	
PM10 size fraction	0.35	ton PM10/ton TSP
PM2.5 size fraction	0.1	ton PM2.5/ton PM10

Emissions (ton/yr)		
TSP	PM-10	PM-2.5
0.410	0.143	0.014

Total Production Emissions and Percent of Weld County Inventory

Description	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X
Project - per well	18.62	37.42	26.65	1.77	0.18	0.0010
Project - total wells	55.86	112.27	79.96	5.32	0.53	0.0029
Weld County	30,365	91,338	135,941	29,948	ND	545
Project % of Weld County Emissions	0.184%	0.123%	0.059%	0.0177%	ND	0.00054%

Source for Weld County emissions: CDPHE 2013.

Colorado Department of Public Health and Environment (CDPHE). 2013. 2010 Air Pollutant Emissions Inventory. Available online: http://www.colorado.gov/airquality/inv_maps_2010.aspx

NOBLE ENERGY -- ENVIRONMENTAL ASSESSMENT FOR BULLEIT, PTASNIK, & TIMBRO WELLS -- AIR QUALITY ANALYSIS

Production Activities -- Fugitive Emissions

Component Count for Single Well (Estimates only - not field verified)					
System	Component	Gas	Light Oil	Oil/Water	Heavy Oil
Separator	Valve	5	3	2	0
	Flange	10	5	5	0
	Connector	5	5	5	0
	Other	2	1	1	0
Compressor	Valve	15	0	2	5
	Flange	10	0	2	10
	Connector	2	0	1	3
	Other	1	0	1	1
Tanks	Valve	3	3	3	0
	Flange	6	3	3	0
	Connector	2	2	2	0
	Other	1	1	1	0
Flare System	Valve	2	2	0	0
	Flange	2	4	0	0
	Connector	1	1	0	0
	Other	1	1	0	0
Totals	Valve	25	8	7	5
	Flange	28	12	10	10
	Connector	10	8	8	3
	Other	5	3	3	1

Equipment Type	Emission Factor (lb/hr/source)[1]	Component Count[2]	Percent VOC[3]	Hours of Operation	Control Factor (Percent)	Total HC Emission Rate (lb/hr)	Total HC Emission Rate (tpy)	Total VOC Emission Rate (tpy)
Valves								
Gas	0.009921	25	26.40%	8,760	0.00%	0.2480	1.09	0.29
Light Oil	0.005511	8	100.00%	8,760	0.00%	0.0441	0.19	0.19
Heavy Oil	0.000019	5	100.00%	8,760	0.00%	0.0001	0.00	0.00
Water/Oil	0.000216	7	100.00%	8,760	0.00%	0.0015	0.01	0.01
Flanges								
Gas	0.000860	28	26.40%	8,760	0.00%	0.0241	0.11	0.03
Water/Oil	0.000006	10	100.00%	8,760	0.00%	0.0001	0.00	0.00
Light Oil	0.000243	12	100.00%	8,760	0.00%	0.0029	0.01	0.01
Other								
Gas	0.019400	5	26.40%	8,760	0.00%	0.0970	0.42	0.11
Water/Oil	0.030864	3	100.00%	8,760	0.00%	0.0926	0.41	0.41
Light Oil	0.016534	3	100.00%	8,760	0.00%	0.0496	0.22	0.22
Open-ended lines								
Gas	0.004409	0	26.40%	8,760	0.00%	0.0000	0.00	0.00
Pump Seals								
Light Oil	0.028660	0	100.00%	8,760	0.00%	0.0000	0.00	0.00
Connectors								
Water/Oil	0.000243	8	100.00%	8,760	0.00%	0.0019	0.01	0.01
Heavy Oil	0.000017	3	100.00%	8,760	0.00%	0.0000	0.00	0.00
Gas	0.000441	10	26.40%	8,760	0.00%	0.0044	0.02	0.01
Light Oil	0.000463	8	100.00%	8,760	0.00%	0.0037	0.02	0.02
Totals		135				0.5701	2.50	1.29

[1] EPA. Protocol for Equipment Leak Emission Estimates, Table 2-4, Oil and Gas Production Operations Average Emission Factors. EPA-453/R-95-017. November 1995. http://www.epa.gov/ttn/chief/efdocs/equiplks.pdf

[2] Component counts are estimates only - not field verified

[3] Estimated VOC weight percent in gas streams

NOBLE ENERGY -- ENVIRONMENTAL ASSESSMENT FOR BULLEIT, PTASNIK, & TIMBRO WELLS -- AIR QUALITY ANALYSIS

Drill Rig Emission Factors (g/hp-hr)							
Rig Types	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_X	Notes
Natural Gas	1	2	0.7	n/a	n/a	n/a	4SLB
Diesel	2.5	2.6	0.3	0.075	0.075	0.0006	Tier 2 Voluntary Levels

Drilling Duration	
Well Type	Days/well
Horizontal	10
Vertical	5

APPENDIX B. CULTURAL RESOURCES

This appendix provides the Memorandum of Agreement between the Bureau of Land Management, Royal Gorge Field Office and the State Historic Preservation Officer, to which Noble Energy, Inc. was a signatory participant. The MOA outlines the mitigation for the potential impacts of the construction of the Bulleit and Timbro wells and their associated infrastructure.

MEMORANDUM OF AGREEMENT

BETWEEN THE BUREAU OF LAND MANAGEMENT, ROYAL GORGE FIELD OFFICE

AND THE

COLORADO STATE HISTORIC PRESERVATION OFFICER

REGARDING THE BULLEIT AND TIMBRO APPLICATIONS FOR PERMIT TO DRILL

WHEREAS, the Bureau of Land Management, Royal Gorge Field Office (BLM) has received Applications for Permit to Drill (APDs) for the Bulleit and Timbro well pads; and

WHEREAS, the surface locations for the proposed APDs are on private lands, but the drilling activities will access adjacent federal minerals as well as private; and

WHEREAS, BLM's approval of the APDs pursuant to the Mineral Leasing Act of 1920, as amended, and BLM's implementing regulations governing Onshore Oil and Gas Operations (43 C.F.R. part 3160), thereby make the project an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, 36 C.F.R. part 800; and

WHEREAS, BLM has defined the undertaking's area of potential effect (APE) as two (2) ten-acre blocks fully encompassing the surface locations from which the well pads and related facilities would be located; and

WHEREAS, BLM has received written refusals of permission to conduct archaeological inventories within the APE from the private landowners; and

WHEREAS, BLM has received documentation demonstrating the unfeasibility of moving the well pads and facilities; and

WHEREAS, BLM has determined, in consultation with the Colorado State Historic Preservation Office (SHPO), that the undertaking may result in adverse effects to historic properties and this probability is considered high; and

WHEREAS, BLM has consulted with Noble Energy, Inc. (Operator) regarding the effects of the undertaking on historic properties and has invited the Operator to sign the Memorandum of Agreement (MOA) as an invited signatory; and

WHEREAS, BLM consulted the Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Lakota Tribe, Comanche Tribe of Oklahoma, Crow Creek Sioux, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, Oglala Sioux Tribe, Pawnee Nation of Oklahoma, Rosebud Sioux Tribe, Eastern Shoshone Tribe, Southern Ute Tribe, Standing Rock Sioux Tribe, Ute Tribe, and the Ute Mountain Ute Tribe to determine whether properties of traditional religious and cultural significance to the tribes were present in the APE, and the tribes identified no such properties; and

WHEREAS, in accordance with 36 C.F.R. § 800.6(a)(1), BLM has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination providing the specified documentation, and the ACHP has chosen not to participate in the consultation pursuant to 36 C.F.R. § 800.6(a)(1)(iii); and

WHEREAS, archaeological inventory in kind in the vicinity of the APE is not feasible; and

WHEREAS, the Operator wishes to resolve the effects of the undertaking in a manner that will result in benefits to BLM;

NOW, THEREFORE, BLM and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

BLM will ensure that the following measures are carried out:

I. RESOLUTION OF ADVERSE EFFECTS

1. Cultural Resources Inventory

    a. Within 60 days of receiving the APD approval, the Operator will complete the following:

        i. Select an archaeological contractor with a BLM Cultural Resources Use Permit in good standing;

        ii. Require the archaeological contractor to submit a fieldwork authorization to BLM for approval and signature;

iii. Instruct the archaeological contractor to conduct an intensive (Class III) cultural resources inventory of the acreage depicted and described in Attachment 1;

iv. Submit to BLM inventory documentation (report and site forms) that complies with the Colorado Survey Manuals (Office of Archaeology and Historic Preservation Publication 1527), BLM's Colorado Handbook of Guidelines and Procedures for Identification, Evaluation, and Mitigation of Cultural Resources and Supplemental Digital Specifications Guide and the Secretary of the Interior's Standards for Archeology and Historic Preservation.

b. Within thirty (30) days of receipt of the inventory documentation (reports and site forms) produced by the Operator's archaeological contractor, BLM will review the materials for compliance.

c. At its discretion, BLM may field check the non-APE inventoried acreage.

2. Terms of Compliance/Non-Compliance

a. The Operator will amend the Surface Use Plan of Operation for the Bulleit and Timbro APDs to include compliance with this MOA.

b. BLM will attach a Condition of Approval to the Operator's APD that requires compliance with this MOA.

c. If the Operator does not comply with this MOA, BLM will document an Incident of Non-Compliance (INC).

d. If the Operator does not respond to the requirements of the INC, BLM may shut in the wells until the Operator complies.

3. The stipulations in this MOA apply only to the Bulleit and Timbro APD undertaking and do not set precedent for effects resolutions that might apply to future undertakings.

II. DURATION

This MOA will be null and void if its stipulations are not carried out within one (1) year from the date of its execution. At such time, and prior to work continuing on the undertaking, BLM shall either (a) execute a MOA pursuant to 36 C.F.R. § 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 C.F.R. § 800.7. Prior to such time, BLM may consult with the other signatories to reconsider the terms of the MOA and amend it in accordance

with Stipulation VIII below. BLM shall notify the signatories as to the course of action it will pursue.

III. MONITORING AND REPORTING

Each six months following the execution of this MOA until it expires or is terminated, BLM shall provide all signatories to this MOA a summary report detailing work carried out pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in BLM's efforts to carry out the terms of this MOA.

IV. DISPUTE RESOLUTION

Should any signatory to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, BLM shall consult with such party to resolve the objection. If BLM determines that such objection cannot be resolved, BLM will:

1. Forward all documentation relevant to the dispute, including the BLM's proposed resolution, to the ACHP. The ACHP shall provide BLM with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, BLM shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories, and provide them with a copy of this written response. BLM will then proceed according to its final decision.

2. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, BLM may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, BLM shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories to the MOA, and provide them and the ACHP with a copy of such written response.

4. BLM's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

V. AMENDMENTS

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

VI. TERMINATION

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per

Stipulation V, above. If within thirty (30) days an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, BLM must either (a) execute an MOA pursuant to 36 CFR § 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. BLM shall notify the signatories as to the course of action it will pursue.

EXECUTION of this MOA by BLM and the SHPO and implementation of its terms evidence that BLM has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

Bureau of Land Management

10/30/13

Keith Berger, Field Manager, Royal Gorge Field Office **Date**

State Historic Preservation Office

11/4/13

for **Edward C. Nichols, State Historic Preservation Officer** **Date**

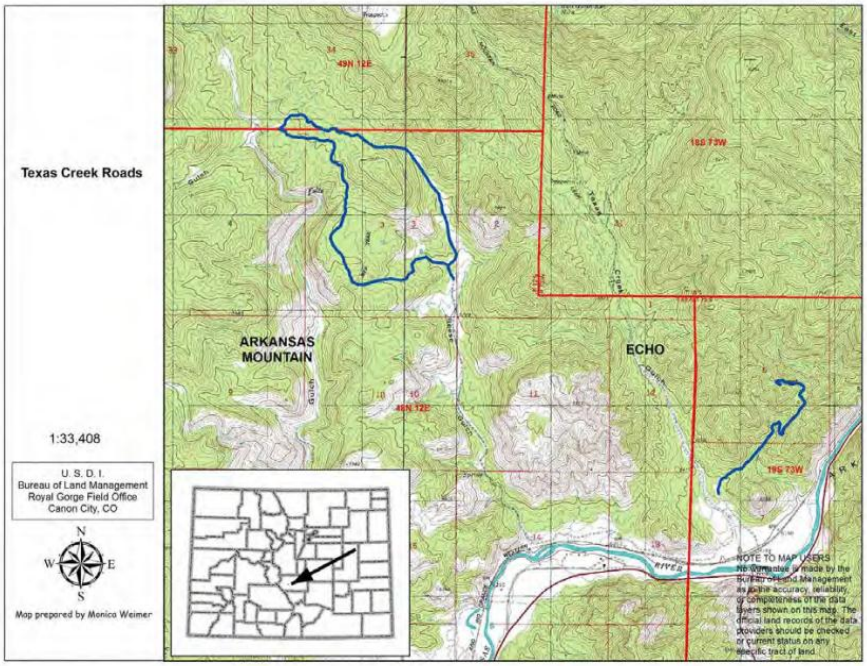
INVITED SIGNATORIES:

Noble Energy, Inc.

Sheri Robbins for Robert Velarman 10/30/13

Date

Attachment 1



The inventory area includes two sections of existing roads/trails that are currently in use by off-highway vehicles. The standard corridor inventory requirement of 50 feet on both sides of the centerline is depicted on the map.

6

This page intentionally left blank.