

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

**Environmental Assessment
Whiting Horsetail 7F & 7G APDs**

January 2016

PREPARING OFFICE

U.S. Department of the Interior
Bureau of Land Management
Royal Gorge Field Office
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BLM



Environmental Assessment

Whiting Horsetail 7F & 7G APDs

DOI-BLM-CO-F020-2016-0008 EA

Prepared by
U.S. Department of the Interior
Bureau of Land Management
Royal Gorge Field Office
Cañon City, CO

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Table of Contents

1. Introduction	1
1.1. Identifying Information:	1
1.1.1. Title, EA number, and type of project:	1
1.1.2. Location of Proposed Action:	1
1.1.3. Name and Location of Preparing Office:	1
1.1.4. Identify the Subject Function Code, Lease, Serial, or Case File Number:	1
1.1.5. Applicant Name:	1
1.2. Introduction and Background	1
1.3. Purpose and Need	1
1.4. Decision to be Made	2
1.5. Plan Conformance Review	2
1.6. Scoping and Issues	2
2. Proposed Action and Alternatives	3
2.1. Description of the Proposed Action	5
2.2. Alternatives Analyzed in Detail	5
2.2.1. No Action Alternative	11
2.3. Alternatives Considered	11
2.3.1. Alternatives Considered, but not Analyzed in Detail	11
3. Affected Environments and Effects	13
3.1. Introduction	15
3.1.1. Interdisciplinary Team Review	15
3.2. Physical Resources	17
3.2.1. Air Quality and Climate	17
3.2.2. Geologic and Mineral Resources	36
3.2.3. Soils	38
3.2.4. Hydrology/Water Quality	40
3.3. Biological Resources	42
3.3.1. Threatened, Endangered and Sensitive Species	42
3.3.2. Vegetation	44
3.3.3. Sensitive Species	45
3.3.4. Migratory Birds & Terrestrial Wildlife	46
3.4. Heritage Resources and Human Environment	47
3.4.1. Cultural Resources	47
3.4.2. Native American Religious Concerns	48
3.4.3. Paleontological Resources	48
3.4.4.	50
3.4.5. Visual Resources	50
3.4.6. Wastes, Hazardous and Solid	51
3.5. Cumulative Impact Summary	52
4. Consultation and Coordination	55

4.1. List of Preparers and Participants	57
4.2. Tribes, Individuals, Organizations or Agencies Consulted	57
5. References	59
6. Finding of No Significant Impact	63
7. Horsetail 7F & 7G APDs	69
7.1. Horsetail 7F & 7G APDs	71
7.2. Rationale:	71
7.3. Mitigation Measures and Monitoring:	71
7.4. Appeal or Protest Opportunities:	73
7.5. Authorizing Official:	73

Chapter 1. Introduction

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Chapter 1 Introduction

1.1. Identifying Information:

1.1.1. Title, EA number, and type of project:

Horsetail 7F & 7G APD's

DOI-BLM-CO-F020-2016-0008 EA

1.1.2. Location of Proposed Action:

6th PM, 10N 57W Sec. 7 SENW & SWNE

1.1.3. Name and Location of Preparing Office:

Royal Gorge Field Office

1.1.4. Identify the Subject Function Code, Lease, Serial, or Case File Number:

COC75059

1.1.5. Applicant Name:

Whiting Oil and Gas

1.2. Introduction and Background

This EA has been prepared by the BLM to analyze the impacts associated with drilling, completing and operating of 12 horizontal oil wells on private surface estates/over private mineral estates (fee/fee), to develop federal and private (fee) minerals. The projects are located on rangeland in Northeast Weld County approximately 22.4 miles east of the town of Grover, Colorado. The Federal mineral estate that will be accessed by the wells is leased and subject to oil and gas development. All surface activities related to these actions will take place on privately owned surface over federal minerals (off lease), there is no public land or public access in the project area.

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. Production will specifically target petroleum resources in the Niobrara formation underlying the private and BLM leases. The need for the action is to develop oil and gas resources on Federal Lease COC75059 consistent with existing Federal lease rights provided for in the Mineral Leasing Act of 1920, as amended, and consistent with the fluid minerals provision in the Northeast RMP as amended, and Federal Oil and Gas onshore orders.

1.4. Decision to be Made

The BLM will decide whether to approve the Horsetail 7F & 7G Applications for Permits to Drill (APDs) project based on the analysis contained in this Environmental Assessment (EA). This EA will analyze the proposed action; to drill, compete and produce 12 horizontal oil wells in order to develop federal and private minerals from a private surface (fee/fee/fed). Access to the proposed project would be on existing highway, county and oil field roads. The finding associated with this EA may not constitute the final approval for the proposed action.

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 EIS and Record of Decision (RD)

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

Decision Number/Page: 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 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 project is listed on the Royal Gorge NEPA log page.

Persons/Public/Agencies Consulted: Internal scoping conducted by the RGFO Interdisciplinary Team (ID Team) and external scoping by posting this project on the Royal Gorge Field Office NEPA website, was the primary mechanism used by the BLM to initially identify issues.

Issues Identified: No issues were identified during scoping.

Chapter 2. Proposed Action and Alternatives

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Chapter 2 Proposed Action and Alternatives

2.1. Description of the Proposed Action

The BLM RGFO has received 12 Applications for Permit to Drill (APD's) proposing the drilling, completion and operation of 12 horizontal oil wells on private surface over private minerals, developing both private and federal minerals (fee/fee/fed). The operator plans to drill completely fee (100% private) wells from the surface of some or all of these proposed pads, regardless of the BLM's decision on the proposed federal wells. In order to drill the wells, the operator proposes the construction of 2 well pads and access roads. Since all surface activity and related disturbance is taking place on private surface, and private minerals are targeted along with federal minerals, BLM has limited authority over the actions that take place on the surface, including authority to impose mitigation measures (as COAs to the approved APD) pertaining to the surface management of the well site. However, BLM will analyze the impacts to applicable resources, including some that BLM has no authority to affect.

Since totally fee wells are planned for these pads, which are located on private surface over private minerals, the operator may construct pad(s) and drill totally fee wells prior to issuance of any BLM APD(s), depending on rig and permitting schedules. However, a well intended to be completed in BLM minerals shall not be drilled until a BLM APD is issued to the operator for that well.

The general area description would be defined as rural rangeland (shortgrass prairie) located in the northeastern plains of Colorado, used primarily for livestock production and oil and gas development. There are some county, private ranch and oilfield roads in the project area. Access is limited to private or oilfield roads, over private surface. There is no public land in the project area. Extensive oil and gas development has occurred in the area, mostly on private (fee) surface and private (fee) mineral estate.

2.2. Alternatives Analyzed in Detail

Proposed Action

Individual pad details:

Horsetail 7F Pad: The new portion of the access road will be approximately 1,677' in length, 25' wide (15' running surface, 5' borrow ditches). This will result in approximately one acre disturbance. The maximum slope of road is less than 3% and the only cut/fills associated with the road are what is necessary to crown and ditch road. There will be one cattle guard at the entrance to the location. The road cut will not exceed 2 feet with no major cuts and fills on the road.

The proposed Horsetail 7F pad is the planned surface location of 6 horizontal fee/fee/fed oil wells, in addition to 6 totally fee (non-federal) wells the operator is also planning for this pad. It will have a maximum cut of 39,220 cu yards resulting in approximately 31,710 cu yards of excess material, plus 7,120 cu yards of topsoil which will be stripped from the top 6" of the surface and stockpiled before construction, for use during interim reclamation. Construction of the well pad would result in approximately 10.8 acres of new surface disturbance, which would be reduced to approximately 4 acres after successful interim reclamation.

Horsertail 7G Pad: The proposed Horsetail 7G pad is the planned surface location of 6 horizontal fee/fee/fed oil wells, in addition to several totally fee (non-federal) wells the operator is

also planning for this pad. The new portion of the access road will be approximately 50' in length, 25' wide (15' running surface, 5' borrow ditches). This will result in approximately .02 acres disturbance. The maximum slope of road is less than 3% and the only cut will not exceed 2 feet. There will be one cattle guard at the entrance to the location.

The proposed Horsetail 7G pad is the planned surface location of 6 horizontal fee/fee/fed oil wells, in addition to 6 totally fee (non-federal) wells the operator is also planning for this pad. It will have a maximum cut of approximately 4.2 feet and a maximum fill of approximately 8.0 foot resulting in approximately 4,670 cu yards of excess material, plus 4,670 cu yards of topsoil which will be stripped from the top 6" of the surface and stockpiled before construction, for use during interim reclamation. Construction of the well pad would result in approximately 6 acres of new surface disturbance, which would be reduced to approximately 3.3 acres after successful interim reclamation.

100% of the water used for the entire project will be obtained from Grassland Water Solutions and water well permit #77669-F and is designated by the State of Colorado as non-tributary to the South Platte River, will be transported via truck, stored in an existing earthen pit located in SENE Section 12, T10N. R58W and then piped via a temporary surface pipeline which would follow existing roads. The estimated water use is approximately 11.2 acre feet/well.

Construction and reclamation of pads and roads will be done in accordance with BLM's Gold Book standards, and employ applicable oil field BMPs. Stormwater/erosion control measures will be taken to stabilize the site. The proposed drilling and completion of all wells will utilize closed loop systems. The wells will be drilled horizontally, and completed using hydraulic fracturing techniques. All liquids will be stored in tanks on the pad. No pits will be utilized on location. Completion fluids will be flowed back to enclosed steel tanks. Drill cuttings will hauled to a state permitted off site disposal facility. All other waste materials produced during drilling, completion and operation of the well (completion fluids, produced water, sewage and garbage) will be hauled off site and recycled or disposed of at applicable state permitted commercial treatment/disposal facilities. The duration of construction, drilling and completion is estimated to be 19 days per well.

Interim reclamation of each pad will begin within 6 months (weather permitting) of completion of the final well. Interim reclamation will consist of redistribution of excess soil, re-contouring the areas of the pad not needed for production as close to original as possible. All areas not needed for transportation of produced liquids and routine maintenance will be re-vegetated in accordance with the reclamation section of the multi-point surface operations plan. If the wells are productive, production facilities will be located on a nearby central tank battery that will also service fee wells, on private land.

Final reclamation of each project will begin within 6 months (weather permitting) of final well plugging. Final reclamation will be completed in accordance with the reclamation section of the multi-point surface operations plan, which consists of proper plugging of wells, removal of all facilities and related equipment from the surface of the site (if left in place, abandoned pipelines will be flushed, cut below ground level, and capped), and removal of any surfacing materials on road or pad. Top soil will be stripped and segregated so it can be spread evenly over the entire area. Pad and road areas will be ripped, re-contoured to their original form and top soil will be evenly spread over the surface. The area will be drill or broadcast seeded, and if necessary covered with weed free mulch. Area will be monitored for presence of weeds, which will be controlled if present. If initial seeding is not successful, reseeding will be repeated until desirable vegetation is established.

The Application for Permit to Drill (APD) for each new well includes a detailed and specific drilling program and multi-point surface operations plan (including detailed construction and reclamation plans.) The proposed action would be implemented consistent with the operations plans provided with approved permit, with Conditions Of Approval (COAs), Onshore Oil and Gas Orders, and 43 CFR §3100.



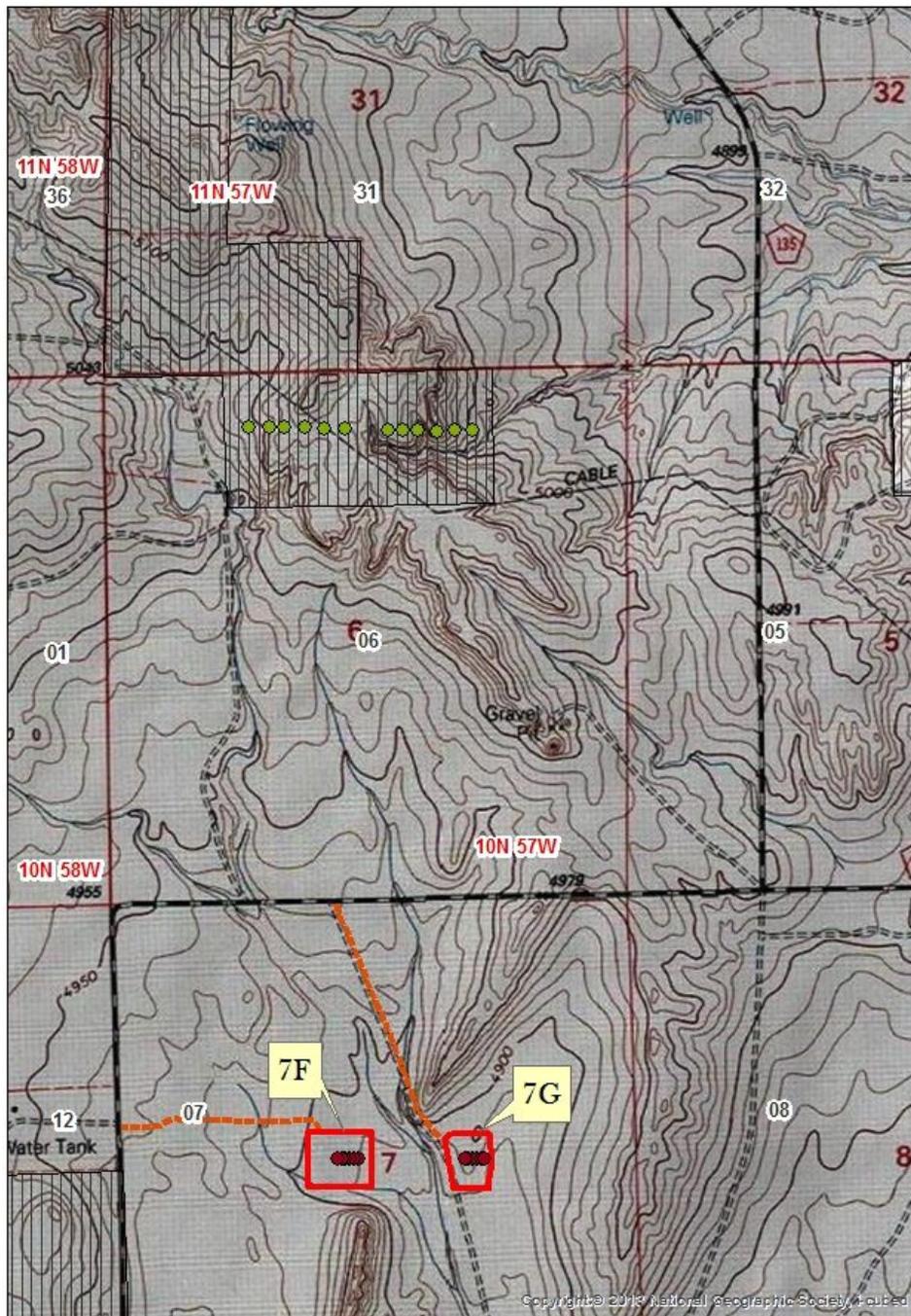
Legend Overview Whiting Horsetail 7F & 7G Project

 Horsetail 7G 7F Pads
USA Topo Maps

DOI-BLM-CO-FO20-2016-00008-EA
6th PM T10N, R57W
0 0.5 1 2 3 4
Miles



NOTE TO MAP USERS: No warranties is made by the Bureau of Land Management as to the accuracy, reliability or completeness of the data layers shown on this map. The official land records of the data providers should be check or current status on any specific tract of land.



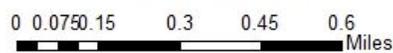
Legend

- Proposed SHL
- Proposed BHL
- Proposed Pads
- Proposed Access Roads

Project Map Whiting Horsetail 7F & 7G

DOI-BLM-CO-FO20-2016-00008-EA

6th PM T10N, R57W



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Legend

- Proposed SHL
- Proposed BHL
- Proposed Pads
- - - Proposed Access Roads

Project Map Whiting Horsetail 7F & 7G

DOI-BLM-CO-FO20-2016-00008-EA
 6th PM T10N, R57W
 0 0.1 0.2 0.4 0.6 0.8
 Miles



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2.2.1. 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 BLM cannot deny the right to drill and develop the leasehold, individual APDs can be denied. The no action alternative constitutes denial of the federal APDs associated with the proposed action. In this case, all proposed surface activity takes place on private surface over private minerals, therefore, denial of the APDs will not prevent development of the private minerals, or any other surface activity associated with this project.

2.3. Alternatives Considered

2.3.1. Alternatives Considered, but not Analyzed in Detail

Other alternatives were not considered due to the proposed project being a non-discretionary action being proposed on private surface over private mineral estate.

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Chapter 3. Affected Environments and Effects

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Chapter 3 Affected Environment and Effects

3.1. Introduction

3.1.1. Interdisciplinary Team Review

The following table is provided as a mechanism for resource staff review, to identify those resource values with issues or potential impacts from the proposed action and/or alternatives. Those resources identified in the table as impacted or potentially impacted will be brought forward for analysis.

Resource	Initial and date	Comment or Reason for Dismissal from Analysis
<u>Air Quality</u> Ty Webb, Chad Meister, Forrest Cook	FC 1/20/2016	See Affected Environment
<u>Geology/Minerals</u> Stephanie Carter, Melissa Smeins	MJS, 12/4/2015	See Geology/Minerals Section 3.2.2
<u>Soils</u> John Smeins, Aaron Richter	AR 12/28/2015	See Soils Section 3.2.3
<u>Water Quality Surface and Ground</u> John Smeins, Aaron Richter	AR, 12/28/2015	See Water Quality Section 3.2.4
<u>Invasive Plants</u> John Lamman	JL, 12/16/2015	Project is located on private surface over private minerals off lease (fee/fee/fed), therefore BLM does not have authority over invasive species control on the location, however the State of Colorado requires operators to control list A and B noxious weeds on oil and gas locations.
<u>Threatened, Endangered & Proposed Species</u> Lara Duran	LD, 1/4/16	See analysis below
<u>Vegetation</u> John Lamman	JL, 12/16/2015	See affected environment
<u>Wetlands and Riparian</u> Dave Gilbert	DG 12/18/15	The proposed activity is within uplands.
<u>Wildlife Aquatic</u> Dave Gilbert	DG 12/15/18,	The proposed activity is within uplands.
<u>Sensitive Species</u> Lara Duran	LD 1/4/16	See analysis below
<u>Migratory Birds & Terrestrial Wildlife</u> Lara Duran	LD, 1/4/16	See analysis below
<u>Cultural Resources</u> Monica Weimer	MMW, 12/3/15	No historic properties affected. See Section 3.4.1 for details.

<u>Native American Religious Concerns</u> Monica Weimer	MMW, 12/3/15	No concerns identified. See Section 3.4.2 for details.
<u>Economics</u>	SAS 12/29/ 2015	Economic impacts would be limited to a slight increase in royalties to the federal government and overall employment opportunities related to the oil and gas and service support industry in the region as well as the economic benefits to state and county governments related to royalty payments and severance taxes.
<u>Paleontology</u> Melissa Smeins, Stephanie Carter	MJS, 12/4/ 2015	See Paleontological Resources Section 3.4.3
<u>Visual Resources</u> Kalem Lenard	KL, 1/5/2016	See analysis below.
<u>Environmental Justice</u> Martin Weimer		The proposed action affects areas that are rural in nature. The land adjacent to these parcels is mixed short grass prairie and farmland, as a result, there are no minority or low-income populations in or near the project area. As such, the proposal will not have a disproportionately high or adverse environmental effect on minority or low-income populations.
<u>Wastes Hazardous or Solid</u> Melissa Smeins	MJS, 12/4/ 2015	See Wastes, Hazardous or Solid section
<u>Recreation</u> Kalem Lenard	KL, 1/5/2016	No public access or public surface present.
<u>Farmlands Prime and Unique</u> Jeff Williams, Chris Cloninger, John Lamman	AR, 12/28/2015	No Prime or Unique Farmlands
<u>Lands and Realty</u>	SAS 11/30/ 2015	N/A, Private surface.
<u>Wilderness, WSAs, ACECs, Wild & Scenic Rivers</u> Kalem Lenard	KL, 1/5/2016	No Wilderness, WSA, ACEC, or Wild & Scenic Rivers present
<u>Wilderness Characteristics</u> Kalem Lenard	KL, 1/5/2016	No wilderness characteristics areas present.
<u>Range Management</u> John Lamman	JL, 12/16/2015	Surface estate is private
<u>Forest Management</u> Ken Reed	SAS 11/30/ 2015	N/A, private surface.
<u>Cadastral Survey</u>	SAS 11/30/ 2015	Chain of Survey on file in project folder.

Noise Martin Weimer		The project area is located in farm and grasslands. Certain levels of noise are associated with drilling operations, these include drill rig operation, compressors/generators and general machine and vehicle operation. Such noises could have the effect of driving away wildlife. These impacts are temporary and terminate when drilling operations are complete.
Fire Ty Webb	SAS 11/30/ 2015	N/A, private surface.
Law Enforcement Steve Cunningham	SAS 11/30/ 2015	N/A private surface.

The affected resources brought forward for analysis include:

- Air Quality
- Geology/Minerals
- Soils
- Water Quality
- Threatened Endangered and Proposed Species
- Vegetation
- Sensitive Species
- Migratory Birds & Terrestrial Wildlife
- Cultural Resources
- Native American Religious Concerns
- Paleontology
- Visual Resources
- Wastes, Hazardous or Solid

3.2. Physical Resources

3.2.1. Air Quality and Climate

Affected Environment:

The U.S. Environmental Protection Agency (EPA), as directed by the Clean Air Act (CAA), has established national ambient air quality standards (NAAQS) 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 (SO₂), particulate matter smaller than 10 and 2.5 microns (PM₁₀ and PM_{2.5}, respectively), ozone (O₃), and nitrogen dioxide (NO₂). Please note that ozone is generally not directly emitted from sources, but is chemically

formed in the atmosphere via interactions of oxides of nitrogen (NOX) and volatile organic compounds (VOCs) in the presence of sunlight and under certain meteorological conditions (NOX and VOCs are ozone precursors). Exposure to air pollutant concentrations greater than the NAAQS has been shown to have a detrimental impact on human health and the environment. 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 current NAAQS levels are shown in the National Ambient Air Quality Standards (NAAQS) figure below. 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.

In addition to the criteria pollutants, regulations also exist to control the release of hazardous air pollutants (HAPs). HAPs are chemicals that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. EPA currently lists 188 identified compounds as hazardous air pollutants, some of which can be emitted from oil and gas development operations, such as benzene, toluene, and formaldehyde. Ambient air quality standards for HAPs do not exist; rather these emissions are regulated by the source type, or specific industrial sector responsible for the emissions.

The EPA has delegated regulation of air quality to the State of Colorado (for approved State Implementation Plan (SIP) elements). The Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division (APCD) administers Colorado's air quality control programs, and is responsible for enforcing the state's air pollution laws.

The CAA and the Federal Land Policy and Management Act of 1976 (FLPMA) require the BLM to ensure actions taken by the agency comply or provide for compliance 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)].

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 µg/m ³	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010]	Primary		1-hour	100 ppb	98th percentile, averaged over 3 years
Ozone [80 FR 65292, Oct 26, 2015]	Primary and secondary		8-hour	0.070 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 µg/m ³	Annual mean, averaged over 3 years
		Secondary	Annual	15 µg/m ³	Annual mean, averaged over 3 years
		Primary and secondary	24-hour	35 µg/m ³	98th percentile, averaged over 3 years
	PM ₁₀	Primary and secondary	24-hour	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010]	Primary		1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
			Secondary	3-hour	0.5 ppm ^b
^a mg/m ³ = milligrams per cubic meter, µg/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.					
Source: National – 40 CFR 50, Colorado – 5 CCR 1001-14					

Existing Regional Air Quality

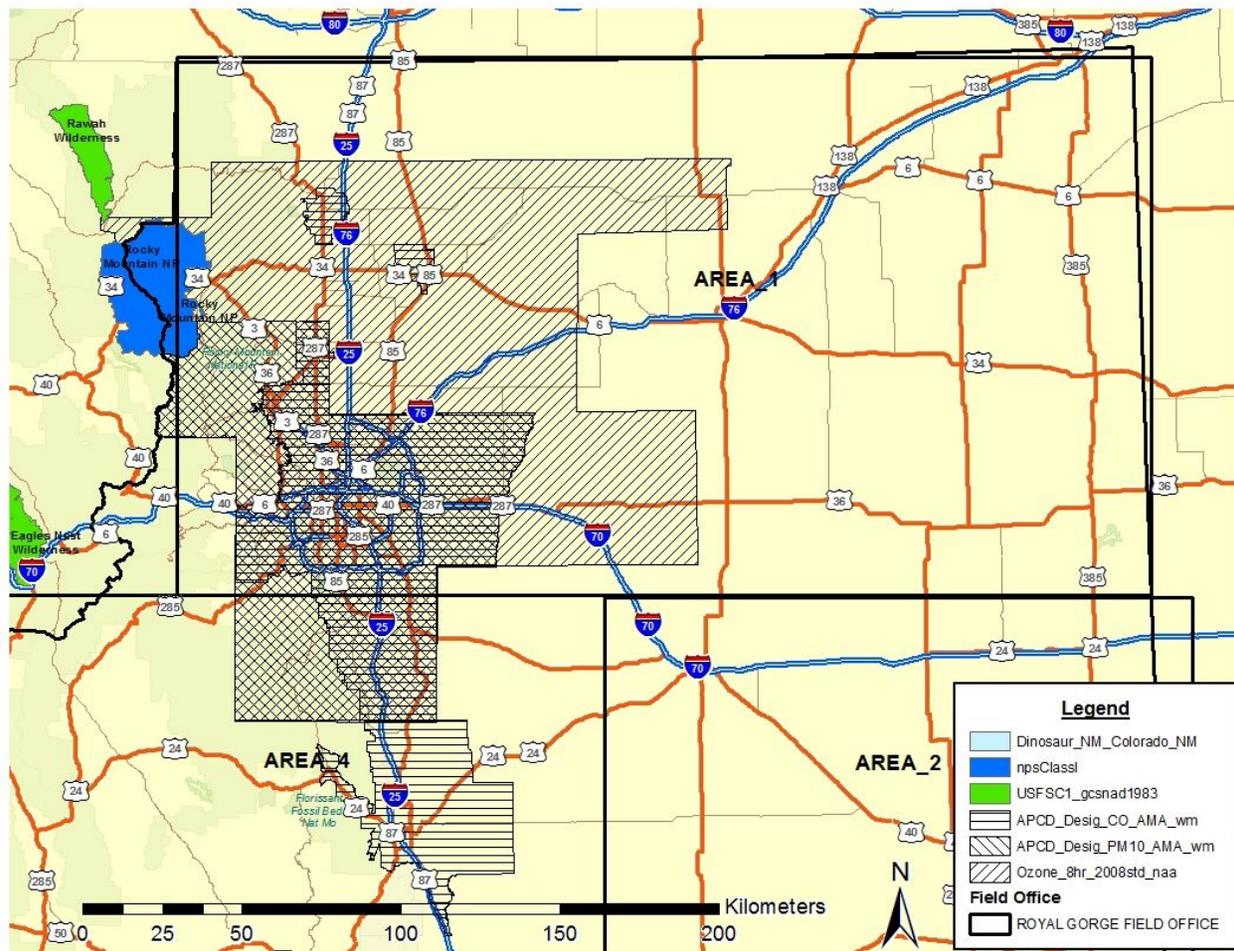
Air quality for any area is generally influenced by the amount of pollutants that are released within the vicinity and up wind of that area, and can be highly dependent upon the contaminants chemical and physical properties. Additionally, an area's topography or terrain (such as mountains and valleys) and weather (such as wind, temperature, air turbulence, air pressure, rainfall, and

cloud cover) will have a direct bearing on how pollutants accumulate or disperse. Ambient air quality in the affected environment (i.e. compliance with the NAAQS) is demonstrated by monitoring for ground level atmospheric air pollutant concentrations. The APCD monitors ambient air quality at a number of locations throughout the state. The data is summarized by monitoring regions and CDPHE prepares an annual report (Annual Air Quality Reports) to inform the public about air quality trends within these regions. Similarly, several Federal Land Managers (FLMs) like the BLM, FS, and NPS, also monitor air quality for NAAQS and Air Quality Related Values (AQRVs) to meet organic act requirements. Table 3-1 below presents three years of monitoring data for criteria pollutants for northeastern Colorado RGFO counties near the proposed Project area (or adjacent / representative county monitors where no monitoring exists in the RGFO proposed Project area). The maximum monitoring value is presented where multiple monitors exist within a single county that monitor for the same pollutant. Concentrations are in units (ppm, etc.) and averaging period ranks (2nd high, etc.) of the standards form (see the “Level” column in Figure 3.1 above), with the exception of the ozone data, which is shown as the 4th highest 8-hour average for one year. To compute the ozone design values (3 year average of the 4th highest 8-hour max) and PM_{2.5} and NO₂ concentrations to compare to the NAAQS, sum three consecutive years of data and divide by three.

Ambient Air Quality Monitoring Data

County	Pollutant	Averaging Period	Monitored Values			
			2011	2012	2013	2014
Adams	CO	1-hour	2.4	2.2	2.4	2.4
Adams	CO	8-hour	1.6	1.3	1.5	1.7
Adams	NO ₂	1-hour	64	64	58	66
Adams	O ₃	8-hour	0.075	0.072	0.077	0.067
Adams	PM ₁₀	24-hour	65	86	93	97
Adams	PM _{2.5}	24-hour	20	28.7	23	28
Adams	PM _{2.5}	Annual	7.6	8.6	8.5	9.4
Arapahoe	O ₃	8-hour	0.078	0.076	0.079	0.067
Arapahoe	PM _{2.5}	24-hour	12.3	28.1	19.7	17
Arapahoe	PM _{2.5}	Annual	5.9	6.8	6.6	6
Weld	CO	1-hour	2.5	3.2	2.5	2.7
Weld	CO	8-hour	1.5	1.6	1.4	1.7
Weld	O ₃	8-hour	0.077	0.074	0.073	0.070
Weld	PM ₁₀	24-hour	46	91	47	60
Weld	PM _{2.5}	24-hour	26.9	32	23.1	32
Weld	PM _{2.5}	Annual	7.4	7.9	7.1	8.1

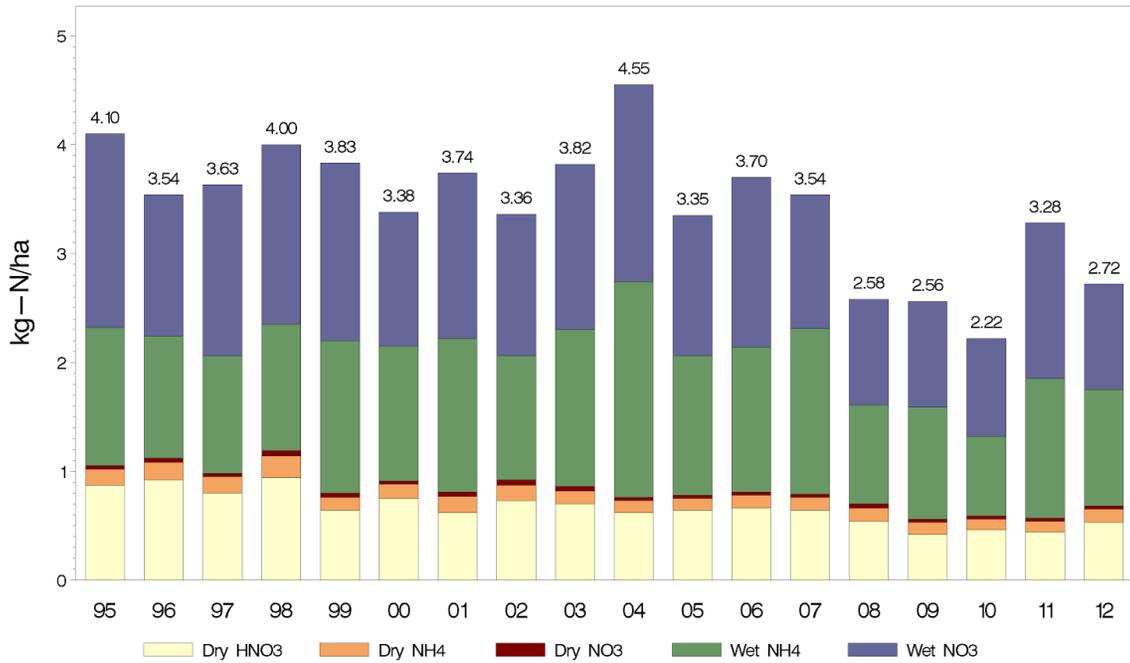
Field Office and Designated Air Boundaries



AQRVs are metrics for atmospheric phenomenon like visibility and deposition impacts that may adversely affect specific scenic, cultural, biological, physical, ecological, or recreational resources. Visibility changes can occur when excessive pollutant contaminates (mostly fine particles) scatter light such that the background scenery becomes hazy. Deposition can cause excess nutrient loading in native soils and acidification of the landscape, which can lead to declining buffering capacity changes in sensitive stream and lake water chemistries (commonly referred to as acid neutralization change (ANC)). Air pollutants are deposited by wet deposition (precipitation) and dry deposition (gravitational settling). The chemical components of wet deposition include sulfate (SO₄), nitrate (NO₃), and ammonium (NH₄); the chemical components of dry deposition include sulfate, sulfur dioxide (SO₂), nitrogen oxides (NO_x), nitrate, ammonium, and nitric acid (HNO₃). A recent 2014 NPS Study suggests that the critical nitrogen load value for high elevation surface water in all natural areas of Colorado is 2.3 kg/ha-yr. The NPS *Technical Guidance on Assessing Impacts on Air Quality in NEPA and Planning Documents* suggests that critical sulfur load values above 3 kg/ha-yr may result in moderate impacts. AQRVs are important to FLMs because they have a mandate to ensure their Class I and sensitive Class II areas meet scientific (landscape nutrient loading) and congressionally mandated goals (i.e. regional haze). Class I areas are generally pristine landscapes such as national parks, national forests, and wilderness areas that are specifically provided the highest levels of air quality protection under the CAA. Sensitive Class II areas are usually afforded additional protection under state specific rule making

for one or more pollutants. This status elevates them above ordinary Class II areas which account for every other area of the country that is not explicitly designated as Class I or Sensitive Class II.

Total N Deposition ROM406

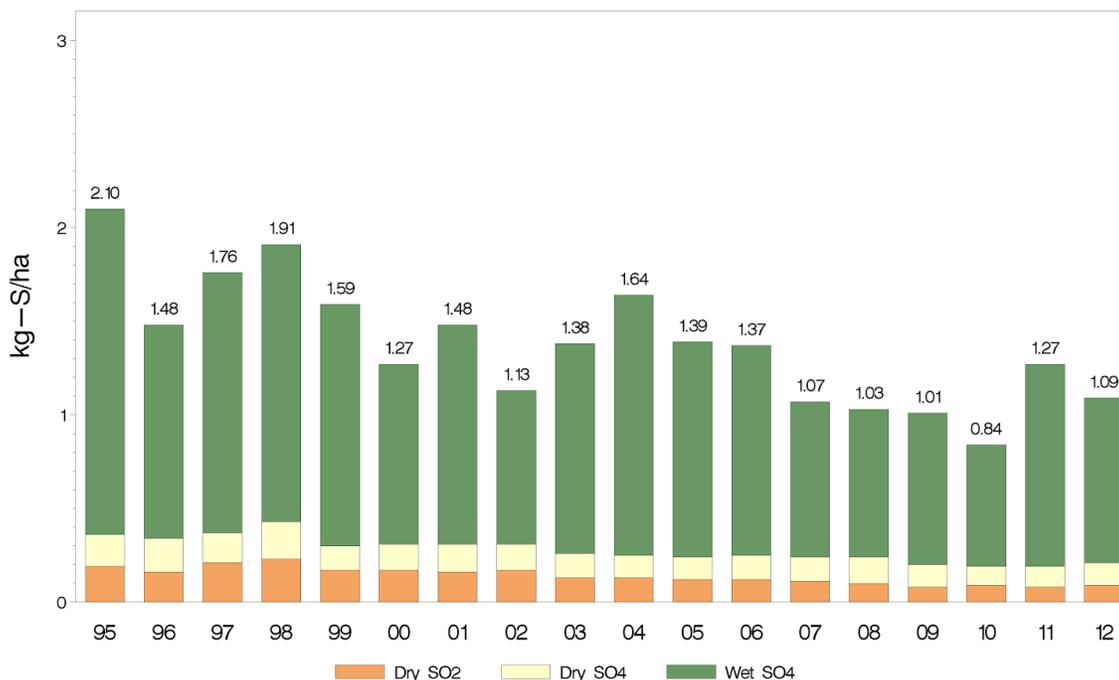


Source: CASTNET + Interpolated NADP-NTN/PRISM

Only complete years are shown

23APR14

Total S Deposition ROM406



Source: CASTNET + Interpolated NADP-NTN/PRISM

Only complete years are shown

23APR14

Greenhouse Gases and Climate Change

There is broad scientific consensus that humans are changing the chemical composition of Earth's atmosphere. Activities such as fossil fuel combustion, deforestation, and other changes in land use are resulting in the accumulation of trace greenhouse gases (GHGs) such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and several industrial gases in the Earth's atmosphere. An increase in GHG emissions is said to result in an increase in the earth's average surface temperature, primarily by trapping and thus decreasing the amount of heat energy radiated by the Earth back into space. The phenomenon is commonly referred to as global warming. Global warming is expected in turn, to affect weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, which is collectively referred to as climate change. The Intergovernmental Panel on Climate Change (IPCC) has predicted that the average global temperature rise between 1990 and 2100 could be as great as 5.8°C (10.4°F), which could have massive deleterious impacts on the natural and human environments. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and the burning of fossil carbon fuel sources have caused GHG concentrations to increase measurably, from approximately 280 ppm in 1750 to 400 ppm in 2014 (as of April). The rate of change has also been increasing as more industrialization and population growth is occurring around the globe. This fact is demonstrated by data from the Mauna Loa CO₂ monitor in Hawaii that documents atmospheric concentrations of CO₂ going back to 1960, at which point the average annual CO₂ concentration was recorded at approximately 317 ppm. The record shows that approximately 70% of the increases in atmospheric CO₂ concentration since pre-industrial times occurred within the last 54 years.

Project Area County Oil and Gas Production

The table below shows current oil and gas production statistics on a per county basis (well counts and production numbers are for both federal and fee minerals) for the county containing the proposed project O&G development and nearby counties: Adams, Arapahoe, Logan, Morgan and Weld. The oil and gas data is from the Colorado Oil and Gas Conservation Commission (COGCC) database and is provided to convey the current level of intensity for oil and gas development within the vicinity of the proposed project.

Project Area County Annual Production Data (2014)

County	County Annual Oil Prod. (bbl)	County Annual Gas Prod. (Mcf)	County Annual H2O Prod. (bbl)
Adams	535,130	4,656,531	1,034,934
Arapahoe	1,056,441	1,740,365	559,475
Logan	197,943	354,879	6,148,095
Morgan	120,168	447,553	4,087,104
Weld	81,688,369	392,238,826	28,179,309

National Emissions Inventory Data (2011)

As previously stated, air quality is generally a function of air pollutants emissions loading within any particular region. With respect to the proposed project county and nearby counties (Adams, Arapahoe, Logan, Morgan and Weld in northeast Colorado), the following emissions inventories are provided to describe the affected environment in terms of current cumulative emissions intensities.

2011 County NEI Data (tons)

County	PM10	PM2.5	VOC	CO	NOX	SO2	CO2	CH4	N2O	NH3	HAPs
Adams	14,055	4,346	21,395	72,900	24330	8,033	2,669,518	261	94	1,346	5,067
Arapahoe	13,296	3,350	17,861	85,894	11876	207	2,692,975	217	99	632	5,212
Logan	7,659	1,719	11,568	8,737	4052	101	212,893	24	5	4,518	2,453
Morgan	6,564	1,622	10,861	11,648	7650	13,082	274,751	61	8	5,410	2,351
Weld	27,960	6,194	137,717	68,222	25663	575	1,782,317	266	59	16,080	7,886

Environmental Effects

Proposed Action:

Direct and Indirect Impacts:

In general the proposed action will have a temporary negative impact to air quality which will mostly occur during the construction / development phase. Utilization of the access road, surface disturbances, and development activities such as drilling, hydraulic fracturing, well completion, and equipment installation will all impact air quality through the generation of dust related to travel, transport, and general construction. This phase will also produce short-term emissions of criteria, hazardous, and greenhouse gas pollutants from vehicle and construction equipment exhausts. Once construction / development is complete, the daily activities at the site will be reduced to operational and maintenance checks which may be as frequent as multiple daily visits for product hauling. Emissions will result from vehicle exhausts and generated dust from the maintenance and process technician visits. The pad can be expected to produce fugitive emissions of well gas, which contains mostly methane and a minor fraction of volatile organic compounds. Fugitive emissions may also result from pressure relief valves and

working and breathing losses from tanks located at the site, as well as any flanges, seals, valves, or other infrastructure connections used at the site. Liquid product load-out operations will also generate fugitive emissions of VOCs and vehicular emissions. The project design plans show that many of the operations will be permitted and therefore, most operations will be subject to some portions of the pollution control regulations currently on the books (State and Federal), and thus the proponent will have control equipment installed at the site to mitigate some or all of the expected fugitive emissions from flashing, load-outs, and leaks. Some control equipment, such as flares / combustion units, will produce emissions of criteria, HAP, and GHG emissions via combustion.

As previously stated, ozone is not directly emitted like other criteria pollutants. Ozone formation and prediction is complex, generally results from a combination of significant quantities of VOCs and NOX emissions from various sources within a region, and has the potential to be transported across long ranges. Therefore, it is typically not appropriate to assess (i.e. model) potential ozone impacts of a project on potential regional ozone formation and transport. However, BLM Colorado has conducted a regional modeling study to assess potential ozone formation and impacts on a cumulative basis (see cumulative impacts for discussion).

Emission estimates for activities associated with the proposed action were calculated for this EA, and are disclosed in Table 3–2 below. The emissions inventories (EI) are based on project-specific input from the operator and considered reasonably foreseeable oil and gas development activities for the proposed wells, and includes emissions from both construction, development and production operations. The following pollutants were inventoried where an appropriate basis, methodology, and sufficient data exists: CO, NOX (includes NO₂), PM_{2.5}, PM₁₀, SO₂, VOCs, HAPs, CO₂, CH₄, and N₂O. The EI was developed using reasonable but conservative scenarios for each construction and production activity. Production emissions were calculated for an entire year, and included activities that are not likely to occur every year (i.e. workovers and recompletions), thus the project inventory is conservative on an annualized basis. Potential emissions were calculated for each new project well assuming the minimum/basic legally required emissions control measures, common industry practices (as provided by oil and gas operators in the project area), and project-specific equipment configuration and operations information that was provided by the proposed action proponent. Maximum foreseeable direct and indirect emissions would occur at the beginning of the project during the construction / development phase for all pollutants except VOC / HAPs (VOC and HAPs emissions primarily occur during production phase)..

The following proposed action information was used to develop the project-specific emissions inventory:

- The emissions estimated for construction activities are based on the disturbed surface area of ~ 9 acres as described in the proposed action for each well pad, and 0.25 miles of access road and 0.24 miles of pipeline for each well-pad.

- The emissions inventory calculations assume that all disturbed surfaces (pads and access roads) would receive appropriate application of water during construction / development phase (at least 50% dust control efficiency).
- Production phase equipment / emissions would include storage tanks, product loading, fugitive leaks, pneumatics, separation equipment, on-road traffic and centralized compression engines. The emissions inventory assumes no well-head compression, dehydration, or sweetening units for the project. Oil and water tanks flashing emissions (VOCs / HAPs) are assumed controlled to 95%. Emissions calculations for pneumatic devices assume low-bleed rate devices (6 cfh max). Compression engines would be located at a central facility and engines will be permitted by CDPHE and meet CDPHE Regulation Standards..
- Completion flaring would be limited due to the implementation of green completions (100% emissions control). Completions will use closed loop fluid flowback handling methods and flowback gases will be controlled (green completion). There will not be any open pits at the site.
- Drill rigs engines related emissions are calculated assuming use of dual fuel version engines (information provided by operator). Emissions for completion and other non-road engines (includes fracking) were calculated assuming diesel fired engines. The diesel combustion emissions portion for drilling and other engines are based on EPA Non-road Tier 2 emissions standards and emissions for the drilling natural gas fired engine portion are calculated using EPA AP-42 emissions factors.
- The emissions inventory uses an operator provided flash and sales natural gas analysis to estimate fugitive VOC , HAPs and GHG speciation percentages.
- The emissions inventory and screening modeling assessment conservatively assumes that all operations / activities and production are Federal even though a large portion of the production will be associated with Fee minerals.

Annual Emissions Inventory for Project (Tons)

Annual Project Emissions (Tons)										
Project Phase	PM10	PM2.5	VOC	NOX	CO	SOX	CO2	CH4	N2O	HAPs
construction total (TPY)	1.119	0.342	0.038	0.399	0.214	0.013	63.608	0.051	0.011	0.000
drilling and completions total (TPY)	0.338	0.281	0.897	7.655	5.941	0.243	1,163.771	90.736	17.440	0.000
operations total (TPY) - upstream and mid-stream*	21.998	2.782	79.420	19.246	23.146	0.058	8,555.941	67.523	0.042	7.602

* includes upstream (well-pad level) and centralized compression engine that will be permitted by CDPHE (mid-stream); does not include end-use combustion.

Project-Specific Near-Field Impacts Analysis

A project-specific near-field air quality impacts analysis was conducted using BLM Colorado's near-field screening tool (based on AERMOD) to show that near-field air quality impacts for the proposed project are acceptable (below AAQS and other applicable thresholds). Using aerial images and GIS, it was determined that there is no "sensitive" ambient receptor (location of residence, business, school, hospital, etc.) much closer than 1,000 meters of the proposed Horsetail 7F and 7G well-pads. Therefore, maximum air quality impacts were modeled at a 1,000 meter polar receptor ring (surrounds the proposed well-pads at equidistance in all directions) surrounding the proposed well-pads emission source. USEPA's

recommended guideline model, AERMOD, was used to predict near-field air quality impacts using a 5-year surface meteorological dataset collected at a National Weather Surface ASOS at a northeast Colorado based airport in the vicinity of the project area. Near-field modeling predicted ambient concentrations for NO₂ (1-hour), PM₁₀ and PM_{2.5} (24-hour) and hazardous air pollutants (HAPs) benzene and n-hexane (1-hour and annual).

For modeling short-term (1-hour) NO₂ impacts for comparison to the NAAQS, emissions, the maximum short-term emissions rate which would be associated with the drilling / completion phase was modeled from a centrally located point source and the maximum 5-year average impact was determined for any location along the 1,000 meter receptor ring. The NO₂ 1-hour Standard is calculated as a 3-year average value and due to the short-term temporal nature of the development phase, it is reasonable to conclude that the 5-year average of impacts associated with continuous development is an overestimate of air quality impacts that would actually occur over a 3–5 year time period. In addition, it was assumed that all NO_x emissions are converted to NO₂ (EPA Tier 1 approach) for this screening-level analysis.

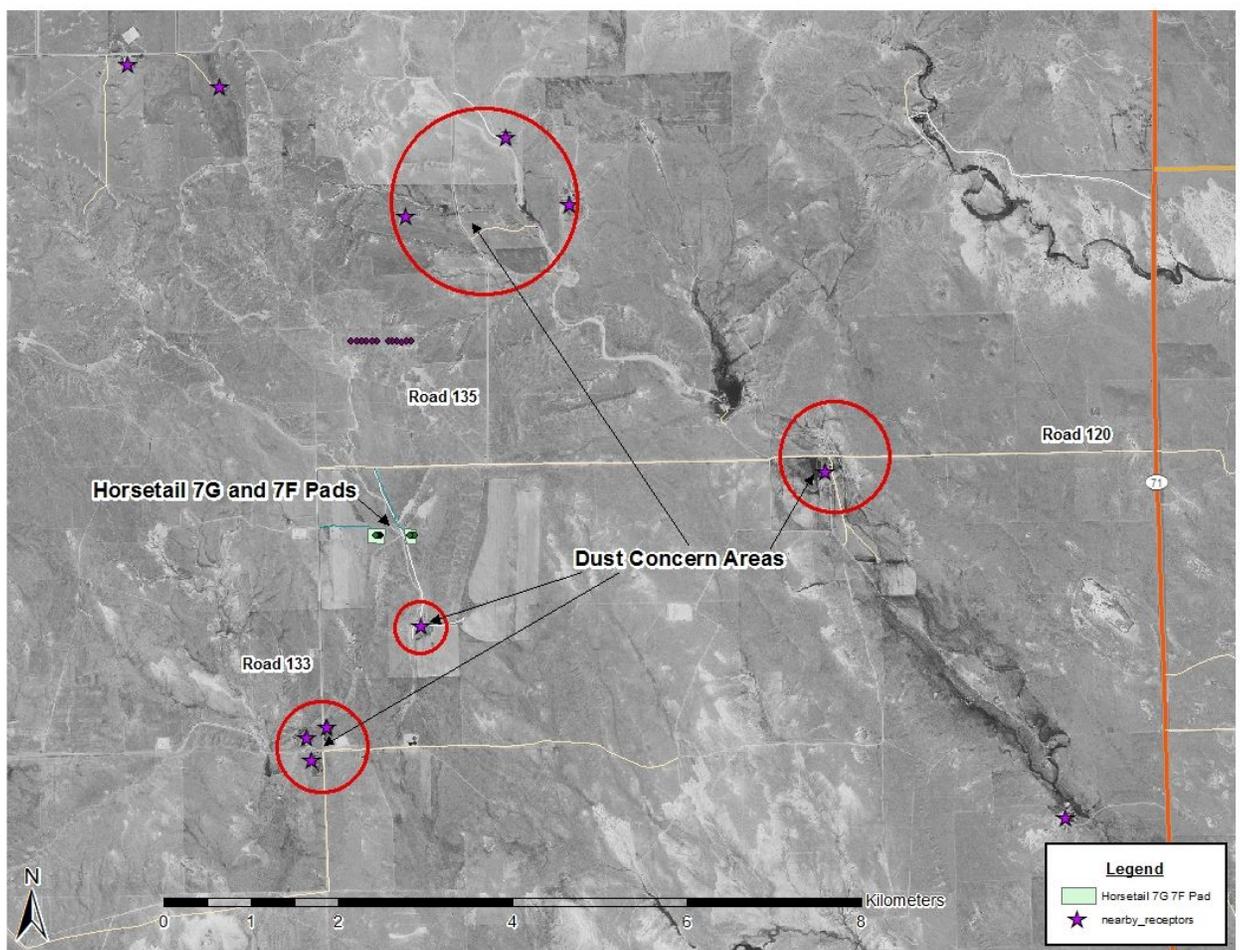
Maximum short-term emissions rates for the well-pads, access roads and pipelines construction phase were modeled to assess potential PM impacts and annual production phase emissions for benzene and n-hexane were modeled to assess the potential HAPs impacts since HAPs emissions for production phase (tanks, flashing, equipment leaks, etc.) are much higher for production / operations phase.

Representative background concentrations (accounting for all emissions not explicitly modeled) were added to screening level modeled impacts for cumulative concentrations to compare to ambient thresholds. CARMMS predicted year 2021 NO₂ and PM concentrations for grid cells intersecting the Project area account for foreseeable oil and gas and other growth / projected emissions changes in the Region and were used to represent background concentrations for NO₂ and PM. Year 2013 monitored benzene and n-hexane concentrations for a monitor located near an active Colorado-based oil and gas field were used as background concentrations for these HAPs.

The maximum screening level modeled near-field cumulative (includes background) NO₂, PM and HAPs concentrations that were based on operator input for the proposed action emissions inventory were predicted to be well below the applicable ambient air quality thresholds (NAAQS, HAPs reference levels, long-term exposure cancer risk, etc.). The proposed action emissions inventory was based on proposed action design features and operator committed measures including routine application of dust control (water) to unpaved disturbed surfaces. As modeled, acceptable near-field dust impacts are highly dependent on the routine application of dust suppressant for construction / development and operations / production phases. In addition to routine water application to disturbed surfaces for well-pad, access road and pipeline construction, the air quality analysis for the EA identified several unpaved access road segments near ambient receptors (residences) where dust mitigation measures should be implemented. The following Figure below shows an aerial view of project area and unpaved roadway dust concern areas circled with red line. It is anticipated that the operator will

access the Horsetail 7G and 7F well-pads via Road 120, 133 or 135; depending on the access route taken, unpaved road sections within the area(s) of concern (see following figure) should be treated with routine water or dust suppressant application at a minimum during construction / development phase and during dry periods of production / operations phase when multiple daily (5 or more per day) truck traffic trips are made to well-pads for product (oil, etc.) hauling, work-overs or maintenance projects. It is anticipated that at least 1,000 feet of dust suppression application on each side of residence driveway / entrance should be applied to minimize dust impacts to nearby residences; fresh gravel application to unpaved surfaces are preferred approach to reduce dust with unpaved road traffic but at a minimum routine water application will be required.

Near-Field Air Quality Analysis — Dust Impact Concern Areas



In consideration of disclosing cumulative and regional air quality impacts, the BLM has initiated the Colorado Air Resources Management Modeling Study (CARMMS). The study includes assessing statewide impacts of projected oil and gas development (both federal and fee (i.e. private)) out to year 2021 for three development scenarios (low, medium, and high). Projections for development are based on either the most recent FO Reasonably Foreseeable Development (RFD) document (high), or by projecting the current 5-year average development paces forward to 2021 (low). The medium scenario included the same well count projections as the high, but

assumed restricted emissions, where the high assumed current development practices and “on the books” emissions controls and regulations (2012). Each FO was modeled with the source apportionment option, meaning that incremental impacts to regional ozone and AQRVs from Federal oil and gas development in these areas are essentially tracked to better understand the significance of such development on impacted resources and populations. The CARMMS project leverages the work completed by the WestJumpAQMS, and the base model platform and model performance metrics are based on those products (2008).

Based on the CARMMS projections, the BLM continually tracks emissions changes and air quality conditions to determine which projection path (low , medium, high) would be most appropriate to estimate air quality impact correlations based on the cumulative development (i.e. net emissions changes) that has occurred since the base emissions inventory year (2008). Although the predicted impacts will be based on future modeling results (2021), the relative changes in the impacts between the scenarios will provide insight into in understanding how mass emissions impact the atmosphere on a relative basis.

For the CARMMS, the RGFO was broken into 4 geographic areas due to the overall size and diversity of the RGFO. Figure 1.2 shows the northern RGFO Area #1 for CARMMS and the proposed Project would be approximately in the middle of this CARMMS source apportionment area. In addition, the RGFO Area #1 is further broken into two source apportionment modeling areas for CARMMS: within Pawnee National Grasslands (PNG) boundary and outside PNG boundary. The proposed Project is located within the PNG boundary of RGFO Area #1.

CARMMS O&G Development and Emissions Tables

The following Table provides the RGFO Area # 1 oil and gas development and projected production rates modeled for the CARMMS RFD (High) and 5-year Average (Low) modeling scenarios (includes all development within PNG and outside PNG boundary).

CARMMS Future O&G Development / Projections Modeled – RGFO Area #1*

Parameter	RFD (High) Scenario1	5-year Average (Low) Scenario2
Federal Wells Per Year	47 (470 in 10 years)	9 (100 in 10 years)
Cumulative (Fed and non-Fed) Wells Per Year	585	1,350
Wells Per Pad (assumed for analysis)	4	4
2021 Cumulative Active Well Counts	29,673	37,323
% 2021 Cumulative Wells that Are Federal	2%	1%
Cumulative Average Annual No. Drill Rigs Operating	32	74
Cumulative 2021 Gas Production (MMscf/yr)	514,165	800,374
Cumulative 2021 Oil / Condensate Production (Mbbbl/yr)	163,744	341,476

CARMMS Baseline and Projected Year 2021 Annual Emissions (TPY) – RGFO Area #1 Federal O&G (inside and outside of PNG boundary)

Field Office	PM10	PM2.5	NOX	VOC	CO	SO2
Baseline - 2011	10.5	3.9	140.2	666.4	115.2	0.6
RFD (High) Scenario - 2021	910.5	118.1	1229.7	2437.5	1091.6	4.6
Emissions Change (2021 minus 2011) – RFD Scenario	900.0	114.2	1089.5	1771.1	976.4	4.0

RFD (Low) Scenario - 2021	170.7	22.2	248.6	781.4	258.0	0.8
Emissions Change (2021 minus 2011) – Low Scenario	160.2	18.3	108.4	115.0	142.8	0.3

* RFD based on O&G Industry and BLM Resource Specialists 20-year projections for the RGFO.

* Future O&G development projections based on recent 5 years (2008-2012) of O&G development data for the RGFO.

The above Table provides baseline year 2011 and projected year 2021 Federal oil and gas emissions for the RGFO Area #1. The emissions changes (as shown) from baseline year 2011 to year 2021 is reflective of the CARMMS 10-year emissions change for RGFO Area #1 Federal O&G development and production for both (High and Low) CARMMS modeling scenarios.

The CARMMS incremental modeling changes / results (year 2021 minus year 2011) for each source group (i.e. RGFO Area #1) are applicable for the amount of additional air pollutant emissions that were modeled in the Study. Annual oil and gas completions / development inventories (post year 2011) are routinely compiled by the BLM to ensure that current and future oil and gas development does not exceed the acceptable “budgets” (O&G development / emissions rates) as modeled in CARMMS. For years 2012 through 2015, approximately 77 new Federal O&G wells have been completed for the entire RGFO (most wells are located in Area #1) since year 2011 (approximately 19 new completed Federal wells per year). This annual development rate is much lower than the ~ 47 new Federal wells per year for RGFO Area #1 as modeled for CARMMS year 2021 RFD scenario (new development for years 2012 through 2021) and is currently tracking closer to the ~ 9 new Federal wells per year (new O&G development for years 2012 through 2021) for RGFO Area #1 as modeled for the CARMMS “low” scenario.

As future oil and gas development occurs (including the proposed project) in the RGFO, project-specific emissions (based on approved APDs) are being added to the total regional emissions estimates (all emissions sources: oil and gas emissions and more) to compare regional emissions rates modeled in cumulative air quality modeling studies (CARMMS) along with the corresponding modeling results to confirm that activities approved by the BLM Colorado are within the modeled emissions analyzed in the cumulative analyses. The results and summaries of these annual analyses are being included in the BLM Colorado Air Resources annual reports.

Based on the oil and gas development level analysis as described above and the information provided in Table 1-5, it is reasonable to conclude that current levels of RGFO Federal oil and gas development are tracking closer to CARMMS “low” levels. However, the modeling results for the CARMMS High scenario are being presented for assessing future potential regional / cumulative air quality impacts since updated RFD estimates indicate that increased (more than current levels) annual Federal O&G development is likely to occur in RGFO Area #1, specifically the PNG area. The following sub-section provides CARMMS High scenario source apportionment modeling results for incremental RGFO Area #1 oil and gas development year 2012 through year 2021 within PNG.

CARMMS Modeling Results for High Scenario – RGFO Area #1 Federal O&G

As described above, the RFD forward projections (High) modeling scenario provides a look at impacts that would cover all potential oil and gas development using BLM O&G specialists and industry O&G development projection data. The following table provides a quasi-cumulative

summary of ozone, visibility and nitrogen deposition impacts for all of the new (post-year 2011) projected RGFO Area #1 Federal oil and gas emissions within the PNG boundary (proposed Project is located within Pawnee National Grasslands boundary) associated with the High modeling scenario. These impacts show the relative contribution to full cumulative (all world-wide emissions sources) impacts for the new projected RGFO Area #1 oil and gas emissions (within Pawnee NG) associated with the High modeling scenario.

CARMMS – RGFO Area #1 Federal O&G Contribution to Modeled Impacts

Source Group - Modeling Scenario	Number of Annual Days Above 0.5 dv Change	Maximum Modeled Annual Nitrogen Deposition (kg/ha-yr)	Overall Maximum 4th High Daily 8-hour Ozone Contribution (ppb)	Maximum 4th High Daily 8-hour Ozone Contribution to Modeled Exceedance (ppb)	Overall Maximum 8th High 24-hour PM2.5 Contribution (ug/m3)
RGFO Area #1 within PNG – High Scenario - Year 2021	0	0.0017	0.5	0.03	0.6

* maximum modeled concentrations / values for any Class I / sensitive Class II area (AQRV) or grid cell (ozone).

As shown in the table above, there are no days that the projected new RGFO year 2021 Federal oil and gas emissions within PNG have a significant (~ 0.5 dv) visibility change impact at any Class I or sensitive Class II area and the maximum modeled nitrogen deposition contribution is below the Deposition Analysis Threshold (DAT) ~ 0.005 kg/ha-yr and minimal with respect to the cumulative critical nitrogen deposition load of 2.3 kg/ha-yr value. The maximum contributions to 4th high daily maximum 8-hour ozone concentrations are minimal with respect to the 70 ppb 8-hour ozone standard and the maximum contribution to the 8th high maximum 24-hour PM2.5 concentration is minimal with respect to the 35 ug/m3 24-hour PM2.5 standard.

The information above shows that the predicted air quality impact contributions associated with the CARMMS RFD High oil and gas development scenario for the RGFO Area #1 within PNG are minimal, and it is reasonable to conclude that project-level O&G development (based on actual development plans) would have even lower contributions to the overall cumulative air quality.

CARMMS Modeling Results – Full Cumulative

Even though current oil and gas development rates are tracking at or below CARMMS Low modeling scenario oil and gas development projections (new O&G development for years 2012 through 2021) for all or most of the BLM Colorado planning areas / Field Offices, the CARMMS High modeling scenario results are being reported for cumulative air quality impacts in order to be consistent with the CARMMS RGFO Area #1 – PNG specific impacts discussion. It's important to note that all other emissions sources (other than new Colorado –based O&G) were modeled at the same rates for the CARMMS High and Low scenarios (the new Colorado O&G were only source category with varying development / emissions rates for the different CARMMS modeling scenarios).

The following table provides a full cumulative summary of ozone, visibility and nitrogen deposition impacts for all (i.e. world-wide) emissions sources associated with the CARMMS High modeling scenario.

CARMMS Modeled AQRV Impacts - High 2021 Scenario - Full Cumulative Emissions Inventory

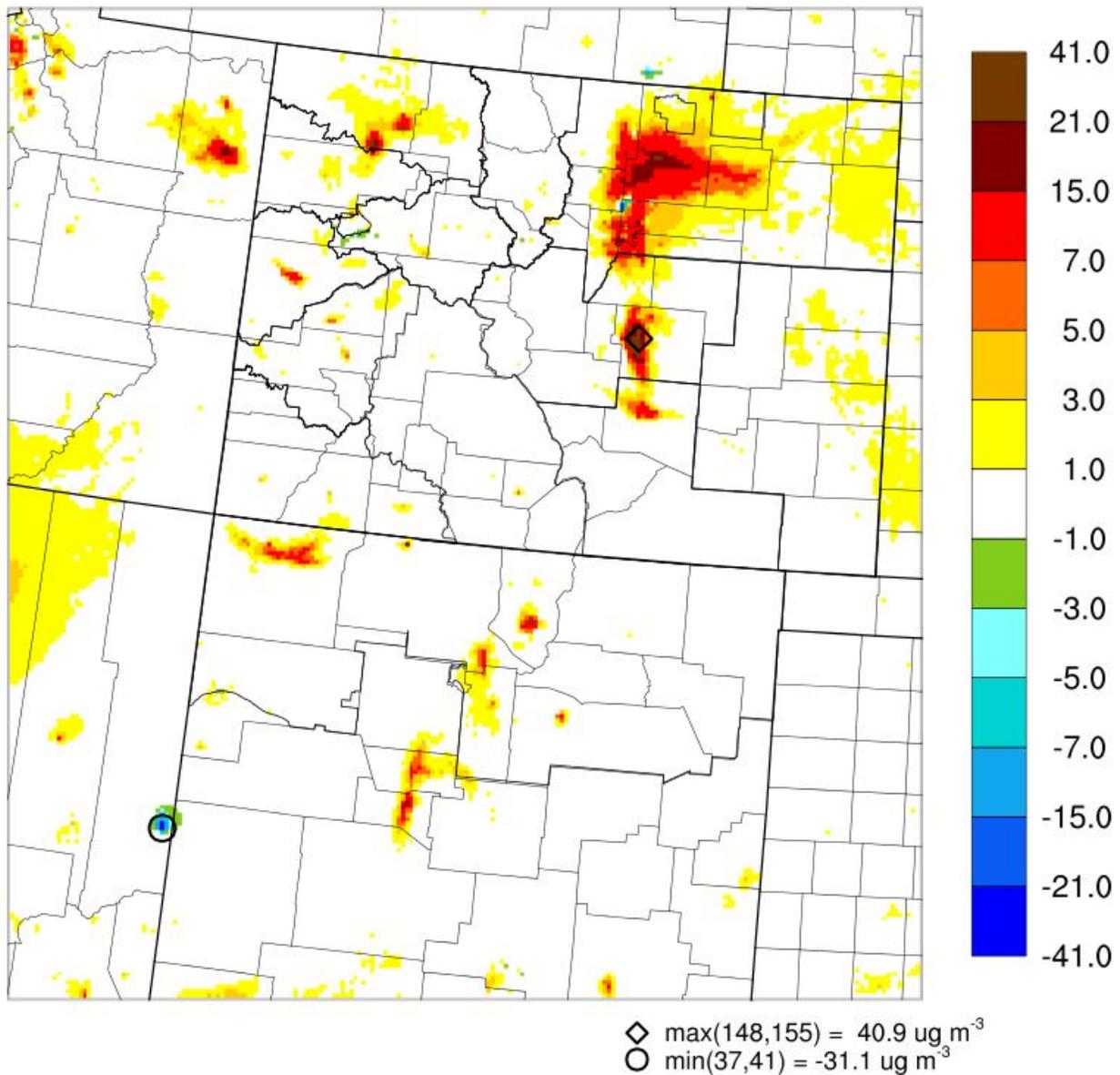
Class I Area	Best 20% Days Visibility Metric (dv) - 2021 High Improvement from 2008	Worst 20% Days Visibility Metric (dv) - 2021 High Improvement from 2008	Maximum Modeled Annual Nitrogen Deposition (kg/ha-yr) – 2021 High Improvement from 2008
Rocky Mtn. National Park	0.04	0.89	1.08

* positive values mean overall improvement and deposition values are maximum for all grid cells making up the Class I area.

For full cumulative ozone design value projections at regional ozone monitoring sites, the maximum current year 8-hour ozone design concentration (DVC; based on 2006-2010 observations) is 82.0 ppb at the Rocky Flats North (CO_Jefferson_006) monitor that is projected to be reduced to 79.5 ppb for the CARMMS 2021 Low Development Scenario. There are eight monitoring sites in the CARMMS 4 km domain with year 2008 DVCs above the former ozone NAAQS (75 ppb) and CARMMS predictions show that there would be 17 monitoring sites with DVF for future year 2021 ozone concentration above the new ozone Standard (70 ppb) for the CARMMS 2021 High and Medium scenarios, and 16 monitoring sites with DVF above new ozone Standard for CARMMS Low scenario (note that there would be ~ 19 monitoring sites with year 2008 DVCs above the new ozone Standard [70 ppb] and CARMMS predicts that there would only be two sites with year 2021 ozone concentration DVFs above the former ozone Standard [75 ppb] for all CARMMS scenarios). Even though there has recently been a new ozone Standard established since base year 2008, the cumulative ozone concentrations are predicted to decrease at air quality monitor locations throughout the Region. The CARMMS predicted average reductions in cumulative ozone concentrations (from base year 2008 to future year 2021) for all 37 Regional monitors in the CARMMS ozone analysis are 1.6 ppb, 1.6 ppb and 2.1 ppb for the CARMMS High, Medium and Low Scenarios, respectively. CARMMS predicts slight increases (< 1ppb) at only two Larimer County, Colorado based monitor locations for the CARMMS High and Medium Scenarios (no predicted increases at Regional monitors for the CARMMS Low Scenario).

are expected to increase in major Colorado Front Range cities and near mining operations in Colorado.

**The 8th highest daily average PM_{2.5} Concentration
2021 High Oil and Gas Scenario - 2008
CARMMS CAMx 4km**



With the exception of PM_{2.5} concentrations near large cities, future mining operations and non-Federal O&G operations, the CARMMS High Scenario full cumulative modeling results show an overall improvement to air quality in the region from year 2008 to year 2021.

Greenhouse Gases and Climate Change

The implementation of the proposed action is estimated to contribute 8,824 metric tons of carbon dioxide equivalent (CO₂(e)) in the maximum construction / development year (~ 2 well-pads, roads and pipeline constructed and 24 wells developed). Over a 25 year timeframe, the total operational phase production GHG emissions expected are approximately 246,478 metric tons CO₂(e) for the 24 new wells. The total operational / production (post-development) annual GHG emissions for all phases of production (upstream [well-pad level operations], midstream [centralized compressor station] and downstream [end-use combustion]) expected are approximately 1,624,436 metric tons CO₂(e) per year for the 24 new wells. The downstream end-use consumption emissions were estimated using U.S. EIA Annual Energy Outlook information. It should be noted that production values (also estimated at this time) could vary significantly over the life of the project, making any prediction of the quantities of GHG emitted in the long-term highly speculative.

The CDPHE used the EPA's State Inventory Tool to estimate future years GHG emissions inventories for Colorado for the CDPHE year 2013 GHG Report. In year 2020, it is estimated that Colorado's annual GHG emissions will be approximately 128,060,000 metric tons CO₂(e). The proposed action annual production phase (post-development) GHG emissions including downstream end-use combustion would represent about 1.3 % of the state of Colorado's year 2020 annual GHG emissions. Given the relative magnitude of greenhouse gas emissions associated with the development of the 24 wells as compared to the state's GHG emission levels, the GHG contribution associated with the new wells (while considering all product is used locally and end-use combustion occurs in Colorado) is small.

To provide additional context, the EPA has recently modeled global climate change impacts from a model source emitting 20% more GHGs than a 1500MW coal-fired steam electric generating plant (approx. 14,132,586 metric tons per year of CO₂, 273.6 metric tons per year of nitrous oxide, and 136.8 metric tons per year of methane). It estimated a hypothetical maximum mean global temperature value increase resulting from such a project. The results ranged from 0.00022 and 0.00035 degrees Celsius occurring approximately 50 years after the facility begins operation. The modeled changes are extremely small, and any downsizing of these results from the global scale would produce greater uncertainty in the predictions. The EPA concluded that even assuming such an increase in temperature could be downscaled to a particular location, it "would be too small to physically measure or detect", see Letter from Robert J. Meyers, Principal Deputy Assistant Administrator, Office of Air and Radiation re: "Endangered Species Act and GHG Emitting Activities (Oct. 3, 2008). The project emissions are a fraction of the EPA's modeled source and are shorter in duration, and therefore reasonable to conclude that the project would have no measurable impact on the climate.

Protective/Mitigation Measures

It is anticipated that the operator would apply for either an Colorado APCD air permit for the site as a whole, or cover individual equipment under one of Colorado's general permits for oil and gas operations. The state as the regulatory authority for oil and gas actions requires controls of emissions and standards for compliance that the operator will be subject to. It is expected that the operator will comply with the requirements and make every effort to minimize emissions through good engineering and operating practices to the maximum extent practical. In addition to the existing state and federal requirements, the following BLM requirements will apply:

* At a minimum, applicant will continuously apply water or dust-suppressant to unpaved surfaces in areas of concern (see Figure 1.3) likely to be disturbed during construction / well development

phase (continuously for this phase) and during operations / production phase when dry conditions exist and when daily multiple (5 or more per day) truck trips to well-pads occur to haul product (oil, water) or for regular maintenance, etc. All unpaved road traffic generated dust emissions should be minimized on unpaved roads in the project area by reducing speeds, applying dust suppressant, etc., but it is expected that at least 1,000 feet of additional dust suppression should be applied on each side of residence driveways / entrances (see dust concern areas in Figure 1.3) to minimize dust impacts to nearby residences.

* The applicant should not develop and operate the new facilities with equipment and practices that result in higher emissions than were analyzed for the EA air quality analysis. Consideration should be given to the information and assumptions provided by operator for developing the project-specific emissions inventory. Some of the design features include Tier 2 engines for drilling, completion and fracking; green completions, oil and produced water tanks emissions controlled with VRU and low-bleed pneumatic devices.

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 could occur as under the Proposed Action, provided that the wells were drilled or completed such that they would not produce or drain federally-owned oil and gas. Consequently, the air quality and GHG impacts described above (Environmental Consequences for APD Approval) for the Proposed Action could 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, the air quality impacts associated with No Action Alternative would be essentially very similar as those disclosed for the Proposed Action – APD Approval.

Protective/Mitigation Measures:

None

Cumulative Impacts:

May be similar to Proposed Action.

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 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. 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.

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 and prospective mineral zones. At the APD stage, geologic and engineering reviews will be completed 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.

Cumulative Impacts:

Cumulative impacts on geology and minerals resources would primarily occur as a result of development, which would irreversibly deplete recoverable hydrocarbons from the producing formation.

No Action Alternative:

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.

Direct and Indirect Impacts:

May be similar to proposed action.

Protective/Mitigation Measures:

None

Cumulative Impacts:

May be similar to proposed action

3.2.3. Soils

Affected Environment:

Well Pads

The two proposed pads are on the Ascalon fine sandy loam soils, 0 to 6 percent slopes, with a small overhang (10 – 20% of total pad area) on the Bankard loamy fine sand, 0 to 3 percent slopes. The Ascalon soils are derived from calcareous loamy alluvium, with a root restrictive layer at a depth of greater than 80 inches. The natural drainage class is well drained, with low runoff potential and no frequency of ponding. This soil does not meet hydric criteria. The Ascalon soil is in the Loamy plains (R067BY002CO) Ecological site, and is of statewide farmland importance.

The Bankard soils are derived from stratified, calcareous sandy alluvium, and also have a root restrictive layer at a depth greater than 80 inches. The natural drainage class is excessively drained, with a very low runoff potential and no frequency of ponding. This soil does not meet hydric criteria. The Bankard soil is in the Sandy Bottomland (R067BY031CO) Ecological site, and is not of farmland importance.

Access Roads

The access roads outlined in the Proposed Action cross the Ascalon soils that are described in the pads section. The 7F access road also crosses the Bushman fine sandy loam, 0 to 3 percent slopes. This soil is derived from calcareous loamy alluvium, with a root restrictive layer at a depth of greater than 80 inches. The natural drainage class is well drained, with very low runoff potential and no frequency of ponding. This soil does not meet hydric criteria. The Bushman soil is in the Sandy Plains (R067BY024CO) Ecological site, and is of local farmland importance.

Environmental Effects

Proposed Action:

Direct and Indirect Impacts:

The proposed pads would disturb 16.8 acres of private land surface, and the access roads would disturb one additional acre. Post reclamation, 7.3 acres would remain disturbed for the pads and one for the access roads. This is assuming successful

interim reclamation including re-contouring, seeding, and necessary stabilization. The proposed action would have a moderate to major direct impact to soils present at the construction site. Indirectly, the increased runoff from the disturbed soils could result in increased erosion and gulying down gradient. Due to the gentle slopes, high infiltration rate of the native soils, and construction standards being proposed, impacts to soils off site would be minor.

Project construction could result in a small percent of increased wind erosion during initial operations of associated with construction and drilling, however would be mitigated by applications of water or chemicals for dust abatement as needed. A risk of windblown erosion will continue until those disturbed lands are hardened, reclaimed by vegetation cover, protected by tackifier, straw, or manure, or protected by other methods. Overall-negative effects to soil resources, such as loss of top soil resulting from wind erosion should be reduced significantly through the correct implementation of interim and final reclamation measures and the implementation of BMPs during the construction. Continued monitoring and maintenance of the pads would be required to limit any further or unnecessary impacts to soil resources.

Protective/Mitigation Measures/Residual Effects:

After completion and/or abandonment of the well, the soils would still be irreversibly different than they originally were. Overall, with the proposed reclamation and stormwater and dust abatement practices, soil productivity would not be considerably altered if the proposed areas are abandoned. All infrastructure (roads, drill pads, etc.) being proposed, would be built to Colorado Oil and Gas Conservation Commission standards. No additional mitigation would be required.

Cumulative Impacts:

The area around the proposed wells has a variety factors effecting soils including other wells, roads, housing, agriculture, and livestock grazing. The addition of the infrastructure needed to develop the wells would have an additional impact to the areas soils. In the long term, if economical quantities of oil and gas are found, additional wells can be expected to be drilled. This could add a large amount of disturbance that could have a larger impact on soils in the future.

No Action Alternative:

Direct and Indirect Impacts:

It is expected that under this alternative the facilities would still be constructed in order to drill the non-federal wells planned by the operator for these pads, and the impacts to soil resources would be approximately the same.

Protective/Mitigation Measures:

None

Cumulative Impacts:

May be similar to Proposed Action

3.2.4. Hydrology/Water Quality

Surface, Groundwater, Floodplains

Affected Environment:

The proposed well pads would be located in an upland setting in the Spring Creek-Pawnee Creek watershed (1019001403). Annual rainfall is estimated between 13 and 17 inches per year. 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 estimated to be from 250 to 300 feet thick in the region, 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. Well yields may be as high as 100 gallons per minute (GPM), but are generally somewhat lower. The Laramie-Fox Hills aquifers are under artesian pressure at the current time.

The Colorado Division of Water Resources CDSS interactive map shows one known groundwater well within one mile of the proposed pads. The well is an irrigation system belonging to the surface owner, Jack Ficus (Permit ID 4967) and is drilled to an unknown depth. However, based on cattle trailing and visible stock ponds seen in aerial photos it appears there may be more water wells than shown in the state records.

Environmental Effects

Proposed Action:

Direct and Indirect Impacts:

The State of Colorado regulates water use within Colorado, including water used for oil and gas development. 100% of the water for this project will either be purchased from Grassland Water Solutions, and will come from wells it operates at its Pawnee facility, or from the water well permit #77669-F. The Grasslands water wells produce from the Upper Laramie and Laramie-Fox Hills Aquifer located in the Upper Crow Creek Designated Groundwater Basin, which is deemed non-tributary to the South Platte River. The water produced from well #7769-F is also deemed non-tributary to the South Platte River by the State of Colorado. It is estimated that approximately 135 acre feet of water will be required to construct the pads and roads, drill and complete this well.

Surface water impacts of the proposed wells are mainly associated with the surface disturbance associated with drilling and related infrastructure after well completion. For the proposed project, approximately 17.8 acres would be disturbed. Most impacts to surface water from oil and gas activity is due to removal of vegetation and exposure of mineral soils. Site specific impacts would be soil compaction caused by construction that would reduce the soil infiltration rates, in turn increasing runoff during precipitation events. Downstream effects of the increased runoff may include changes in downstream channel morphology such as bed and bank erosion or accretion. The potential for increased runoff is greater during the construction and drilling phase of the project, and would be

reduced or eliminated after successful interim and final reclamation. Due to the flat nature of the topography, high infiltration rates and low potential for runoff of the soils in the project area, stormwater management plans and interim reclamation practices little to no new impacts to surface water quality would result from the surface disturbance portion of drilling the proposed wells. Additional surface water impacts could result from chemicals, or other fluids, accidentally spilled or leaked during the development process and could result in the contamination of both ground and surface waters. State and Federal regulations reducing the potential for spills and requiring spill clean-up and stormwater management structures along with operator committed best management practices such as elimination of pits with closed loop drilling and use of enclosed steel frac tanks would mitigate this potential impact.

The proposed well would pass through usable groundwater. Groundwater in this area is relied on for agricultural, industrial and, domestic use. If contamination of groundwater from any source occurs, changes in groundwater quality could impact springs and water wells that are sourced from the affected aquifers. Potential impacts to groundwater resources could occur if proper drilling and completion practices are not followed. This could include loss of well integrity, surface spills, or loss of fluids in the drilling and completion process. It is possible for drilling fluids (mud) to be introduced into the water producing formations without proper casing and cementing of the well bore. Changes in porosity or other properties of the rock being drilled through can also result in the loss of drilling fluids. When this occurs, drilling fluids can be introduced into groundwater without proper cementing and casing. Fresh water based mud will be used when drilling through usable water zones. Usable water zones will protected with surface casing (surrounding intermediate or production casing), which is set and cemented before drilling into hydrocarbon producing zones. Site specific conditions and drilling practices determine the probability of this occurrence and determine the groundwater resources that could be impacted. After well is drilled and cased, it will be completed using hydraulic fracturing.

Hydraulic fracturing is the process of injecting high pressure fluid into the target formation in order to open naturally occurring fractures in the formation, allowing hydrocarbons to flow into the completed portion of the wellbore. The target formations where the hydraulic fracturing treatment takes place is separated from usable groundwater zones by a geologic “confining layer” that is thousands of feet thick. Hydraulic fracturing fluid typically contains about 90% water, 9% sand, with chemical additives making up the remaining volume. These chemicals typically consist of substances such as acid, surfactant, friction reducer, gelling agent and breaker, scale inhibitor ph adjusting agent, ect. COGCC regulations require operators to publicly disclose chemicals used in hydraulic fracturing on FracFocus: <http://fracfocus.org/>

At the APD stage, geologic and engineering reviews are performed to ensure that mud programs, cementing and casing programs are adequate to protect all downhole resources. BLM Onshore Order #2 requires the protection of usable water zones (TDS < 10,000). This includes proper casing, cementing and plugging (upon abandonment) procedures, making contamination of ground water resources highly unlikely. Surface casing and cement would be extended beyond usable

water zones. Production casing will be extended and adequately cemented within the surface casing to protect other mineral formations, in addition to usable water bearing zones. These requirements ensure that drilling fluids, hydraulic fracturing fluids and produced water and hydrocarbons remain within the well bore and do not enter groundwater, or any other formations.

The State of Colorado also has oil and gas regulations in place to protect ground and surface waters, including the regulation of hydraulic fracturing.

Protective/Mitigation Measures:

No additional mitigation is required to protect water resources beyond what is found in other sections of this document and other APD approval requirements.

Cumulative Impacts:

Most of the watershed is undeveloped other than oil and gas development. The other uses include agriculture and cattle grazing. With proper mitigation and protective measures, cumulative impacts to surrounding areas are expected to be minimal.

No Action Alternative:

Direct and Indirect Impacts:

It is expected that under this alternative the facilities would still be constructed in order to drill the non-federal wells planned by the operator for these pads, and the impacts to surface water resources would be approximately the same. Similar potential groundwater impacts may take place for the drilling of the non-federal wells, but no federal wells would penetrate groundwater zones, and no water would be used to drill and complete the federal wells.

Protective/Mitigation Measures:

None

Cumulative Impacts:

May be similar to Proposed Action.

3.3. Biological Resources

3.3.1. Threatened, Endangered and Sensitive Species

Affected Environment: The list of federally listed threatened, endangered and proposed species and designated critical habitat for Weld County was obtained from the US Fish and Wildlife Service for the action area on October 7, 2015 from that agency's iPaC website. Of the threatened and endangered species that may be present in Weld County, nine species have range within a ½ mile of the proposed action area, which includes the proposed well pad, access road and drill line, or need to be considered due to downstream South Platte River concerns. Those listed species include: Interior least tern (*Sternula antillarum*), Mexican spotted owl (*Strix occidentalis lucida*), piping plover (*Charadrius melodus*), whooping crane (*Grus americana*), Preble's meadow

jumping mouse (*Zapus hudsonius preblei*), Colorado butterfly plant (*Guara neomexicana* spp. *coloradensis*), Ute ladies' tresses orchid (*Spiranthes diluvialis*), Western prairie -fringed orchid (*Platanthera praeclara*), and Pallid sturgeon (*Scaphirhynchus albus*). See the Analysis for Threatened, Endangered and Proposed Species in the administrative record for more information.

Environmental Effects

Proposed Action:

Direct and Indirect Impacts: There are no cool moist canyons or cliffs within a ½ mile of the proposed action area, therefore suitable habitat for Mexican spotted owl is not present. There would be NO EFFECT to Mexican spotted owl from the proposed Whiting Horsetail 7F & 7G APD project.

A dry creek bed appears to be located in between the two proposed well pads, approximately 147 feet from the closest pad. One of the proposed access roads parallels that creek bed. During on-site inspections, no riparian vegetation was observed on the banks of the creek bed. The uplands support shortgrass prairie and dry shrubs that are grazed. Such conditions are not suitable habitats for Colorado butterfly plant, Ute ladies'-tresses orchid, and Preble's meadow jumping mouse. Since suitable habitat for these species is not present, there would not be effects to these species or their habitats. Since there would be no direct or indirect effects to these species, there would be no cumulative effects to these species or their habitats. There would be NO EFFECT to Colorado butterfly plant, Ute ladies'-tresses orchid, Preble's meadow jumping mouse from the proposed Whiting Horsetail 7F & 7G APD project for the following reasons: 1) suitable habitat is not present, 2) there would be no direct or indirect effects to habitat or the species, and 3) there would be no cumulative effects.

Interior least tern, piping plover, whooping crane, pallid sturgeon and Western prairie fringed orchid do not occur in Colorado and therefore dry land operations in Colorado would not affect these species. Furthermore, the proposed action does not include water depletions from the South Platte River. Therefore, suitable habitat for Interior least tern, piping plover, whooping crane, pallid sturgeon and Western prairie fringed orchid located in the South Platte River downstream of the action area would not be affected by the project. Since there would be no direct or indirect effects to these species, there would be no cumulative effects to these species or their habitats. There would be NO EFFECT to Interior least tern, piping plover, whooping crane, pallid sturgeon and Western prairie fringed orchid for the following reasons: 1) Only non-tributary water would be used; water levels in the South Platte River would not be affected, 2) these species do not occur in Colorado and would not be affected by dry land operations in Colorado when non-tributary water is the only water source, and 3) there would be no cumulative effects.

Protective/Mitigation Measures: None

Cumulative Impacts: See above

No Action Alternative:

Direct and Indirect Impacts: Since suitable habitat for Mexican spotted owl, Colorado butterfly plant, Ute ladies'-tresses orchid, Preble's meadow jumping

mouse is not present, the No Action Alternative would have NO EFFECT on those species. Since water depletions would not occur in the No Action Alternative, there would be NO EFFECT Interior least tern, piping plover, whooping crane, pallid sturgeon and Western prairie fringed orchid from that alternative.

Protective/Mitigation Measures: None

Cumulative Impacts: See above

3.3.2. Vegetation

Affected Environment: Key species such as green needlegrass, western wheatgrass, American vetch, fourwing saltbush and winterfat have been reduced to remnant amounts. Blue grama and buffalograss have increased in abundance, dominate the community, and are beginning to take on a sod appearance. Sand dropseed, red threeawn, sixweeks fescue, plains pricklypear, hairy goldaster and bottlebrush squirreltail have also increased. This plant community is at risk of losing western wheatgrass, which is the major cool season grass left at this point.

Environmental Effects

Proposed Action:

Direct and Indirect Impacts: Generally oil and gas development involves complete removal of vegetation and at times re-contouring of the landscape to allow for resources to be retrieved. The type of ground activity associated with oil and gas development does result in increased susceptibility to adverse impacts such as soil compaction, weed infestations and erosion (See Soils and Invasive Plants sections). Due to these adverse impacts, establishment of native vegetation similar to adjacent undisturbed vegetation can take up to 30 years..

Protective/Mitigation Measures: See 2.2.1 Proposed Action.

Cumulative Impacts: Pad construction for the project would result in a slight reduction in native vegetation in the general project area, however, much of the vegetation in the project area is already highly modified as a result of oil and gas and agricultural activities.

No Action Alternative:

Direct and Indirect Impacts:

May be similar to the Proposed Action.

Protective/Mitigation Measures: None

Cumulative Impacts:

May be similar to the Proposed Action.

3.3.3. Sensitive Species

Affected Environment:

Seven BLM Sensitive species are believed to have suitable habitat within ½ mile of the proposed action area. These species are: mountain plover (*Charadrius montanus*)*, long-billed curlew (*Numenius americanus*), ferruginous hawk (*Buteo regalis*)*, eagle (*Aquila chrysaetos*)*, burrowing owl (*Athene cunicularia*)*, black-tailed prairie dog (*Cynomys ludovicianus*), swift fox, (*Vulpes velox*). See the Analysis for BLM Sensitive Species in the administrative record for more information. Species denoted with an asterisk are further protected under the Migratory Bird Treaty Act.

Environmental Effects

Proposed Action:

Direct and Indirect Impacts: The following is a list of possible effects on the above BLM sensitive species that could occur from the proposed action: 1) Long-term loss of between approximately 8 and 17 acres of suitable breeding and foraging habitat from construction and site conversion from grassland to development; 2) Fragmentation of suitable breeding and foraging habitat; 3) Degradation of approximately 5 acres of suitable breeding and foraging habitat from post construction reclamation; 4) Disturbance to individual animals from construction and operation noise; 5) Flushing individual animals from human presence, especially during construction and initial operations, maintenance, etc.; 6) Abandonment of reproductive sites for individual animals, if present, short-term and long-term; 7) Changes in insect or small mammal prey assemblages, mixed results; 8) Predation from opportunistic species associated with humans and development (e.g. fox, coyote, crows, etc.); 9) Predation from raptors due to construction of structures that could serve as perches (e.g. new fences, drill rigs, etc.); and 10) Collisions with vehicles, increased risk of mortality, reduction in safe passage. A portion of the affected suitable habitat may be reclaimed but the effects would likely persist due to the structure, operations and maintenance. Reclamation would reduce the level of effects, but would not eliminate effects. Because the limited spatial extent of this particular pad, the direct and indirect effects would be narrow in scope and spatial extent, and limited to individuals.

Protective/Mitigation Measures: Please refer to the conservation measures described in the Migratory Bird section that would be applicable for mountain plover, long-billed curlew, ferruginous hawk, golden eagle, and burrowing owl.

Cumulative Impacts: Cumulative effects would occur for mountain plover, long-billed curlew, ferruginous hawk, golden eagle, burrowing owl, black-tailed prairie dog, and swift fox given the spatial extent and intensity of oil and gas development, agricultural production, housing developments in the vicinity of the proposed action area. The cumulative effects felt would be similar to those described above, but at a much broader portion of the species' range. In addition, it can be assumed that to some degree these BLM sensitive species would avoid oil and gas developments even after construction is completed and lands are reclaimed across a larger extent due to cumulative effects described above. Overall, this

particular proposed application for permit to drill would not affect the population at the planning area, nor cause a trend towards listing.

No Action Alternative:

Direct and Indirect Impacts:

May be similar to the Proposed Action.

Protective/Mitigation Measures: None

Cumulative Impacts:

May be similar to the Proposed Action.

3.3.4. Migratory Birds & Terrestrial Wildlife

Affected Environment:

Eleven migratory birds described as priority BLM species, bird species of conservation concern by Colorado Partners in Flight or US Fish and Wildlife Service Birds of Conservation Concern (BCC) – 2008 List for BCR 18-Shortgrass Prairie could occur within the ½ mile action area. They are: BLM Priority Migratory Birds: Cassin's sparrow (*Aimophila cassinii*), horned lark (*Eremophila alpestris*), lark bunting (*Calamospiza melanocorys*), loggerhead shrike (*Lanius ludovicianus*), and Swainson's hawk (*Buteo swainsoni*); Colorado Partners In Flight & Landbird Conservation Priority Birds: Bell's vireo (*Vireo bellii*), grasshopper sparrow (*Ammodramus savannarum*), McCown's longspur (*Calcarius mccownii*), prairie falcon (*Falco mexicanus*), short-eared owl (*Asio flammeus*), and upland sandpiper (*Bartramia longicauda*). These species are believed to winter and/or breed in or near the project area and have declining populations. See the Analysis for Migratory Birds in the administrative record for more information.

Environmental Effects

Proposed Action:

Direct and Indirect Impacts: For the migratory bird species considered, the following effects could be expected from the proposed action: 1) maintenance, construction and operations during nesting season may damage nests, could cause a short-term and long-term loss of between approximately 8 and 17 acres of nesting habitat; 2) these species may nest attempt nest building in the action area annually and on-going operations could affect their ability to reproduce in the action area, cause them to flush from the area, and abandon their nests or chicks; 3) foraging habitat would be minimally affected. Because the spatial extent of this particular proposed application for permit to drill would occur but would be limited in spatial extent, the effects to breeding and foraging would be limited to individual birds.

Protective/Mitigation Measures: Before construction, conduct bird surveys during the breeding season appropriate for the bird species described in this analysis within a 1/8 mile of the entire project area and to include all proposed construction and activity area. To capture the most species, the most appropriate time to survey would be between May 20th to July 10th (see analysis in the administrative record for details). Surveys shall be coordinated with the BLM wildlife biologist and

shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions, following interior line transects (Hanni 2002) or Monitoring Colorado Bird's (MCB) point transects (Leukering 2000), or other pre-approved protocol. If surveys result in positive detection of breeding migratory birds or raptors, then no vegetation and ground surface-disturbing activities would be allowed for a 60-day period during the core breeding season of these birds to provide limited protection of migratory bird and raptor breeding activities; the 60-day period shall be coordinated with the BLM wildlife biologist to ensure appropriate protections of breeding activity are provided. If raptor nests are detected then a 1/2 mile buffer, or a comparable stipulation depending on the raptor species, would be required. If surveys result in negative detection of breeding migratory birds or raptors, then construction activities could proceed. If bird surveys are not feasible, then no construction or implementation activities would be allowed between May 15th and July 15th to provide limited protection of migratory bird and raptor breeding activities. Vegetation and ground surface-disturbing activities that are initiated prior to March 1st may continue through the breeding season because it is assumed loss of suitable breeding habitat occurred in the project area prior to the start of the bird breeding season, which would preclude these species from nesting in the area.

Cumulative Impacts: Cumulative effects to these species and individual birds could be felt due to the large extent to which surrounding lands are developed for oil and gas, as well as for agricultural production, housing developments, etc. Since most of the surrounding lands are privately owned, there would be little protection under the Migratory Bird Treaty Act for these species from these non-federal activities.

No Action Alternative:

Direct and Indirect Impacts:

May be similar to the Proposed Action.

Protective/Mitigation Measures: None

Cumulative Impacts:

May be similar to the Proposed Action.

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 area of potential effect [see Reports CR-RG-15-80 N and CR-RG-15-122 P]. Although the remains of a historic structure (5WL7748) was recorded during one of the cultural resources inventories, it is not eligible for the National Register of Historic Places, and therefore, does not qualify as a historic property. Therefore, no historic properties will be affected by the proposed undertaking.

Proposed Action:

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

Cumulative Impacts: None

No Action Alternative:

Direct and Indirect Impacts: May be similar to the Proposed Action.

Protective/Mitigation Measures: None

Cumulative Impacts: May be similar to the Proposed Action.

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 or cultural significance in the APE. The cultural resources inventories of the APEs produced no other evidence that suggests the APE holds special significance for Native Americans. The BLM conducted a consultation with the following tribes (CR-RG-14-34 NA): 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.

Proposed Action:

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

Cumulative Impacts: None

No Action Alternative:

Direct and Indirect Impacts: May be similar to the Proposed Action.

Protective/Mitigation Measures: None

Cumulative Impacts: May be similar to the Proposed Action.

3.4.3. Paleontological Resources

Affected Environment:

The proposed wells are located on 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 location.

The White River formation is a Class 5 geologic formation, according to the BLM's Potential Fossil Yield Classification (PFYC) System that was created to assist in determining proper mitigation approaches for surface disturbing activities (WO IM 2008-009). 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. There are several vertebrate fossil finds in the same formation located within 5 miles of the proposed well locations.

Environmental Effects

Proposed Action:

The proposed access roads, pipelines, and well pads would disturb the surface, potentially penetrate the protective soil layer and potentially encounter federally protected vertebrate fossils.

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.

Protective/Mitigation Measures:

The proposed construction of the well pads, access to the well pads, and pipeline 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 by a BLM qualified paleontologist 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 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.

Cumulative Impacts:

Past and current impacts to important fossil resources could be long-term and significant since fossils removed or destroyed would be lost to science. Impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the proposed activity would have a beneficial impact in that ground disturbing activities may result in the discovery of important fossil resources.

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:

None

Cumulative Impacts:

May be similar to Proposed Action

3.4.5. Visual Resources

Affected Environment

The project area, near the Pawnee National Grasslands, is located in an agricultural area with an abundance of modifications to the landscape, particularly related to agriculture uses. Increasingly, evidence of oil and gas leasing can be found within the landscape as well. A visual resource inventory conducted by the BLM in 2015 revealed that, overall, the project area has low visual values. This is largely due to the lack of dramatic topography and fairly uniform vegetation. It is also a long distance from major viewing corridors such as highways or towns. However, the inventory did reveal that there is public sensitivity and concern regarding the cumulative impacts that oil and gas development is having on the landscape associated with the Pawnee National Grasslands.

Environmental Effects

Proposed Action:

Direct and Indirect Impacts: The project will introduce additional oil and gas infrastructure into the landscape. The facilities will likely be readily noticeable within the low rolling topography and grassland vegetation. However, the facilities will likely not stand out in comparison to the already modified landscape including oil and gas infrastructure and minimal direct impacts to visual resources are anticipated.

Protective/Mitigation Measures: The following mitigation will assist in reducing impacts to visual resources:

- Use topography to screen facilities to the greatest extent possible
- Paint facilities so they blend with the native vegetation

- Minimize the amount of disturbance associated with roads and well pads

Cumulative Impacts: The project will introduce additional oil and gas infrastructure into the landscape. This project, combined with other oil and gas development, is slowly having a cumulative impact to visual resources in the region.

No Action Alternative:

Direct and Indirect Impacts: May be similar to Proposed Action

Protective/Mitigation Measures: None

Cumulative Impacts: May be similar to Proposed Action

3.4.6. Wastes, Hazardous and Solid

Affected Environment:

It is assumed 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).

Nothing in the analysis or approval of this action by BLM authorizes or in any way permits a release or threat of a release of hazardous materials (as defined under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. 9601 et seq., and its regulations) into the environment that will require a response action or result in the incurrence of response costs.

Environmental Effects

Proposed Action:

Direct and Indirect Impacts: 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

Protective/Mitigation Measures: The following mitigation will assist in reducing potential spills resulting in groundwater and/or soil contamination:

- All Above Ground Storage Tanks will need to have secondary containment and constructed in accordance with standard industry practices or an associated Spill Prevention Control and Countermeasures plan in accordance with State regulations (if applicable).

- If drums are used, secondary containment constructed in accordance with standard industry practices or governing regulations is required. Storage and labeling of drums should be in accordance with recommendations on associated MSDS sheets, to account for chemical characteristics and compatibility.
- Appropriate level of spill kits need to be onsite and in vehicles.
- All spill reporting needs to follow the reporting requirements outlined in NTL-3A.

Cumulative Impacts: Cumulative impacts will be reduced to negligible if protective mitigation measures are followed.

No Action Alternative:

Direct and Indirect Impacts: May be similar to Proposed Action

Protective/Mitigation Measures: None

Cumulative Impacts: May be similar to Proposed Action

3.5. Cumulative Impact Summary

The proposed project is located in Weld County, Colorado. Weld County's economy is based primarily on Oil and Gas development and crop and livestock production. Due to this, much of the natural landscape of Weld County has been modified. Weld County has by far more Oil and Gas wells than any other county in Colorado, with over 22,000 active oil and/or gas wells. The vast majority of these wells are located on privately owned surface and produce entirely privately owned minerals. Because of the comparatively small number of federally owned mineral parcels in this area, the cumulative impact of the drilling and operation of these twelve fee/fee/fed wells would add incrementally to the cumulative impacts of oil and gas development in Weld County. These include minor impacts to air, fluid minerals (geology), soils, water, vegetation, wildlife, paleontological resources and visual resources.

Air: The proposed project is located in Weld County, Colorado. Weld County's economy is based primarily on agriculture (farming and livestock production) and oil and gas development. Due to this, most of the natural landscape of Weld County has been modified. Weld County has more than 22,000 active petroleum wells, more than any other county in the United States, according to Weld county commissioners. Most of these wells are located on privately owned surface and produce entirely privately owned minerals. BLM is involved in less than 5% of all petroleum wells in Weld County. Because of the comparatively small number of Federally owned mineral parcels in this area, the cumulative impact of Federal petroleum development is small but still additive to the impact of the overall petroleum development in Weld County. See analysis for full cumulative impacts on air resources.

Geology (Fluid Minerals): Cumulative impacts on geology and minerals resources would primarily occur as a result of development, which would irreversibly deplete recoverable hydrocarbons from the producing formation.

Soils: The area around the proposed wells has a variety factors effecting soils including roads, housing, agriculture, and livestock grazing. The addition of the infrastructure needed to drill the pads would have an additional impact to the areas soils. In the long term, if economical quantities

of oil and gas are found, additional wells can be expected to be drilled. This could add a large amount of disturbance that could have a larger impact on soils in the future.

Hydrology/Water Quality Most of the watershed is undeveloped other than oil and gas development. The other uses include agriculture and cattle grazing. With proper mitigation and protective measures, cumulative impacts to surrounding areas are expected to be minimal.

Vegetation: Pad construction for the project would result in a slight reduction in native vegetation in the general project area, however, much of the vegetation in the project area is already highly modified as a result of oil and gas and agricultural activities.

Sensitive Species: Cumulative effects would occur for mountain plover, long-billed curlew, ferruginous hawk, golden eagle, burrowing owl, black-tailed prairie dog, and swift fox given the spatial extent and intensity of oil and gas development, agricultural production, housing developments in the vicinity of the proposed action area. The cumulative effects felt would be similar to those described above, but at a much broader portion of the species' range. In addition, it can be assumed that to some degree these BLM sensitive species would avoid oil and gas developments even after construction is completed and lands are reclaimed across a larger extent due to cumulative effects described above. Overall, this particular proposed application for permit to drill would not affect the population at the planning area, nor cause a trend towards listing.

Migratory Birds & Terrestrial Wildlife: Cumulative effects to these species and individual birds could be felt due to the large extent to which surrounding lands are developed for oil and gas, as well as for agricultural production, housing developments, etc. Since most of the surrounding lands are privately owned, there would be little protection under the Migratory Bird Treaty Act for these species from these non-federal activities.

Paleontological Resources: Past and current impacts to important fossil resources could be long-term and significant since fossils removed or destroyed would be lost to science. Impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the proposed activity would have a beneficial impact in that ground disturbing activities may result in the discovery of important fossil resources.

Visual Resources: The project will introduce additional oil and gas infrastructure into the landscape. This project, combined with other oil and gas development, is slowly having a cumulative impact to visual resources in the region.

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Chapter 4. Consultation and Coordination

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Chapter 4 Consultation and Coordination

4.1. List of Preparers and Participants

Please see Interdisciplinary Team Review Table for BLM participants.

4.2. Tribes, Individuals, Organizations or Agencies Consulted

The following tribes were consulted at the lease stage:

Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Sioux Tribe, Comanche Nation 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

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Chapter 5. References

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Chapter 5 References

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

Bureau of Land Management. 1991. Colorado Oil and Gas Leasing Environmental Impact Statement. Lakewood, Colorado.

Bureau of Land Management. 2008 H-1790-1 National Environmental Policy Handbook. Washington, D.C.

Bureau of Land Management. 2015. Royal Gorge Field Office Visual Resource Inventory. Cañon City, Colorado.

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Chapter 6. Finding of No Significant Impact

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Finding of No Significant Impact

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 RGFO has received an Application for Permit to Drill (APD) that proposes the drilling, completion and operation of 12 horizontal oil wells on private surface over private minerals, developing both private and federal minerals (fee/fee/fed). The operator plans to drill completely fee (100% private) wells from the surface of these proposed pads, regardless of the BLM's decision on the proposed federal wells. In order to drill the wells, the operator proposes the construction of 2 well pads and access roads. Since all surface activity and related disturbance is taking place on private surface, and private minerals are targeted along with federal minerals, BLM has limited authority over the actions that take place on the surface, including authority to impose mitigation measures (as COAs to the approved APD) pertaining to the surface management of the well site. However, BLM will analyze the impacts to applicable resources, including some that BLM has no authority to affect.

Since totally fee wells are planned for these pads, which are located on private surface over private minerals, the operator may construct pad(s) and drill totally fee wells prior to issuance of any BLM APD(s), depending on rig and permitting schedules. However, a well intended to be completed in BLM minerals shall not be drilled until a BLM APD is issued to the operator for that well.

The general area description would be defined as rural rangeland (shortgrass prairie) located in the northeastern plains of Colorado, used primarily for livestock production and oil and gas development. There are some county, private ranch and oilfield roads in the project area. Access is limited to private or oilfield roads, over private surface. There is no public land in the project area. Extensive oil and gas development has occurred in the area, mostly on private (fee) surface and private (fee) mineral estate.

The projects are located on rangeland in Northeast Weld County approximately 22.4 miles east of the town of Grover, Colorado. The Federal mineral estate that will be accessed by the wells is leased and subject to oil and gas development. All surface activities related to these actions will take place on privately owned surface over federal minerals (off lease), there is no public land or public access in the project area.

Intensity:

The potential intensity/severity of the impacts anticipated from the Horsetail 7F & 7G APD's were considered for each of the ten areas suggested for consideration by the CEQ. With regard to each::

Impacts that may be beneficial and adverse:

There would be minor impacts to air quality, vegetation, and visual resources. Most of the impacts would occur during the drilling and construction phase, and be lessened with operator committed BMPs. Potential impacts might occur to ground and surface water; however such impacts should

not occur if the required drilling requirements and regulations are followed. Impacts to surface water and soils may occur, but will be mitigated or eliminated due to regulations and operator committed BMPs. Other minor impacts might occur to migratory birds but would be mitigated through the use of a timing limitation. Positive impacts include benefits in royalties and revenue generated to the federal government from productive wells. Other indirect effects could include effects due to overall employment opportunities related to the oil and gas and service support industry in the region as well as the 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.

Public health and safety:

The proposed action will have a temporary negative impact to air quality through the generation of fugitive dust during the construction phase. Utilization of the road, surface disturbance, and construction activities such as drilling, hydraulic fracturing, well completion, and equipment installation will all impact air quality through the generation of dust related to travel, transport, and general construction. This phase will also produce short term emissions of criteria, hazardous, and greenhouse gas pollutants from vehicle and construction equipment exhausts. Once construction is complete the daily activities at the site will be reduced to operational and maintenance checks which may be as frequent as a daily visit. Emissions will result from vehicle exhausts from the maintenance and process technician visits. The pad can be expected to produce fugitive emissions of well gas, which contains mostly methane and a minor fraction of volatile organic compounds. Fugitive emissions may also result from pressure relief valves and working and breathing losses from any tanks located at the site, as well as any flanges, seals, valves, other infrastructure connections used at the site. Liquid product load-out operations will also generate fugitive emissions of VOCs and vehicular emissions. If the operator is unable to sell any produced gas from the well, then gas flaring will also produce emissions of criteria, HAP, and GHG emissions.

Unique characteristics of the geographic area:

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

Degree to which effects are likely to be highly controversial:

The potential for controversy associated with the effects of the proposed action is low. There is no disagreement or controversy among ID team members or reviewers over the nature of the effects on the resource values on public land by the proposed action.

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

The drilling of oil and gas wells has occurred historically over the past century and although the potential risks involved can be controversial, they are neither unique nor unknown. There is low potential of unknown or unique risks associated with this project due to numerous other well locations having been successfully drilled in this area of Weld County.

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Chapter 7. Horsetail 7F & 7G APDs

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DECISION RECORD

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ROYAL GORGE FIELD OFFICE
NEPA Number: DOI-BLM-CO-F020-2016-0008-EA

7.1. Horsetail 7F & 7G APDs

DECISION: It is my decision to authorize the Proposed Action as described in the attached EA. The proposed action is the drilling, completion and operation of 12 horizontal oil wells on private surface over private minerals, developing both private and federal minerals (fee/fee/fed)

The projects are located on rangeland in Northeast Weld County approximately 22.4 miles east of the town of Grover, Colorado. The Federal mineral estate that will be accessed by the wells is leased and subject to oil and gas development. All surface activities related to these actions will take place on privately owned surface over federal minerals (off lease), there is no public land or public access in the project area.

The proposed action was analyzed in the Environmental Assessment (EA) DOI-BLM-CO-F020-2016-0008 and a Finding of No Significant Impact was reached and an EIS will not be prepared.

7.2. Rationale:

This project will develop oil and gas resources on Federal minerals Lease COC75059 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 resulting from livestock grazing roads, houses, and oil and gas production. The development of the 12 proposed wells would have mostly temporary and overall minor impacts on resources present in the project area.

7.3. Mitigation Measures and Monitoring:

Air Quality: In addition to the existing state and federal requirements, the following BLM requirements will apply:

It is anticipated that the operator would apply for either an Colorado APCD air permit for the site as a whole, or cover individual equipment under one of Colorado's general permits for oil and gas operations. The state as the regulatory authority for oil and gas actions requires controls of emissions and standards for compliance that the operator will be subject to. It is expected that the operator will comply with the requirements and make every effort to minimize emissions through good engineering and operating practices to the maximum extent practical. In addition to the existing state and federal requirements, the following BLM requirements will apply:

* At a minimum, applicant will continuously apply water or dust-suppressant to unpaved surfaces in areas of concern (see Figure 1.3) likely to be disturbed during construction / well development

phase (continuously for this phase) and during operations / production phase when dry conditions exist and when daily multiple (5 or more per day) truck trips to well-pads occur to haul product (oil, water) or for regular maintenance, etc. All unpaved road traffic generated dust emissions should be minimized on unpaved roads in the project area by reducing speeds, applying dust suppressant, etc., but it is expected that at least 1,000 feet of additional dust suppression should be applied on each side of residence driveways / entrances (see dust concern areas in Figure 1.3) to minimize dust impacts to nearby residences.

* The applicant should not develop and operate the new facilities with equipment and practices that result in higher emissions than were analyzed for the EA air quality analysis. Consideration should be given to the information and assumptions provided by operator for developing the project-specific emissions inventory. Some of the design features include Tier 2 engines for drilling, completion and fracking; green completions, oil and produced water tanks emissions controlled with VRU and low-bleed pneumatic devices.

Migratory Birds:Protective/Mitigation Measures: Before construction, conduct bird surveys during the breeding season appropriate for the bird species described in this analysis within a 1/8 mile of the entire project area and to include all proposed construction and activity area. To capture the most species, the most appropriate time to survey would be between May 20th to July 10th (see analysis in the administrative record for details). Surveys shall be coordinated with the BLM wildlife biologist and shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions, following interior line transects (Hanni 2002) or Monitoring Colorado Bird's (MCB) point transects (Leukering 2000), or other pre-approved protocol. If surveys result in positive detection of breeding migratory birds or raptors, then no vegetation and ground surface-disturbing activities would be allowed for a 60-day period during the core breeding season of these birds to provided limited protection of migratory bird and raptor breeding activities; the 60-day period shall be coordinated with the BLM wildlife biologist to ensure appropriate protections of breeding activity are provided. If raptor nests are detected then a 1/2 mile buffer, or a comparable stipulation depending on the raptor species, would be required. If surveys result in negative detection of breeding migratory birds or raptors, then construction activities could proceed. If bird surveys are not feasible, then no construction or implementation activities would be allowed between May 15th and July 15th to provide limited protection of migratory bird and raptor breeding activities. Vegetation and ground surface-disturbing activities that are initiated prior to March 1st may continue through the breeding season because it is assumed loss of suitable breeding habitat occurred in the project area prior to the start of the bird breeding season, which would preclude these species from nesting in the area.

Paleontological Resources: 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 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.

Visual Resources:

The following mitigation will assist in reducing impacts to visual resources:

- Use topography to screen facilities to the greatest extent possible
- Paint facilities so they blend with the native vegetation
- Minimize the amount of disturbance associated with roads and well pads

Wastes, Hazardous or Solid: The following mitigation will assist in reducing potential spills resulting in groundwater and/or soil contamination:

- All Above Ground Storage Tanks will need to have secondary containment and constructed in accordance with standard industry practices or an associated Spill Prevention Control and Countermeasures plan in accordance with State regulations (if applicable).
- If drums are used, secondary containment constructed in accordance with standard industry practices or governing regulations is required. Storage and labeling of drums should be in accordance with recommendations on associated MSDS sheets, to account for chemical characteristics and compatibility.
- Appropriate level of spill kits need to be onsite and in vehicles.
- All spill reporting needs to follow the reporting requirements outlined in NTL-3A.

7.4. Appeal or Protest Opportunities:

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.

7.5. Authorizing Official:

/s/ Keith E. Berger

1/28/16

Keith E. Berger
Field Office Manager

Date