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

# Environmental Assessment

Horsetail 10 and 13 APDs

DOI-BLM-CO-F02-2014-038 EA

March, 2014

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# CHAPTER 1 - INTRODUCTION

## 1.1 IDENTIFYING INFORMATION

CASEFILE/PROJECT NUMBER (optional): Lease # COC 73412 and 75059

PROJECT TITLE: Horsetail 10 and 13 Applications for Permits to Drill

PLANNING UNIT: Northeast

LEGAL DESCRIPTION: Weld County, T10N R57W S 10 and S 13

APLLICANT: Whiting Oil and Gas

## 1.2 INTRODUCTION AND BACKGROUND

BACKGROUND: This EA has been prepared by the BLM to analyze environmental impacts of the construction of two well pads and the drilling of eight horizontal oil wells on private surface estates/over private mineral estates (fee/fee). The projects are located on rangeland in Northwest Weld County approximately 17 miles east of the town of Grover, Colorado. The wells will access fee and federal minerals. 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, 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. The need for the action is to develop oil and gas resources on Federal Lease COC73412 and COC75059 consistent with existing Federal lease rights provided for in the Mineral Leasing Act of 1920, as amended.

## 1.4 DECISION TO BE MADE

The BLM will decide whether to approve the Horsetail 10L and 13H 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 construct two well pads, install production facilities, and drill 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: O&G Resources, Issue 21

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

## 1.6 SCOPING, PUBLIC INVOLVEMENT AND ISSUES

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

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

Issues Identified:
No issues were identified during public scoping.

# CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

## 2.1 INTRODUCTION

The BLM has received 2 Application for Permit to Drill (APD), and is anticipating receiving 6 additional APDs, proposing the construction of two well pads, and the drilling of 8 horizontal oil wells on private surface over private minerals, developing both private and federal minerals (fee/fee/fed). 4 of the 8 proposed fee/fee/fed wells are to be drilled on the "10" well pad, which will also have 5 totally private (fee surface/100% fee minerals) wells drilled from its surface, regardless of the BLM's decision pertaining to the fee/fee/fed wells planned for this pad. Four of the proposed 8 fee/fee/fed wells are planned to be drilled from the "13" pad, which will also contain 3 totally fee wells, regardless of the BLM's decision pertaining to the Federal wells on this pad. 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.

The projects are in Weld County, approximately 17 miles east of the Town of Grover. The federal mineral estate is leased and subject to oil and gas development.

The general area description would be defined as rural rangeland located in the northeastern plains of Colorado, used primarily for livestock production and oil and gas development. There are a few county roads in the project area. Access is limited to private or petroleum field roads, over private surface. The roadways vary in development but most are dirt/primitive roads. There is no public land or public roads or other public access 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

### 2.2.1 PROPOSED ACTION

The proposed action is to construct two well pads and drill 8 horizontal wells in order to develop private and federal minerals, from a private surface over private minerals.

Access to the proposed projects would be gained by traveling on existing highways, county and oil field roads.

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 BLM well cannot be drilled until a BLM APD is issued to the operator for that well.

**Proposed Pad Details:**

**Horsetail "10" Pad:**

Access to the proposed Horsetail "10" pad would be achieved by turning south from WCR 120 onto an existing improved oil field road for approximately .5 miles. The proposed new access road will veer southwest from here to the proposed pad. The new road will be approximately 550' in length, 25' wide (15' running surface, 5' borrow ditches). This will result in approximately .3 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. The road will be surfaced with gravel where necessary. An 18" culvert will be installed where road crosses

The proposed Horsetail "10" pad is the planned surface location of 8 horizontal oil wells, 4 fee/fee/fed and 4 totally fee wells. It will have a maximum cut of 19.4 feet and a maximum fill of 4.6 feet resulting in 37,430 cu yards of excess material, plus 7,060 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 11.4 acres of new surface disturbance, which would be reduced to approximately 3.5 acres after successful interim reclamation.

**Horsetail "13" Pad:**

Access to the proposed Horsetail "13" pad would be achieved by turning south from WCR 120 onto an existing improved oil field road for approximately .5 miles. The proposed access route will veer east then southeast from here to the proposed pad. Currently there is a two track ranch road along most of

this route, which will be upgraded where the pad access will overlay this road. The new/upgraded road will be approximately 13,610' in length, 25' wide (15' running surface, 5' borrow ditches). This will result in approximately 7.8 acres 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. An 18" corrugated steel culvert will be installed where the road crosses a drainage west of the proposed pad. The road will be surfaced with gravel where necessary.

The proposed Horsetail "13" pad is the planned surface location of 8 horizontal oil wells, 4 fee/fee/fed and 4 totally fee wells. It will have a maximum cut of 9.5 feet and a maximum fill of 3.7 feet resulting in 21,580 cubic yards of material, plus 6,890 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 9.9 acres of new surface disturbance, which would be reduced to approximately 3.5 acres after successful interim reclamation.

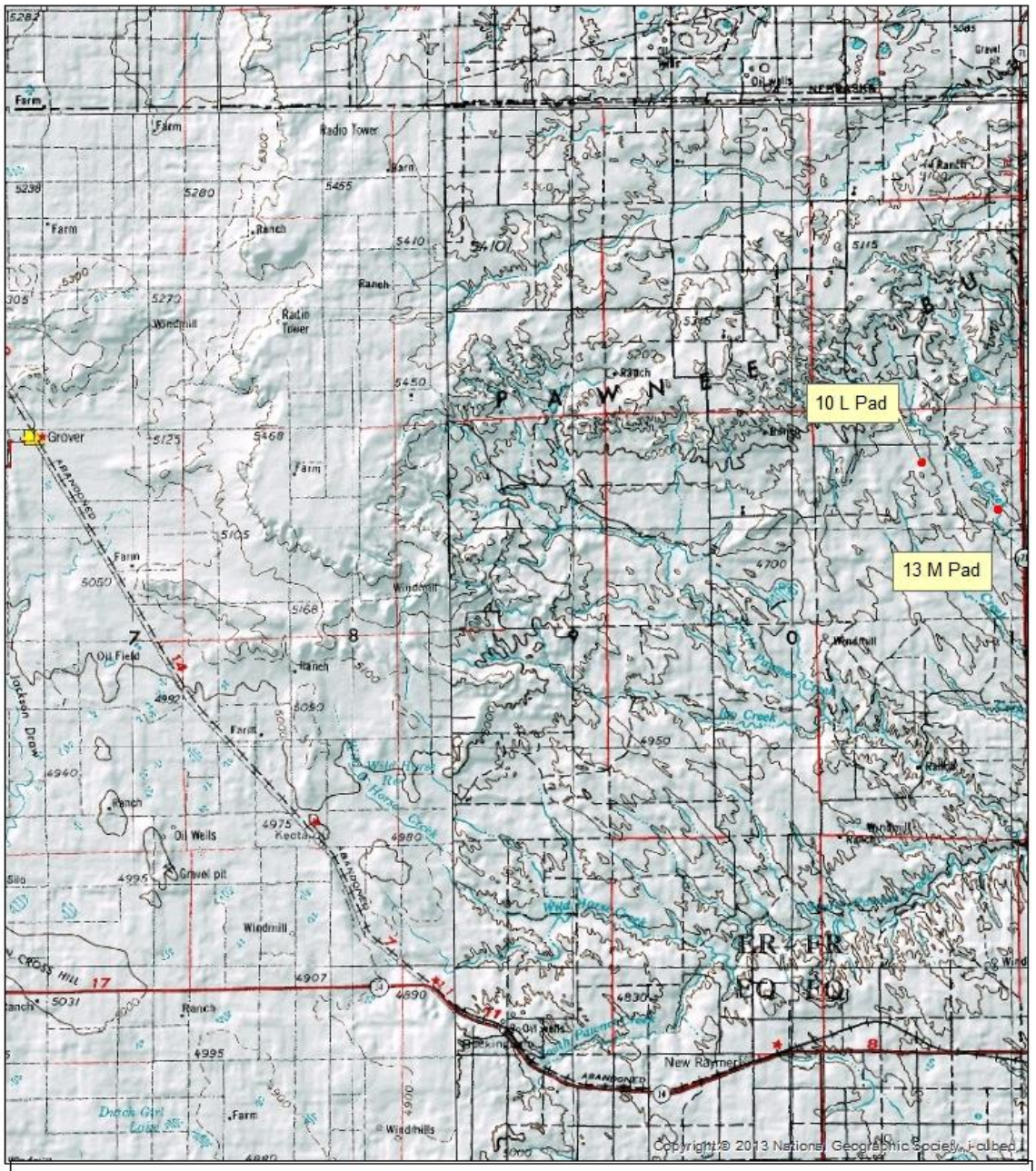
Construction and reclamation of pads and roads will be done in accordance with BLM's Gold Book standards, and employ applicable oilfield BMPs. Stormwater/erosion control measures will be taken to stabilize the site. The proposed drilling and completion of all wells will utilize closed loop systems. All liquids will be stored in tanks on the pad. No pits will be utilized. Drill cuttings will be bio-remediated onsite, in accordance with state regulations, and after it meets the standards of Colorado Table 910-1, will be spread thin over wellsite before interim reclamation. 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 drilling is estimated to be 14 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.

Final reclamation of each project will begin within 6 months (weather permitting) of final well plugging, or in the event of a dry hole. 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, the operator must re-seed the area until desirable vegetation is established. The bond will not be released until BLM has determined that successful reclamation has been achieved.

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, the applicable terms of Federal Lease COC73412 and 75059, Onshore Oil and Gas Orders, and 43 CFR §3100.

## Overview Map




OVERVIEW MAP OF HORSETAIL 10 L AND 13 M

DOI-BLM-CO-F02-2014-038 EA

**6th PM, T10N R57W**

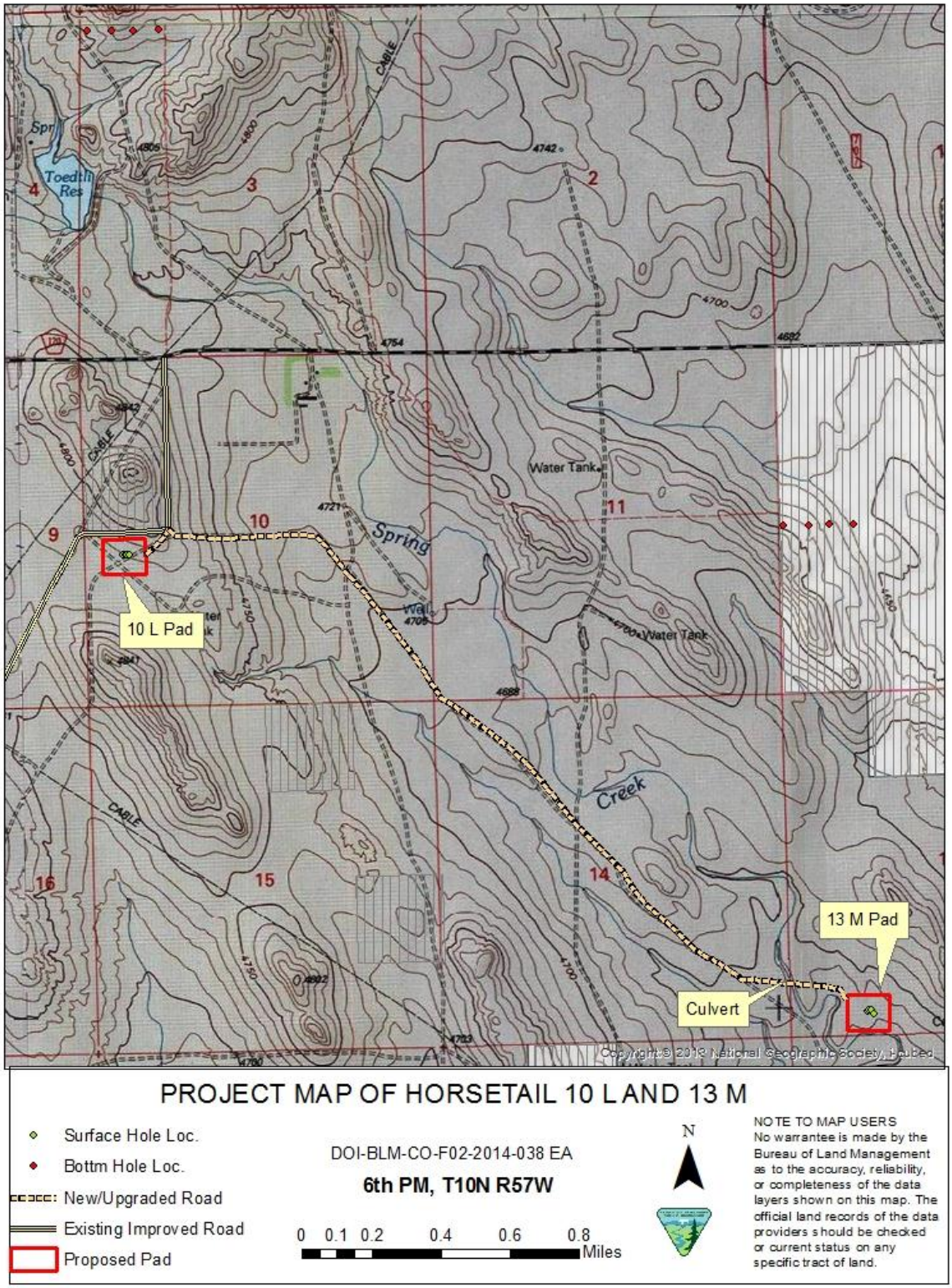
0 1 2 4 6 8 Miles

N

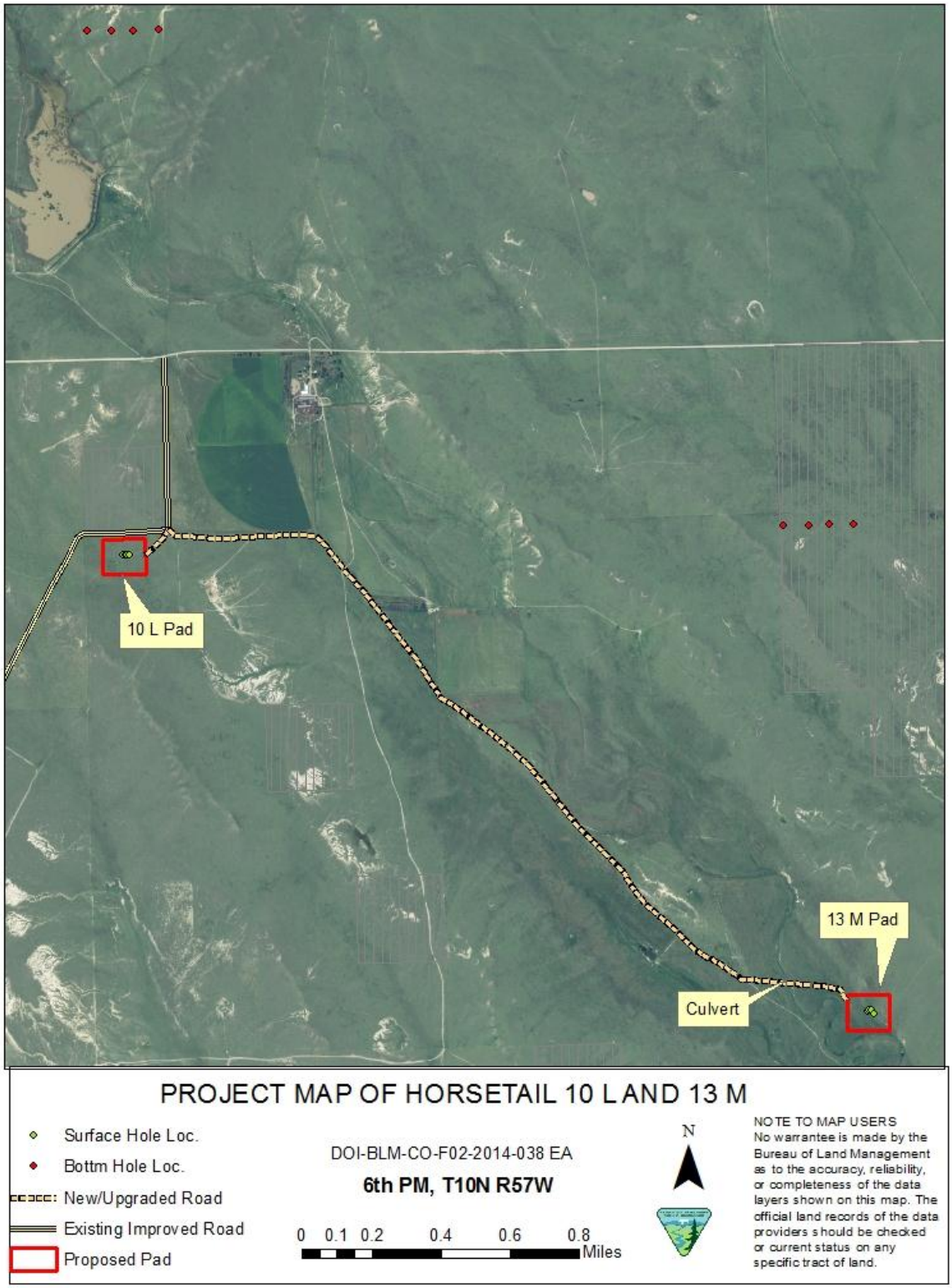
Proposed Pad

NOTE TO MAP USERS
No warrantee 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 checked or current status on any specific tract of land.

## Topographic Project Map



## Aerial Photo of Project



### 2.2.2 NO ACTION ALTERNATIVE

The proposed action involves Federal subsurface minerals that are encumbered with Federal oil and gas leases, which grant the lessee a right to explore and develop the leases. Although BLM cannot deny the right to drill and develop the leasehold, individual APDs can be denied to prevent unnecessary and undue degradation. The no action alternative constitutes denial of the APDs associated with the proposed action. Under the no action alternative, therefore, none of the proposed developments described in the proposed action would take place.

## 2.3 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.

# CHAPTER 3 - AFFECTED ENVIRONMENT AND EFFECTS

## 3.1 INTRODUCTION

This section provides a description of the human and natural environmental resources that could be affected by the Proposed Action and presents comparative analyses of the direct, indirect and cumulative effects on the affected environment stemming from the implementation of the actions under the Proposed Action and other alternatives analyzed.

### 3.1.1 INTERDISCIPLINARY TEAM REVEIW

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 potentially impacted will be brought forward for analysis.

| Resource | Initial and date | Comment or Reason for Dismissal from Analysis |
|---|---|---|
| **Air Quality**<br>*Ty Webb, Chad Meister, Melissa Hovey* | FC, 4/21/14 | See affected environment |
| **Geology/Minerals**<br>*Melissa Smeins* | MJS, 4/22/2014 | See affected environment |
| **Soils**<br>*John Smeins* | JS, 04/09/14 | All soil disturbances would still occur regardless of BLMs decision to approve the Proposed Action; therefore, there the Proposed Action would have little additional effect to soil resources. |
| **Water Quality**<br>Surface and Ground<br>*John Smeins* | JS, 04/09/14 | See Water Quality section. |
| **Invasive Plants**<br>*John Lamman* | JL, 04/22/2014 | See affected environment. |

| Resource | Initial and date | Comment or Reason for Dismissal from Analysis |
|---|---|---|
| **T&E and Sensitive Species**<br>*Matt Rustand* | MR, 3/24/2014 | No T&E species or habitats are located within the action area. BLM sensitive species ferruginous hawk, mountain plover, black-tailed prairie dog, burrowing owl, swift fox, and milk snake may be found in this habitat type. See affected environment. |
| **Vegetation**<br>*Jeff Williams, Chris Cloninger, John Lamman* | JL, 12/26/2013 | See affected environment |
| **Wetlands and Riparian**<br>*Dave Gilbert* | 04/16/2014 | The Proposed Action is within an upland setting in rangelands. |
| **Wildlife Aquatic**<br>*Dave Gilbert* | DG, 04/16/2014 | The Proposed Action is in an upland location, but in the vicinity of Spring Creek. Crossing of the drainage does occur on private land getting to the 13M pad at the location of an installed culvert. The road is there regardless of the federal mineral interaction and no aquatic habitat is proposed to be disturbed. |
| **Wildlife Terrestrial**<br>*Matt Rustand* | MR, 3/24/2014 | See affected environment |
| **Migratory Birds**<br>*Matt Rustand* | MR, 3/24/2014 | See affected environment. |
| **Cultural Resources**<br>*Monica Weimer* | MMW, 4/2/14 | No concerns. See Reports CR-RG-14-105 N and CR-RG-14-111 N. |
| **Native American Religious Concerns**<br>*Monica Weimer* | MMW, 4/2/14 | No concerns, per Tribal Consultation CR-RG-14-34 NA. |
| **Economics**<br>*Dave Epstein, Martin Weimer* | AR, 3/10/14 | See affected environment |
| **Geologic and Mineral Resources**<br>*Melissa Smeins, Stephanie Carter* | MJS, 4/22/2014 | See affected environment |
| **Paleontology**<br>*Melissa Smeins,* | MJS, 4/22/2014 | See affected environment |
| **Visual Resources**<br>*Kalem Lenard* | KL, 3/21/2014 | The project is within a modified environment. The project would introduce weak contrasts to the landscape associated with pads, roads, and facilities. Impacts would be minimal. |
| **Environmental Justice**<br>*Martin Weimer* | AR, 4/14/14 | The proposed action affects areas that are rural in nature. The land adjacent to the well site is grassland, 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. |
| **Wastes Hazardous or Solid**<br>*Stephanie Carter* | MJS, 4/22/2014 | See affected environment |
| **Recreation**<br>*Kalem Lenard* | KL, 3/21/2014 | Not Present |

| Resource | Initial and date | Comment or Reason for Dismissal from Analysis |
|---|---|---|
| **Farmlands Prime and Unique** *Jeff Williams, Chris Cloninger, John Lamman* | JL, 04/22/2014 | Not Present |
| **Lands and Realty** | | N/A (private surface) |
| **Wilderness, WSAs, ACECs, Wild & Scenic Rivers** *Kalem Lenard* | KL, 3/21/2014 | Not Present |
| **Wilderness Characteristics** *Kalem Lenard* | KL, 3/21/2014 | Not Present |
| **Range Management** *Jeff Williams, Chris Cloninger, John Lamman* | JL, 04/22/2014 | Surface estate is private |
| **Forest Management** *Ken Reed* | | N/A (private surface) |
| **Cadastral Survey** *Jeff Covington* | JC, 4/21/14 | COS for 10L-0304B and 13M-1204 are attached in the project folder. |
| **Noise** *Martin Weimer* | AR, 4/14/14 | The project area is located in grassland. Certain levels of noise are associated with drilling operations, these include drill rig operation, compressors/generators and general machine and vehicle operation. These impacts are temporary and terminate when drilling operations are complete. |
| **Fire** | | N/A (private surface) |
| **Law Enforcement** *Steve Cunningham* | | N/A (private surface) |

The affected resources brought forward for analysis include:

- Air quality
- Geology/Minerals
- Water Quality
- Invasive Plants
- Vegetation
- Wildlife Terrestrial
- Migratory Birds
- Paleontology
- Wastes Hazardous or Solid

# 3.2 PHYSICAL RESOURCES

## 3.2.1 AIR QUALITY

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 ($SO_2$), particulate matter smaller than 10 and 2.5 microns ($PM_{10}$ and $PM_{2.5}$, respectively), ozone ($O_3$), and nitrogen dioxide ($NO_2$). Please note that ozone is generally not directly emitted from sources, but is chemically formed in the atmosphere via interactions of oxides of nitrogen ($NO_X$) and volatile organic compounds (VOCs) in the presence of sunlight and under certain meteorological conditions ($NO_X$ 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 Table 3-1 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)].

**Existing Regional Air Quality & Climate**

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,

**Table 3-1 Ambient Air Quality Standards**

| Pollutant [final rule citation] | | Standard Type | Averaging Period | Level | Form |
|---|---|---|---|---|---|
| **Carbon Monoxide** [76 FR 54294, Aug 31, 2011] | | Primary | 8-hour | 9 ppm | 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/m3 | Not to be exceeded |
| **Nitrogen Dioxide** [75 FR 6474, Feb 9, 2010] | | Primary | 1-hour | 100 ppb | 98th percentile, averaged over 3 years |
| [61 FR 52852, Oct 8, 1996] | | Primary and secondary | Annual | 53 ppb | Annual mean |
| **Ozone** [73 FR 16436, Mar 27, 2008] | | Primary and secondary | 8-hour | 0.075 ppm | Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years |
| **Particulate Matter** [73 FR 3086, Jan 15, 2013] | $PM_{2.5}$ | Primary | Annual | 12 µg/m3 | Annual mean, averaged over 3 years |
| | | Secondary | Annual | 15 µg/m3 | Annual mean, averaged over 3 years |
| | | Primary and secondary | 24-hour | 35 µg/m3 | 98th percentile, averaged over 3 years |
| | $PM_{10}$ | Primary and secondary | 24-hour | 150 µg/m3 | 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 |
| Colorado (State Only) | | Primary and Secondary | 3-hour | 267 ppb | Not to be exceeded in any 12 month period |
| [38 FR 25678, Sept 14, 1973] | | Secondary | 3-hour | 0.5 ppm | Not to be exceeded more than once per year |

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

µg/m3 = micrograms per cubic meter, ppb = parts per billion, ppm = parts per million.

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.

The proposed action area (northwestern Weld County) is predominantly used for agriculture. The small town of Grover, population 137 in 2010 (U.S. Census, 2013a), lies to the west of the Project Area. The population density of Weld County is generally low and dispersed, with 63 people per square mile (U.S. Census, 2013b). Approximately 75% of the available land area of Weld County is linked to the agricultural sector of the economy. Oil and gas development is another major economic driver for the area, and Weld County has some 25,000 active wells within its boundaries (BLM, 2013). Activities occurring within the area that affect air quality include exhaust emissions from motor vehicles, agricultural equipment, drilling rigs, and several stationary sources, as well as fugitive dust from roads, agriculture, and energy development (BLM, 2012). The proposed APD well pads are located in an area designated as Class II, as defined by the Federal Prevention of Significant Deterioration (PSD) provision of the CAA. The PSD Class II designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. The closest Class I area[1] to the proposed well site locations is Rocky Mountain National Park, which lies approximately 160 km to the west.

According to the APCD APEN records, there are 4 sources of VOC emissions and 3 sources of NOx emissions within 10km of the center point between the two well pads having emissions of approximately 75 and 17 tons per year, respectively. All of the sources were related to the oil and gas industry. The COGCC database returned over 150 records for the same 10 km intersect. At a 5 km intersect, 47 records were returned. The records show that 34 locations were abandoned, 1 was shut-in, 3 were producing, and 9 locations were identified for exploration or development activities that have not yet commenced.

Mean temperatures in the area range from 27.8 degrees Fahrenheit (°F) in January to 74.0° F in July. The area receives average annual precipitation of approximately 14.22 inches (NOAA, 2013). Winds are most often out of the northwest, north, and east. Over the course of the year, typical wind speeds vary from 0 mph to 20 mph. The highest average wind speed of 10 mph occurs in April, and the lowest average wind speed of 5 mph occurs in August (Weatherspark, 2013).

Table 3-2 below presents three years of monitoring data for criteria pollutants (with the exception of lead) for each of the counties containing proposed action development (or adjacent / representative county monitors where no monitoring exists in the APD counties). The maximum monitored value is presented where multiple monitors exist within a single county that monitor for the same pollutant. Concentrations are in units of the standards form (see the "Level" column in Table 3-1 above). To compute the design values for ozone and $PM_{2.5}$, which are based on a three year average, sum all three years of data (if available) and divide by three.

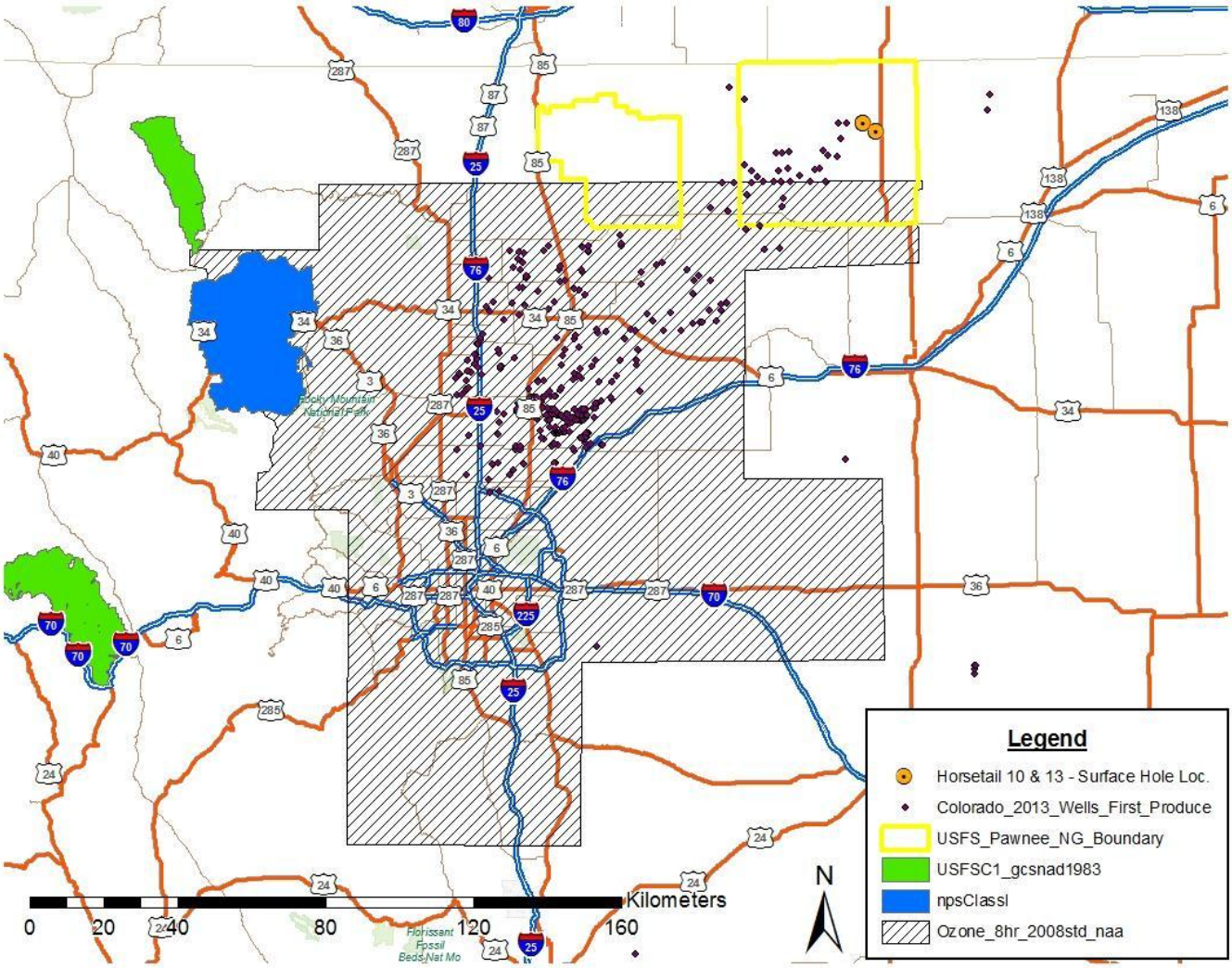
**Table 3-2 Ambient Air Quality Monitoring Data**

| County | Pollutant | Standard | Monitored Values | | |
|---|---|---|---|---|---|
| | | | 2011 | 2012 | 2013 |
| Weld | CO | 1-hour | 2.5 | 3.2 | 2.5 |
| Weld | CO | 8-hour | 1.5 | 1.6 | 1.4 |
| Weld | O3 | 8-hour | 0.077 | 0.074 | 0.073 |
| Weld | PM10 | 24-hour | 46 | 91 | 47 |
| Weld | PM2.5 | 24-hour | 26.9 | 32 | 23.1 |
| Weld | PM2.5 | Annual | 7.4 | 7.9 | 7.1 |

[1] 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.

With the exception of ozone (2011), Table 3-2 indicates that none of the criteria pollutants monitored for within the region have exceeded the NAAQS. And although the data shows the ozone exceedance, the 3 year design value of ozone is currently in compliance with the NAAQS. Figure 3-1 depicts the APD well pad locations with respect to the area's air quality boundaries. The development is located within the Pawnee National grass Lands boundaries, but is not on Forest Service surface. The proposed well pads are also outside of the Denver-Northern Front Range-Nonattainment area. The figure also shows contemporaneous development in the region for all of 2013[2].

**Figure 3-1. Project Location and Air Quality Boundaries**




## National Emissions Inventory Data (2011)

As previously stated, air quality is generally a function of emissions loading within any particular region. With respect to the project county the following emissions inventories are provided to describe the affected environment in terms of current cumulative emissions intensities.

**Table 3-3 Project County Emissions Inventory Data**

[2] COGCC data for new production in 2013. Data includes new wells and new production zones for existing wells. In the latter case the BLM looked for existing Well API numbers and removed the duplicates to approximate the new wells only.

| Weld | $PM_{10}$ | $PM_{2.5}$ | VOC | CO | $NO_X$ | $SO_2$ | $CO_2$ | $CH_4$ | $N_2O$ | $NH_3$ | HAPs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Agriculture | 9,082 | 1,866 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,763 | 0 |
| Biogenics | 0 | 0 | 21,010 | 4,785 | 1,977 | 0 | 0 | 0 | 0 | 0 | 4,286 |
| Gasoline Terminals | 0 | 0 | 202 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 3 |
| Commercial Cooking | 57 | 53 | 8 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Dust | 14,441 | 1,747 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fires | 1,143 | 663 | 913 | 7,256 | 237 | 114 | 31,689 | 126 | 0 | 42 | 333 |
| Fuel Comb | 755 | 752 | 2,717 | 10,024 | 7,566 | 119 | 0 | 0 | 0 | 172 | 486 |
| Gas Stations | 0 | 0 | 688 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| Industrial Processes | 1,891 | 647 | 105,040 | 4,617 | 7,534 | 296 | 0 | 0 | 0 | 0 | 536 |
| Miscellaneous | 0 | 0 | 158 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| Mobile | 457 | 384 | 3,743 | 41,485 | 8,320 | 44 | 1,750,628 | 140 | 59 | 103 | 940 |
| Solvent | 22 | 19 | 3,070 | 7 | 19 | 0 | 0 | 0 | 0 | 0 | 1,259 |
| Waste Disposal | 110 | 65 | 170 | 21 | 8 | 2 | 0 | 0 | 0 | 0 | 17 |
| **Sum Totals:** | **27,960** | **6,194** | **137,717** | **68,222** | **25,663** | **575** | **1,782,317** | **266** | **59** | **16,080** | **7,886** |

## 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 ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), and several industrial gases in our atmosphere. An increase in GHG emissions is thought to result in an increase in the earth's average surface temperature, primarily by trapping and 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, precipitation rates, etc., which is commonly 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 burning of fossil carbon sources have caused GHG concentrations to increase measurably, from approximately 280 ppm in 1750 to 396 ppm in 2012 (as of June). 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 $CO_2$ monitor in Hawaii that documents atmospheric concentrations of $CO_2$ going back to 1960, at which point the average annual $CO_2$ concentration was recorded at approximately 317 ppm. The record shows that approximately 70% of the increases in atmospheric $CO_2$ concentration, or build up, since pre-industrial times has occurred within the last 50 years. In the coming decades climate change may lead to changes in the Mountain West and Great Plains, such as increased drought and wild land fire potential.

Environmental Effects

Environmental Consequences of APD Approval - 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 phase. Utilization of the access road, surface disturbances, 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, or other infrastructure connections used at the site. Liquid product load-out operations will also generate fugitive emissions of VOCs and vehicular emissions. Most operations will be subject to some portions of the pollution control regulations currently on the books, and thus the proponent may 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, 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 $NO_X$ 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 is performing a regional modeling study (CARMMS) to assess potential ozone formation and impacts on a cumulative basis (see cumulative impacts for discussion).

Emission estimates from the proposed well sites were calculated for this EA, and are disclosed in Table 3-4 below. The emissions inventories (EI) considered reasonably foreseeable oil and gas development activities for the proposed wells, and includes emissions from both construction and production operations. The following pollutants were inventoried where an appropriate basis, methodology, and sufficient data exists: CO, $NO_X$ (includes $NO_2$), $PM_{2.5}$, $PM_{10}$, $SO_2$, VOCs, HAPs, $CO_2$, $CH_4$, and $N_2O$. 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 region), and any equipment configuration data 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 phase. It is assumed that production would not begin until all of the wells are completed and all of the necessary infrastructure and site equipment connections are made (i.e. individual wells will not be brought online while completion and testing activities are still occurring at the site).

The following assumptions were applied consistently to all potential activities associated with the proposed action:

- The EI used disturbed surface areas as described in the proposed action for well pad, access roads, initial reclamation acres, and any pipeline infrastructure.
- Construction is projected to last approximately 6 months (based on an estimated 14 day drilling cycle and 17 day completion / testing cycle).
- The life of the well, if economically viable, would be expected to sustain operations for approximately 20 – 30 years once production begins.
- All disturbed surfaces (pads and access roads) would receive appropriate application of water during construction phase and emissions calculations assume 50% dust control efficiency.
- All diesel fuel would be standard #2 grade (500 ppm sulfur) or better.
- Production phase equipment would include storage tanks, pneumatics, separation equipment, artificial lift engines. The EI assumed no compression, dehydration, or sweetening units for the project. Tank flashing emissions (VOCs) are assumed controlled to 95%. Emissions

calculations for pneumatic devices assume low-bleed rate devices (6cfh max).

- Natural gas would be piped directly into a 3rd party gathering system. Completion flaring would be limited due to the implementation of green completions.
- Drill rigs, completion and fracking engines emissions are based on EPA Non-road Tier 2 emissions standards.
- Wellhead pump-jack engines emissions calculations are based on EPA NSPS JJJJ standards for > = 50 hp.
- The EI uses a DJ Basin representative natural gas analysis to estimate VOC and HAP speciation percentages (HAP emissions estimates not yet calculated for all emissions generating activities). Assumed fractional % of VOC was HAP for analysis.
- Fugitive well emissions are based on northern Colorado oil and gas operator provided well component counts.
- Total emissions were scaled to represent the BLM portion of the project only (i.e. project is fee/fee/fed). Four of the eight wells on the pad are to be completed to produce fee and federal minerals, the other four will only produce fee minerals. The four fed wells will produce approximately 15% federal and 85% fee minerals respectively.

## Table 3-4 Horsetail 10 Emissions Inventory

| Project Emissions (tons) | Criteria Pollutants | | | | | | GHGs | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Activity** | **$PM_{10}$** | **$PM_{2.5}$** | **VOC** | **NOx** | **CO** | **$SO_2$** | **$CO_2$** | **$CH_4$** | **$N_2O$** | **CO2e** |
| **Construction** | | | | | | | | | | |
| Well Pad / Access Road Construction | 0.06 | 0.01 | 0 | 0.01 | 0.01 | 0 | 2.15 | 0 | 0 | 2.16 |
| Rig Moves | 0 | 0 | 0 | 0 | 0 | 0 | 0.65 | 0 | 0 | 0.65 |
| Drilling | 0.05 | 0.05 | 0.07 | 1.33 | 0.8 | 0.05 | 155.7 | 2.27 | 0.45 | 344.27 |
| Completion | 0.14 | 0.07 | 0.18 | 1.6 | 1.1 | 0.05 | 238.45 | 2.47 | 0.46 | 432.84 |
| Pipeline Construction | 0 | 0 | 0 | 0.01 | 0.01 | 0 | 1.97 | 0 | 0 | 2.01 |
| Initial Reclamation | 0.04 | 0.01 | 0 | 0.01 | 0 | 0 | 1.45 | 0 | 0 | 1.46 |
| **Sub-total: Construction** | **0.31** | **0.14** | **0.26** | **2.96** | **1.92** | **0.1** | **400.37** | **4.74** | **0.91** | **783.4** |
| **Operations** | | | | | | | | | | |
| Fugitive Dust | 0.45 | 0.05 | NA | NA | NA | NA | NA | NA | NA | NA |
| Off-Road Mobile | 0 | 0 | 0 | 0.01 | 0 | 0 | 0.86 | 0 | 0 | 0.87 |
| On-Road Mobile | 0 | 0 | 0 | 0.01 | 0.02 | 0 | 2.35 | 0 | 0 | 2.37 |
| Tanks | NA | NA | 0.09 | NA | NA | NA | 0 | 0 | NA | 0 |
| Tank (liquids) Loadouts | NA | NA | 0.06 | NA | NA | NA | 0 | 0 | NA | 0.01 |
| Components | NA | NA | 0.03 | NA | NA | NA | 0.05 | 0.25 | NA | 5.28 |
| Pneumatic Devices | NA | NA | 0.68 | NA | NA | NA | 0.86 | 1.71 | NA | 36.8 |
| Heaters | 0 | 0 | 0 | 0.01 | 0 | 0 | 6.62 | 0 | 0 | 6.66 |
| Compression & Pump Jack ICEs | 0 | 0 | 0.07 | 0.03 | 0.15 | 0 | 26.49 | 0.03 | 0 | 27.12 |
| Compression Start-up & Shutdown | NA | NA | 0 | NA | NA | NA | 0 | 0 | NA | 0 |
| Flares / Control Equipment | 0 | 0 | 0.04 | 0.03 | 0.15 | 0 | 45.65 | 0.01 | 0 | 46.12 |
| Blowdown Venting | NA | NA | 0.32 | NA | NA | NA | 0.41 | 0.81 | NA | 17.5 |
| Flares / Blowdowns | 0 | 0 | 0.05 | 0.04 | 0.22 | 0 | 65.67 | 0.02 | 0 | 66.35 |
| Non-Road / Workovers - Re-completions | 0 | 0 | 0 | 0.06 | 0.03 | 0 | 6.69 | 0.1 | 0.02 | 14.63 |
| Venting / Workovers - Re-completions | NA | NA | 0.26 | NA | NA | NA | 0.33 | 0.65 | NA | 14 |
| Flares / Workovers - Re-completions | 0.01 | 0.01 | 0.1 | 0.08 | 0.44 | 0 | 135.49 | 0.04 | 0 | 136.89 |
| Dehydration Units | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sweetening Units | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sub-total: Operations** | **0.47** | **0.07** | **1.7** | **0.26** | **1.02** | **0** | **291.44** | **3.63** | **0.02** | **374.6** |
| **Total Emissions** | **0.78** | **0.21** | **1.96** | **3.21** | **2.94** | **0.1** | **691.81** | **8.37** | **0.94** | **1,157.99** |

## Table 3-5 Horsetail 13 Emissions Inventory

| Project Emissions (tons) | Criteria Pollutants | | | | | | GHGs | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Activity** | **$PM_{10}$** | **$PM_{2.5}$** | **VOC** | **NOx** | **CO** | **$SO_2$** | **$CO_2$** | **$CH_4$** | **$N_2O$** | **$CO_2e$** |
| **Construction** | | | | | | | | | | |
| Well Pad / Access Road Construction | 0.27 | 0.04 | 0 | 0.05 | 0.02 | 0 | 8.64 | 0 | 0 | 8.7 |
| Rig Moves | 0.03 | 0 | 0 | 0.01 | 0.01 | 0 | 1.64 | 0 | 0 | 1.65 |
| Drilling | 0.18 | 0.12 | 0.17 | 3.1 | 1.88 | 0.11 | 363.51 | 5.3 | 1.06 | 803.5 |
| Completion | 2.25 | 0.36 | 0.43 | 3.76 | 2.58 | 0.12 | 564.77 | 5.76 | 1.07 | 1,018.39 |
| Pipeline Construction | 0.03 | 0 | 0 | 0.03 | 0.02 | 0 | 4.67 | 0 | 0 | 4.77 |
| Initial Reclamation | 0.1 | 0.02 | 0 | 0.02 | 0.01 | 0 | 3.13 | 0 | 0 | 3.15 |
| **Sub-total: Construction** | **2.86** | **0.55** | **0.61** | **6.96** | **4.52** | **0.23** | **946.36** | **11.06** | **2.13** | **1,840.15** |
| **Operations** | | | | | | | | | | |
| Fugitive Dust | 1.66 | 0.21 | NA | NA | NA | NA | NA | NA | NA | NA |
| Off-Road Mobile | 0 | 0 | 0 | 0.01 | 0.01 | 0 | 2.01 | 0 | 0 | 2.03 |
| On-Road Mobile | 0 | 0 | 0 | 0.02 | 0.05 | 0 | 6.02 | 0 | 0 | 6.05 |
| Tanks | NA | NA | 0.2 | NA | NA | NA | 0 | 0 | NA | 0 |
| Tank (liquids) Loadouts | NA | NA | 0.14 | NA | NA | NA | 0 | 0 | NA | 0.03 |
| Components | NA | NA | 0.06 | NA | NA | NA | 0.11 | 0.58 | NA | 12.32 |
| Pneumatic Devices | NA | NA | 1.58 | NA | NA | NA | 2 | 3.99 | NA | 85.86 |
| Heaters | 0 | 0 | 0 | 0.01 | 0.01 | 0 | 15.44 | 0 | 0 | 15.54 |
| Compression & Pump Jack ICEs | 0 | 0 | 0.17 | 0.07 | 0.36 | 0 | 61.8 | 0.07 | 0 | 63.28 |
| Compression Start-up & Shutdown | NA | NA | 0 | NA | NA | NA | 0 | 0 | NA | 0 |
| Flares / Control Equipment | 0.01 | 0.01 | 0.08 | 0.06 | 0.35 | 0 | 106.51 | 0.03 | 0 | 107.61 |
| Blowdown Venting | NA | NA | 0.75 | NA | NA | NA | 0.95 | 1.9 | NA | 40.84 |
| Flares / Blowdowns | 0.01 | 0.01 | 0.12 | 0.09 | 0.5 | 0 | 153.23 | 0.05 | 0 | 154.82 |
| Non-Road / Workovers - Re-completions | 0 | 0 | 0.01 | 0.13 | 0.08 | 0 | 15.61 | 0.22 | 0.04 | 34.13 |
| Venting / Workovers - Re-completions | NA | NA | 0.6 | NA | NA | NA | 0.76 | 1.52 | NA | 32.67 |
| Flares / Workovers - Re-completions | 0.02 | 0.02 | 0.24 | 0.19 | 1.04 | 0 | 316.14 | 0.1 | 0 | 319.41 |
| Dehydration Units | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sweetening Units | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sub-total: Operations** | **1.71** | **0.26** | **3.97** | **0.6** | **2.39** | **0.01** | **680.56** | **8.47** | **0.05** | **874.58** |
| **Total Emissions** | **4.58** | **0.81** | **4.58** | **7.56** | **6.91** | **0.24** | **1,626.92** | **19.53** | **2.19** | **2,714.73** |

The BLM COSO Air Resource Specialists recently developed a modeling screening tool based on the 5 years' worth of AERMOD runs (US EPAs recommended guideline model) using regional meteorological data sets. The near-field modeling predicted ambient concentrations for the following criteria pollutants: $NO_2$ (1-hour) and $PM_{2.5}$ (24-hour and annual). These pollutants and averaging periods were modeled because of the complexity of meeting the applicable air quality standards, and the results include the maximum and design value concentrations. Modeling runs were made for an access road segment and well pad development activities at base emissions rates (ex: 1 gram / second). Traffic emissions (fugitive dust and tail pipe exhaust) were modeled along the access road as 50 meter volume sources, with receptors set up as equidistant grid points spaced at 25 meters out from the roadway to a distance of 100 meters. Well pad emissions sources were grouped and modeled as a volume source (fugitive dust, off road, and small non-road engines, heaters, etc…), and a single point source (drill rig and fracture engines). The well pad receptors were set up as concentric rings (w/ 25 - 50 meter spacing along the rings circumference, depending on the ring) at distances of 50, 100, 250, 500, and 1000 meters. The model data is used by the screening tool to scale the results at the receptors for emissions rates that correspond to the emissions inventory generated for the project. Project emissions were weighted (according to the processes duration) to calculate a maximum short-term emissions rate to produce a scale factor for each pollutant. The scale factor was then applied to the maximum and design value receptor values along each ring and within the gridded access road receptor domain to estimate the project impacts at those locations (i.e. worst case). The calculated values were then added to the applicable background concentrations (and averaged if necessary for multi-year design values) to compare to the NAAQS. The results presented in Table 3-6 below are for the 1000 meter ring, which corresponds to the COGCC set back requirements under the 100 series rule.

**Table 3-6 Model Tool Results for Criteria Pollutants**

| Results Set | Pollutant (Ave. Period) | Pollutant Units | Background Concentration[a] | Max Modeled NAAQS Value | Combined Concentration | Percent of NAAQS |
|---|---|---|---|---|---|---|
| Access Road | $PM_{10}$ (24-hour) | $\mu g/m^3$ | 43 | 75.61 | 118.61 | 79% |
| Access Road | $PM_{2.5}$ (24-hour) | $\mu g/m^3$ | 17 | 5 | 22 | 63% |
| Well Pad | $PM_{10}$ (24-hour) | $\mu g/m^3$ | 43 | 33.39 | 76.39 | 51% |
| Well Pad | $PM_{2.5}$ (24-hour) | $\mu g/m^3$ | 17 | 2.07 | 19.07 | 54% |
| Well Pad | $PM_{2.5}$ (Annual) | $\mu g/m^3$ | 6 | 0.31 | 6.31 | 53% |
| Well Pad | $NO_2$ (1-hour) | $\mu g/m^3$ | 70.75 | 80.16 | 150.91 | 80% |

[a] $NO_2$ background conc.: Holcim/Golden (2005-2006 data) – CDPHE. $PM_{10}$ background concentration: Tri-State Holly (2007-2008) – CDPHE. $PM_{2.5}$ background concentration: Chatfield (2006-2009) – CDPHE. $PM_{2.5}$ annual conc.: Chatfield (2006-2009) – CDPHE.

In addition to the NAAQS modeling analyses, long-term and short-term exposure impacts were predicted for HAPs (benzene and formaldehyde) emissions from the projects production related activities, including; equipment combustion exhaust, storage tanks, components, pneumatics, and venting. HAPs emissions rates for modeling were calculated by applying the EPAs AP-42

emissions ratio for HAPs to VOC (all of the projects HAPs are VOCs) for the selected pollutants to the VOC emissions from the project. Formaldehyde and benzene were selected for analysis since they have the greatest mass emissions in terms of emissions factors, and also have the lowest risk thresholds among the various oil and gas related HAPs emitted. Short-term (1-hour) HAP concentrations are compared to acute Reference Exposure Levels (RELs). RELs are defined as concentrations at or below which no adverse health effects are expected. As shown in the following table, all HAP maximum 1-hour concentrations (with inclusion of background concentrations) for all receptors are well below the REL concentrations. Long-term maximum potential exposures to HAPs are compared to Reference Concentrations for Chronic Inhalation (RfCs). An RfC is defined by USEPA as the daily inhalation concentration at which no long-term adverse health effects are expected. Annual modeled HAP concentrations are compared directly to the RfCs shown in the table below. All modeled benzene and formaldehyde annual average concentrations for all receptors are well below of their respective RfCs. RfCs for these HAPs are expressed as unit risk factors (URFs) and are shown in the following table. Based on the Superfund National Oil and Hazardous Substances Pollution Contingency Plan, a cancer risk range of 1 in a million to 100 in a million (10–6 to 10–4 risk) is generally acceptable. Cancer risks for each individual HAP and for combined exposure to aggregated HAPs for both the maximally exposed individual (MEI) and most likely exposure (MLE) are within or below this range.

**Table 3-7 Model Tool Results for HAPs**

| Pollutant | Analysis Type[a] | Modeled Concentration ($g/m^3$) | Background Concentration ($g/m^3$) | Total Concentration ($g/m^3$)[b] | Reference Indicator | Indicator Value | Percent Indicator |
|---|---|---|---|---|---|---|---|
| Benzene | Acute | 12.65 | 18.34 | 30.99 | REL | 1,300 | 2% |
| Formaldehyde | Acute | 2.61 | 2.8 | 5.41 | REL | 55 | 10% |
| Benzene | Chronic | 0.01 | 5.97 | 5.98 | RfC | 30 | 19.9% |
| Formaldehyde | Chronic | 0.01 | 1.39 | 1.4 | RfC | 9.8 | 14.3% |
| Benzene | MLE | NA | NA | 4.43E-06 | URF | $7.8 \times 10^{-6}$ | NA |
| Formaldehyde | MLE | NA | NA | 1.73E-06 | URF | $1.3 \times 10^{-5}$ | NA |
| Benzene | MEI | NA | NA | 1.35E-05 | URF | $7.8 \times 10^{-6}$ | NA |
| Formaldehyde | MEI | NA | NA | 5.28E-06 | URF | $1.3 \times 10^{-5}$ | NA |

[a] MLE & MEI analysis is based on a calculated exposure factor, 0.095 and 0.29 respectively.
[b] For the MLE and MEI analysis, the total concentration is the calculated cancer risk.

No discussion of AQRV is warranted for this project due to the fact that Q/D (mass emissions divided by distance to Class I Area) is well below the threshold of "10".

## Greenhouse Gas Emissions and Climate Change

According to the U.S. Global Change Research Program (2009), global warming is unequivocal, and the global warming that has occurred over the past 50 years is primarily human-caused. Standardized protocols designed to measure factors that may contribute to climate change, and to quantify climatic impacts, are presently unavailable. Moreover, specific levels of significance

have not yet been established by regulatory agencies. Predicting the degree of impact any single emitter of GHGs may have on global climate, or on the changes to biotic and abiotic systems that accompany climate change is highly complex, has considerable uncertainty, and requires intense computer modeling (i.e., super computers). As such, no readily available tools exist to predict impacts a project's emissions would have on the global, regional, or local climate. This analysis is therefore limited to comparing the context of total project GHG emissions, and to emissions recently analyzed by EPA. The analysis also discloses readily available information regarding expected changes to the global climatic system and any empirical evidence of climate change that has occurred to date (see cumulative impacts).

The implementation of the Proposed Action is estimated to contribute 3,873 tons of carbon dioxide equivalents ($CO_2e$) in the maximum year. Annual operating GHG emissions will be 43% of the total emissions shown for the maximum year. Over the 25 year project timeframe the total GHG emissions expected are approximately 41,449 tons. The total provided does not account for the ultimate use or consumption of any produced minerals at this time due to the fact that the ultimate form of use and any additional processing required to render the product to sufficient quality (which would cause changes to the quantity of product) cannot be predicted with any reasonable certainty. Additionally, it should be noted that production values, also estimated at this time (by the proponent), could vary significantly over the life of the project, making any prediction of the quantities of GHG emitted highly speculative.

In 2007, the State of Colorado's GHG emissions were 124,000,000 metric tons. The proposed action's GHG emissions represent about 0.03% of the state of Colorado's GHG emissions (total project vs. CO annual basis). Given the relative magnitude of greenhouse gas emissions associated with the development, the GHG contribution to the state, let alone the global GHG burden, is extremely 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 $CO_2$, 273.6 metric tons per year of $N_2O$, and 136.8 metric tons per year of $CH_4$). 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 EPAs modeled source and are shorter in duration, and therefore reasonable to conclude that the project would have no measurable impact on the climate.

**<u>Cumulative Impacts</u>**

The proposed action, when combined with the past, present, and reasonably foreseeable future actions may contribute incrementally to the deterioration of air quality and climate change in the

region. Development of fluid minerals at the rate proposed within the APDs would result in additional surface and subsurface disturbances and emissions during construction, drilling, completion, and production activities. The severity of these incremental impacts (air quality only) could be elevated based on the amount of contemporaneous development in surrounding area/region.

Although no explicit cumulative impact modeling is being proposed to analyze this action, in consideration of disclosing such 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 field office (FO) Reasonably Foreseeable Development[3] (RFD) document (high), or by projecting the current 5 year average development pace for each FO forward to 2021 (low[4]). 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 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).

The results are project are forthcoming. Based on the CARMMS projections (which include this projects emissions), the BLM will determine which projection path (low, medium, high) would be most appropriate to estimate impact correlations from based on the cumulative development that has occurred since the base emissions inventory year (2011). Although the impacts will be based on future results (2021), the relative changes in the impacts between the scenarios will provide insight into understanding how mass emissions impact the atmosphere on a relative basis. The table below provides a summary for the modeling effort within the project area. As evident from the data, the projected federal development within the field office is exceptionally low, and as such the BLM's oil and gas decisions within the RGFO are not expected to significantly contribute to any air quality deterioration that may occur within the cumulative context.

**Table 3-8 CARMMS Projection Data for RGFO (Area 1)**

| Parameter | Low | High |
|---|---|---|
| Federal Wells / Year | 9 | 47 |
| Cumulative Wells / Year | 585 | 1,350 |
| 2021 Cumulative Well Counts | 29,673 | 37,323 |
| 2021 Wells that are Federal | 1.5% | 3.5% |

[3] RFD prepared by the Casper, WY Reservoir Resource Group.

[4] Low for all areas, except for RGFO Area 1 (BLM swapped the 5 yr. ave for RFD, given the high pace of development in this area over the last 5 years.

**Table 3-9 CARMMS Emissions Inventory for RGFO (Area 1)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_X$ | VOC | CO | $SO_2$ | $CO_2$ | $CH_4$ | $N_2O$ |
|---|---|---|---|---|---|---|---|---|---|
| Low | 11,653 | 1,775 | 31,548 | 131,494 | 30,440 | 120 | ND | ND | ND |
| High | 26,483 | 3,701 | 53,177 | 199,587 | 52,910 | 192 | ND | ND | ND |

With respect to GHG emissions, the following predictions were identified by the EPA for the Mountain West and Great Plains region[5]:

- The region will experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow will be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs will be drier.
- More frequent, more severe, and possibly longer-lasting droughts will occur.
- Crop and livestock production patters could shift northward; less soil moisture due to increased evaporation may increase irrigation needs.
- Drier conditions will reduce the range and health of ponderosa and lodge pole pine forests, and increase the susceptibility to fire.
- Grasslands and rangelands could expand into previously forested areas.
- Ecosystems will be stressed and wildlife such as the mountain line, black bear, long-nose sucker, marten, and bald eagle could be further stressed.

If these predictions are realized as mounting evidence suggests is already occurring, there could be impacts to resources within the region. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils.

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 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 under the Proposed Action.

[5] Source: http://www.epa.gov/Region8/climatechange/pdf/ClimateChange101FINAL.pdf

Protective / Mitigation Measures

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

- Process equipment would be permitted by CDPHE in accordance with applicable requirements and required emissions standards to limit the facility's potential to emit and provide appropriate operating, monitoring, and recordkeeping requirements.
- Flashing emissions from storage tanks would be controlled using technology that would reduce VOC emissions by at least 95 percent relative to uncontrolled conditions.
- The operator would control fugitive emissions of particulate matter (dust) during construction and production using procedures that would reduce dust such that no visible dust plumes leave the construction site.
- All pump and compression engines would be required to meet EPA NSPS JJJJ emissions standards.
- All drill rig engines and hydraulic fracturing would be required to meet EPA Non-Road Tier II emissions standards.
- The operator would perform 'Green Completions' for all wells, as required by COGCC Rule 805.b(3).

The BLM would include these requirements as COA's for each of the APDs. The BLM expects that the operator would comply with these requirements and make every effort to minimize emissions through good engineering and operating practices to the maximum extent practical.

### 3.2.2 GEOLOGIC AND MINERAL RESOURCES

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

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 Laramie formation that contains important coal and uranium deposits. During drilling operations on parcels, loss of circulation or problems cementing the surface casing could directly affect mineral zones encountered.

No Action Alternative (Direct and Indirect Impacts)

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

Protective/Mitigation Measures

Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones 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.

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

## 3.2.3 WATER (SURFACE AND GROUNDWATER, FLOODPLAINS)

Affected Environment: The proposed wells would be located in a dry upland setting tributary to the South Platte River with no perennial surface water nearby. Groundwater in this area consists of the Laramie Fox-Hills aquifer that is used for domestic and agricultural purposes and is generally produced from artesian wells. This aquifer can be up to 350 feet thick, although total thickness of water yielding material rarely exceeds 200 feet. The Lower Fox Hills and upper Pierre Aquifer or upper transition zone of the Pierre shale are also important water resources that should be protected, this interval occurs at depths of about 600’ to 1500’. Underlying the Fox Hills is nearly 5,000 feet of Pierre Shale. Based on state records, there is 1 water well within a one mile radius of the proposed wells and target downhole locations; however, based on cattle trailing seen in aerial photos it appears there may be more water wells then shown in the state records. This well is listed as being 165 feet deep.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Surface water impacts of the proposed wells are mainly associated with the surface disturbance associated with drilling and related infrastructure after well completion. For all proposed development, 29.4 acres would be disturbed. Most of this disturbance would be new. Most impacts to surface water from oil and gas activity is due to removal of vegetation and exposure of mineral soils. 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. Due to the flat nature of the topography and infiltration rates of the soils in this area, 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. Best management practices would be contained in the condition of approval that would mitigate this threat.

The drilling of the proposed wells would pass through usable groundwater. Groundwater in this area is relied on for agricultural uses, as well as, domestic use. Potential impacts to groundwater resources could occur if proper cementing and casing programs are not followed. This could include loss of well integrity, surface spills, or loss of fluids in the drilling and completion process. It is possible for chemical additives used in drilling activities 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. Site specific conditions and drilling practices determine the probability of this occurrence and determine the groundwater resources that could be impacted. In addition to changing the producing formations' physical properties by increasing the flow of water, gas, and/or oil around the well bore; hydraulic fracturing can also introduce chemical additives into the producing formations. Types of chemical additives used in drilling activities may include acids, hydrocarbons, thickening agents, lubricants, and other additives that are operator and location specific. These additives are not always used in these drilling activities and some are likely to be benign such as bentonite clay and sand. Concentrations of these additives also vary considerably since different mixtures can be used for different purposes in oil and gas development and even in the same well bore. If contamination of aquifers from any source occurs, changes in groundwater quality could impact springs and water wells that are sourced from the affected aquifers. Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones.

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

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.

No Action Alternative

Direct and Indirect Impacts: It is likely that under this alternative the facilities would still be constructed on entirely private property and the impacts to water resources would be the same.

Protective/Mitigation Measures: None

## 3.3 BIOLOGICAL RESOURCES

### 3.3.1 INVASIVE PLANTS*

Affected Environment: Invasive plants are common in the area due to historical agricultural practices. It is likely that the native plant community has been altered due to the long-term grazing practices in the area. The ecological sites that make up the project site are prone to a wide variety of weeds if severe soil surface disturbance occurs.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Due to the long-term exposure of the project area to historical agricultural practices, expected impacts are thought to be minor.

Protective/Mitigation Measures: Equipment used to implement the proposed action should be washed prior to entering the project area to remove any plant materials, soil, or grease. Areas disturbed by project implementation will be monitored for the presence of weeds on the Colorado State Noxious Weed list. Identified noxious weeds will be treated. Monitoring is required for the life of the project and for three years following completion and/or abandonment of the wells and elimination of identified Colorado State Noxious Weeds list A and B species.

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

*Invasive plants are plants that are not part of (if exotic), or are a minor component of (if native), the original plant community or communities that have the potential to become a dominant or co-dominant species on the site if their future establishment and growth are not actively controlled by management interventions, or are classified as exotic or noxious plants under state or federal law. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants.

## 3.3.2 VEGETATION

Affected Environment: The area around Horsetail 10 and 13 supports blue gramma/buffalograss sod with cool season remnants. It is likely that the native plant community has been altered due to long-term grazing practices in the area.

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.

No Action Alternative
Direct and Indirect Impacts: None
Protective/Mitigation Measures: None

## 3.3.3 THREATENED, ENDANGERED AND SENSITIVE SPECIES

Affected Environment

No threatened or endangered species or habitats are located within the action area. BLM sensitive species with potential habitat include ferruginous hawk, mountain plover, black-tailed prairie dog, burrowing owl, swift fox, and milk snake.

Mountain Plover: Mountain Plover's are found throughout the Royal Gorge Field Office in suitable habitats. While the species is relatively rare they can be found generally in open, flat tablelands that display some function of disturbance such as drought, grazing, fire, etc.).

Black-tailed prairie dog: The BLM considers the black-tailed prairie dog a sensitive species. Black-tailed prairie dogs primarily occur in scattered colonies throughout the eastern plains of Colorado. In the summer of 2001, Colorado started aerial surveys for black-tailed prairie dogs throughout their historic range. Based on known locations of black-tailed prairie dogs, transects were developed for each county to give a 95% confidence interval to the resulting data. Statewide 631,000 acres of black-tail prairie dog colonies were documented.

Swift Fox: Swift foxes primarily occur in short-grass and mixed-grass prairie in the eastern plains of Colorado. The distribution of swift foxes became severely reduced in concert with conversion of mid- and shortgrass prairies to agriculture. Swift fox dens occur in ridges, slopes, hill tops, pastures, roadside ditches, fence rows and cultivated fields. Dens may be relatively

close to human habitations and swift foxes occasionally den in human-made structures such as culverts. Swift foxes primarily consume animals, with leporids and rodents the most frequent prey.

Milk snake: Wide variety of habitats in Colorado, including shortgrass prairie, sandhills, shrubby hillsides. Hibernation sites include rock crevices that may be shared with other snake species. The species occurs throughout most of Colorado at elevations primarily below 8,000 feet and is generally scarce or at least hard to find, but locally fairly common.

Ferruginous hawks: The ferruginous hawk inhabits grasslands and semi-desert shrublands, and is rare in piñon-juniper woodlands. Breeding birds nest in isolated trees, on rock outcrops, structures such as windmills and power poles, or on the ground. Winter residents concentrate around prairie dog towns. Winter numbers and distribution fluctuate greatly according to the availability of prairie dogs; when a local prairie dog population dies off due to plague, hawk numbers decrease drastically. Migrants and winter residents may also occur in shrublands and agricultural areas.

Winter resident on eastern plains, at the same time it is a rare summer resident locally on eastern plains, and occurs very locally in Moffat and Routt counties, along the Book Cliffs, in the Grand Valley, and in the San Luis Valley.

## Environmental Effects

### Proposed Action

Direct and Indirect Impacts: This area has been well developed for energy development, both renewable and non-renewable. The action area has experienced extensive oil and gas development. In the short term, the primary direct impacts of the proposed action will be the loss of available habitat, and an increase in human presence and activity during the drilling phase. These effects will be reduced post drilling.

Protective/Mitigation Measures: Due to the fee/fee and fee/fee/fed nature of the surface and mineral estate, the Bureau of Land Management does not have the authority to attach protective/mitigation measures as conditions of approval unless supported by federal law. No special status species that may be present or have habitat within in the action area are federally protected; therefore, no protective/mitigation measures will be suggested as a result of the environmental assessment.

### No Action Alternative

Direct and Indirect Impacts: The no action alternative effect will be similar to the proposed action effect due to the ownership status of surface lands and mineral estate. The pads may be constructed and fee/fee wells may be drilled without approval from the Bureau of Land Management while yielding an impact similar to the proposed action.

Protective/Mitigation Measures: None.

## 3.3.4 WILDLIFE TERRESTRIAL

Affected Environment

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

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The Proposed Action would initially result in conversion of approximately 21.3 acres of shortgrass prairie to well pads and associated infrastructure. The majority of these areas would be reclaimed and revegetated, with 7 acres of permanent surface disturbance associated with the two pads. There would be a minor direct loss of suitable wildlife habitat in the area. Indirect impacts to wildlife could result from the increase in human activity during the drilling phase, causing an increase in stress to wildlife or limiting movement throughout the Project Area. Decreased human activity during the production phase would reduce these potential indirect impacts to wildlife as well.

Protective/Mitigation Measures: Due to the fee/fee and fee/fee/fed nature of the surface and mineral estate, the Bureau of Land Management does not have the authority to attach protective/mitigation measures as conditions of approval unless supported by federal law. No terrestrial wildlife species that may be present or have habitat within in the action area are federally protected; therefore, no protective/mitigation measures will be suggested as a result of the environmental assessment.

No Action Alternative

Direct and Indirect Impacts: The no action alternative effect will be similar to the proposed action effect due to the ownership status of surface lands and mineral estate. The pads may be constructed and fee/fee wells may be drilled without approval from the Bureau of Land Management while yielding an impact similar to the proposed action.

Protective/Mitigation Measures: None.

## 3.3.5 MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) includes guidance for the protection of native passerines (songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. Within the context of the MBTA, “migratory” birds include non-migratory “resident” species as well as true migrants, essentially encompassing most native bird species. The nesting time

period is of special importance as the ability to create a nest, incubate, and rear chicks to fledging is a vulnerable time period for birds, and disturbances to nesting activities can lead to larger consequences for individual birds. In addition, because birds are generally territorial during the nesting season, their ability to access and utilize sufficient food is limited by the quality and availability of the territory occupied. During non-breeding seasons, birds are generally non-territorial and able to feed across a larger area and wider range of habitats.

Affected Environment

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

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The Project Area and surrounding area is already disturbed by oil and gas development. Some birds have adapted to and currently use habitat patches within well fields for reproduction and growth. The Proposed Action would initially result in conversion of approximately 21.3 acres of shortgrass prairie to well pads and associated infrastructure. The majority of these areas would be reclaimed and revegetated, with 7 acres of permanent surface disturbance associated with the two pads. Noise generated during construction, drilling, and production phases will likely result in a larger impact footprint then the disturbance footprint alone.

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

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

Any secondary containment system will be covered in a manner to prevent access by migratory birds. The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching,

roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, and in-line units. Any action that may result in a "take" of individual migratory birds or nests that are protected by MBTA will not be allowed.

No Action Alternative

Direct and Indirect Impacts: The no action alternative effect will be similar to the proposed action effect due to the ownership status of surface lands and mineral estate. The pads may be constructed and fee/fee wells may be drilled without approval from the Bureau of Land Management while yielding an impact similar to the proposed action.

Protective/Mitigation Measures: None.

## 3.4 HERITAGE RESOURCES AND HUMAN ENVIRONMENT

### 3.4.1 ECONOMICS

Although this project only affects the outcome of 8 proposed wells, the Oil and Gas industry as a whole has a significant impact on the economy. Not only does oil and gas development directly create higher than average paying jobs, it also increase demand for employees of related support fields, such as transportation, equipment fabrication, construction, gas stations, restaurants ect. Aside from the creation of jobs, the production of oil and gas directly generates revenue for federal, state and local governments through taxes, fees and royalties.

A 2013 study by the CU Leeds School of Business (Lewandowski and Wobbekind,2013) illustrated the economic benefits of oil and gas development in Colorado. It showed that the oil and gas industry directly contributed almost $1.6 billion to state and local governments, schools and other special districts in Colorado in 2012. The study found that oil and gas development accounted for about 51,200 jobs in Colorado, most of which pay more wages more than twice of the average wage in the state. In addition, it was estimated that the industry resulted in 60,245 indirect and induced jobs in Colorado, for a total of 111,476 jobs supported by the oil and gas development industry in the state in 2012. The study concluded that the oil and gas industry generated $29.6 billion in output in Colorado's economy in 2012.

These figures don't account for the fees, royalties and lease payments made to the federal government for development of federal oil and gas estate, or take into account the positive economic impact that results from the use of affordable petroleum products for fuels and the produces manufactured with them. The production of domestic petroleum products has the added benefit of reducing the nation's dependence on foreign energy.

### 3.4.2 PALEONTOLOGICAL RESOURCES

Affected Environment: The proposed wells are geographically located in grassland overlying part of the geologic feature that is the eastern flank of the Denver Basin. The Basin consists of a

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

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

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

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

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

No Action Alternative (Direct and Indirect Impacts)

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

Protective/Mitigation Measures

The proposed construction of the well pads, access to the well pads, and pipelines may penetrate the protective soil layer impacting the bedrock unit below. Because a highly fossiliferous (Class

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

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

### 3.4.3 WASTES, HAZARDOUS OR 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.
- No treatment or disposal of wastes on site is allowed on Federal Lands.
- All concrete washout water needs to be contained and properly disposed of at a permitted offsite disposal facility.
- If pits are utilized they need to be lined to mitigate leaching of liquids to the subsurface, as necessary. State and/or Federal regulations may apply to pit construction and removal.

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

## 3.5 CUMULATIVE IMPACTS SUMMARY

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 25,000 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 has minor significance in comparison to the impact of the overall petroleum development in Weld County.

Air Quality: The proposed action, when combined with the past, present, and reasonably foreseeable future actions may contribute incrementally to the deterioration of air quality and climate change in the region. Development of fluid minerals at the rate proposed within the APDs would result in additional surface and subsurface disturbances and emissions during construction, drilling, completion, and production activities. The severity of these incremental impacts (air quality only) could be elevated based on the amount of contemporaneous development in surrounding area/region.

# CHAPTER 4 - CONSULTATION AND COORDINATION

## 4.1 LIST OF PREPARERS AND PARTICIPANTS

Please see Interdisciplinary Team Review list for BLM Participants

## 4.2 TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED

*Native American Tribes were consulted at the lease stage.*

# 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.

Lewandowski, Brian, Wobbekind, Richard. July 2013. *Assessment of Oil and Gas Industry, 2012 Industry Economic and Fiscal Contributions in Colorado.* Business Research Division, Leeds School of Business, University of Colorado Boulder.

# Finding Of No Significant Impact
# (FONSI)

# DOI-BLM-CO-F02-2014-038 EA

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

RATIONALE:

**Context**: The BLM has received 2 Applications for Permits to Drill (APDs), and is anticipating receiving 6 additional APDs. The operator is proposing the construction of two well pads, and the drilling of 8 horizontal oil wells on private surface over private minerals, developing both private and federal minerals (fee/fee/fed).

The projects are in Weld County, approximately 17 miles east of the Town of Grover. The federal mineral estate is leased and subject to oil and gas development.

The general area description would be defined as rural rangeland located in the northeastern plains of Colorado, used primarily for livestock production and oil and gas development. There is no public land or public roads or other public access in the project area.

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

**Intensity**:
I have considered the potential intensity/severity of the impacts anticipated from the proposed Horsetail 10L and 13M projects**.** Project decision relative to each of the 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 from the proposed wells. Most of this would occur during the drilling phase. Potential impacts might occur to ground water; however such impacts should not occur if strict drilling requirements are followed. Other minor impacts might occur to wildlife and migratory birds but would be mitigated through the use of timing stipulations. 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.

**Consideration of whether the action may establish a precedent for future actions with significant impacts:**
The proposed APDs will be limited to standard construction procedures associated with pad/road construction and drilling in Weld County and have occurred historically on split and private mineral estate. There are no aspects of the current proposal that are precedent setting.

**Consideration of whether the action is related to other actions with cumulatively significant impacts:**
The action is a continuation of oil and gas activities that have historically occurred in the area. Continued oil and gas activity in the area will have minor but additive impacts to air and the production greenhouse gas emissions. The project area having been subject to historic drilling activity will continue to experience gradual depletion of the recoverable oil and gas products. Although past cattle grazing had contributed to cumulative impacts, there have been no other recent activities besides oil and gas that has contributed to cumulative impacts.

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

No historic properties were recorded during the cultural resources inventories.

**Threatened and endangered species and their critical habitat:**
There are no known populations of T&E species in the action area.

**Any effects that threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment:** The proposed action conforms with the provisions of NEPA (U.S.C. 4321-4346) and FLPMA (43 U.S.C. 1701 et seq.) and is compliant with the Clean Water Act and The Clean Air Act, the National Historic Preservation Act, Migratory Bird Treaty Act (MBTA) and the Endangered Species Act.

NAME OF PREPARER: Aaron Richter

SUPERVISORY REVIEW: /s/ Jay Raiford

NAME OF ENVIRONMENTAL COORDINATOR: /s/ Martin Weimer

DATE: 5/5/14

SIGNATURE OF AUTHORIZED OFFICIAL: /s/ Keith E. Berger
Keith E. Berger, Field Manager

DATE SIGNED: 5/6/14

**UNITED STATES**
**DEPARTMENT OF THE INTERIOR**
**BUREAU OF LAND MANAGEMENT**
**ROYAL GORGE FIELD OFFICE**

# DECISION RECORD

**Project Name**

# DOI-BLM-CO-F02-2014-038-EA

DECISION: It is my decision to authorize the Proposed Action as described in the attached EA. The proposed action is the construction of two well pads, and the drilling of 8 horizontal oil wells on private surface over private minerals, developing both private and federal minerals (fee/fee/fed).

The projects are in Weld County, approximately 17 miles east of the Town of Grover. The federal mineral estate is leased and subject to oil and gas development.

The proposed action was analyzed in the Environmental Assessment (EA) DOI-BLM-CO-F02-2014-038 and a Finding of No Significant Impact was reached and an EIS will not be prepared.

RATIONALE: This project will develop oil and gas resources on Federal minerals Lease COCs 73412 and 75059 consistent with existing Federal lease rights provided for in the Mineral Leasing Act of 1920, as amended. Extensive oil and gas development has occurred throughout the project area, mostly on private mineral estate.

The project area currently has a high degree of alteration in the form of agricultural fields, roads, houses, and oil and gas production. The addition of the infrastructure needed to construct and drill the 8 proposed wells would have mostly temporary and overall minor impacts on resources present in the project area.

MITIGATION MEASURES\MONITORING:

**Air Quality:**

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

- Process equipment would be permitted by CDPHE in accordance with applicable requirements and required emissions standards to limit the facility's potential to emit and

provide appropriate operating, monitoring, and recordkeeping requirements.

- Flashing emissions from storage tanks would be controlled using technology that would reduce VOC emissions by at least 95 percent relative to uncontrolled conditions.
- The operator would control fugitive emissions of particulate matter (dust) during construction and production using procedures that would reduce dust such that no visible dust plumes leave the construction site.
- All pump and compression engines would be required to meet EPA NSPS JJJJ emissions standards.
- All drill rig engines and hydraulic fracturing would be required to meet EPA Non-Road Tier II emissions standards.
- The operator would perform 'Green Completions' for all wells, as required by COGCC Rule 805.b(3).

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.

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

Invasive Plants: Equipment used to implement the proposed action should be washed prior to entering the project area to remove any plant materials, soil, or grease. Areas disturbed by project implementation will be monitored for the presence of weeds on the Colorado State Noxious Weed list. Identified noxious weeds will be treated. Monitoring is required for the life of the project and for three years following completion and/or abandonment of the wells and elimination of identified Colorado State Noxious Weeds list A and B species.

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

Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern (BCC), no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 - July 15, during the breeding and brood rearing season for most Colorado migratory birds. An exception to this TL will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate

no nesting within 30 meters (100 feet) of the area to be disturbed. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 15 and continue into the 60-day period.

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

**Paleontologic 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 the BLM is going to approve an action involving the mineral estate that may affect the paleontological resources, the action should be conditioned with appropriate paleontological mitigation recommendations to protect the interests of the surface owner. The surface owner may elect to waive these recommendations; such a waiver must be documented in the casefile.

**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.
- No treatment or disposal of wastes on site is allowed on Federal Lands.

- All concrete washout water needs to be contained and properly disposed of at a permitted offsite disposal facility.
- If pits are utilized they need to be lined to mitigate leaching of liquids to the subsurface, as necessary. State and/or Federal regulations may apply to pit construction and removal.

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

SIGNATURE OF AUTHORIZED OFFICIAL: /s/ Keith E. Berger
Keith E. Berger, Field Manager

DATE SIGNED: 5/6/14