

**U.S. Department of the Interior  
Bureau of Land Management  
Colorado River Valley Field Office  
2300 River Frontage Road  
Silt, Colorado 81652**

## **ENVIRONMENTAL ASSESSMENT**

**NUMBER**

DOI-BLM-CO-N040-2012-0061-EA

**CASEFILE NUMBER**

Federal Lease COC24603 (bottomhole).

**PROJECT NAME**

Proposal to Drill One Federal Well from the Expanded GM 41-4 Pad on Fee (Private Surface-Private Minerals) Land in lower Riley Gulch Area Northwest of Parachute, Garfield County, Colorado.

**PAD LOCATION**

Township 7 South (T7S), Range 96 West (R96W), Section 4, Lot 1, Sixth Principal Meridian. Pad elevation is 5,450 feet above mean sea level (MSL).

**APPLICANT**

WPX Energy Rocky Mountain LLC. Contact: Greg Davis, 1515 Arapaho Street, Tower 3, Suite 1000, Denver, CO 80202.

**PROPOSED ACTION**

WPX Energy Rocky Mountain LLC (“WPX”) proposes to drill and develop one new Federal oil and gas well from the expanded GM 41-4 well pad located on fee (private surface-private minerals) land owned by WPX with underlying private minerals. The Federal well would be horizontally drilled from the fee pad into nearby Federal lease COC24603 (Table 1). The project lies approximately 5.5 miles northwest of Parachute, Garfield County, Colorado in the lower reaches of Riley Gulch, an ephemeral drainage that is tributary to Parachute Creek and, in turn, the Colorado River (Figure 1).

The GM 41-4 pad presently supports two producing fee wells completed in 1996 and 1997. The pad would be expanded by 4.4 acres to the west of its present reclaimed footprint to provide space to conduct the horizontal well drilling and the associated support activities (Figure 2). The expanded pad would be designed with the space to eventually accommodate 10 to 14 new wells in the future. Pad expansion would have a cut of about 22 feet at the south corner and 17 feet of fill at the north corner.

<b>Table 1. Surface and Bottomhole Locations of Proposed Federal Well</b>		
<b><i>Proposed Well</i></b>	<b><i>Surface Location (Section 4, T7S, R96W)</i></b>	<b><i>Bottomhole Location (Section 10, T7S, R96W)</i></b>
Williams GM 701-4-HN1	Lot 1, 689 fee FNL 896 feet FEL	SWNW, 1877 feet FNL 310 feet FWL

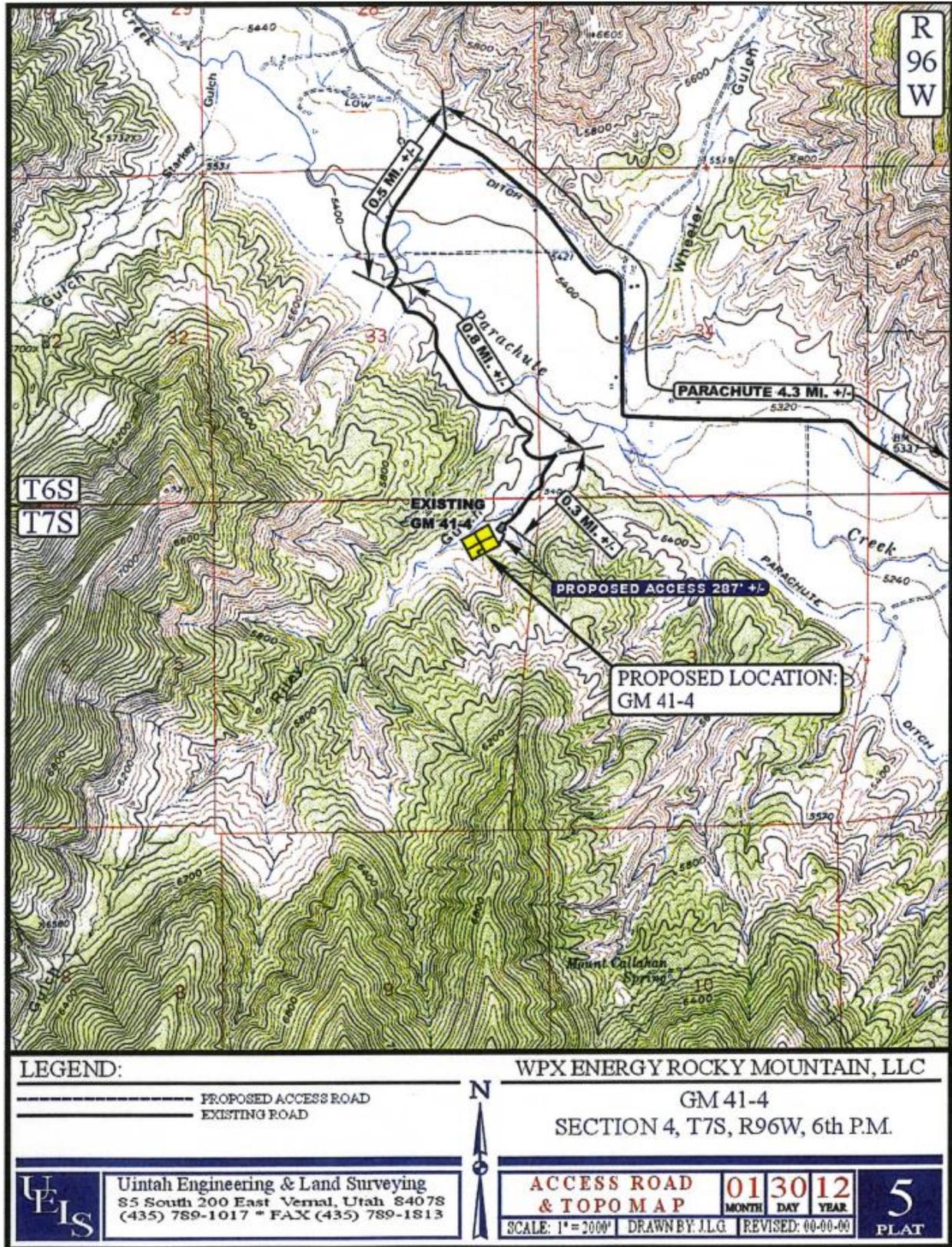


Figure 1. Location Map Featuring Proposed Pad and Access Road.



The project would include a separate frac (hydraulic fracturing) pad and related waterlines, a natural gas pipeline, and a tank battery. These would also be constructed on WPX lands along the existing Riley Gulch access road. The frac pad, 1.28 acres in size, could also support remote completions for future well drilling planned in Riley Gulch.

A short segment of new road (287 feet long and 22 feet wide) would be constructed (within the existing pad reclaim) from the working area on the reclaimed GM 41-4 pad west to the east corner of the expanded pad. Two existing pipelines within the proposed construction footprint of the pad would be deepened prior to pad construction to avoid load-bearing conflicts on the lines. Three 4.5-inch diameter temporary steel surface water supply lines would be installed on the ground surface between the GM 41-4 pad expansion and the new frac pad to support the remote frac operations. Water for drilling and well completion operations would be trucked from approved sources via existing State, County, and/or fee lease roads. A short length of new gas pipeline, approximately 567 feet long, would also be installed. This would tie to an existing pipeline system. Production equipment and storage tanks (two for produced water, two for liquid condensate) would be staged in the formerly reclaimed area of the GM 41-4 well pad near the two producing fee wells (Figure 3).

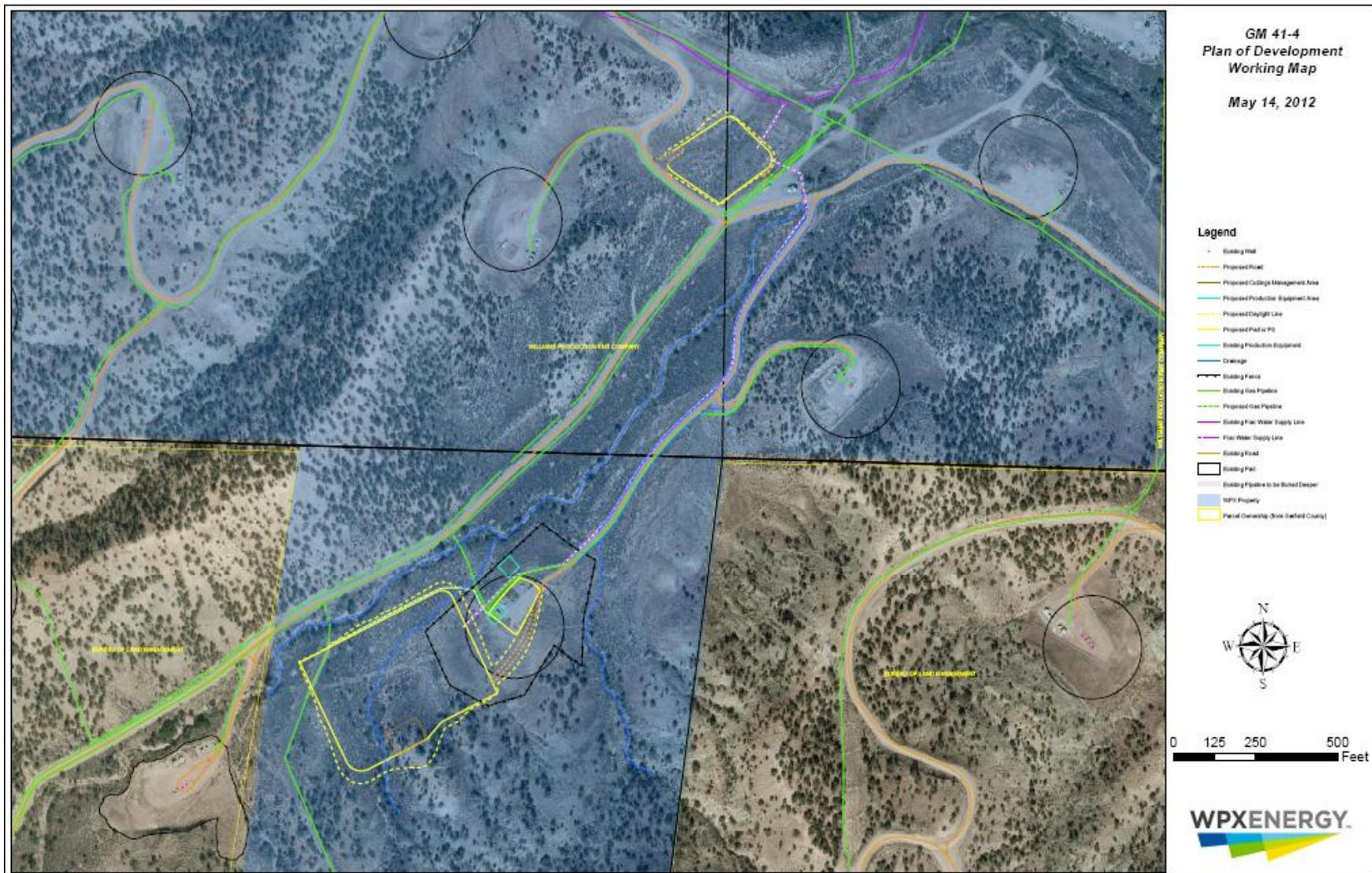
The total surface disturbance associated with this project would involve approximately 6.02 acres of new surface disturbance and 1.64 acres of redisturbance of previously reclaimed lands as detailed in Table 2.

<b>Table 1. Surface Disturbance Calculations</b>	
<i>Private Surface New Disturbance</i>	
GM 41-4 Pad	4.42 acres
Frac Pad	1.28 acres
Waterlines and Gas Pipeline	0.32 acres
<i>Private Surface Re-disturbance</i>	
GM 41-4 Pad and Tank Battery	1.10 acres
Waterlines and Gas Pipeline	0.54 acres
<b>Total Disturbance Area</b>	<b>7.66 acres</b>

After interim reclamation, the project would have 2.64 acres of long-term disturbance for the working area of the pad, tank battery and frac pad.

Cuttings generated during drilling of the proposed well would be dried with shaker systems installed on the drill rig and stored in the pad surface in a designated cuttings storage area (Figure 3). Introduction of drying agents such as sawdust or gypsum would be acceptable alternate methods to achieving a stable pile of cuttings that would eventually be incorporated into the pad cut slope during the interim reclamation work. Prior to blending the cuttings into the reclaim earthwork, the cuttings would be tested and satisfy COGCC Table 910-1 standards.

A unique feature of the planned pad expansion would involve the routing of an ephemeral side drainage that flows across the pad footprint into Riley Gulch. The drainage would be routed around the western edge of the pad using earthen berms constructed to accommodate the expected flows. The new drainage interface with Riley Gulch would feature a rock-lined channel and structures to achieve the necessary drop in elevation to the existing channel (Figures 4a and 4b).

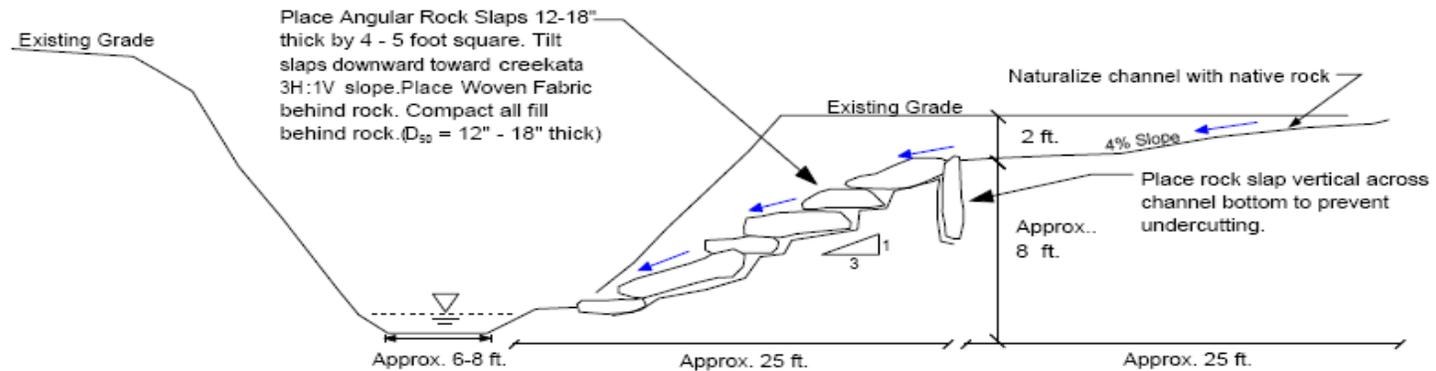


**Figure 3. Proposed Project Plan of Development on Private Land.**

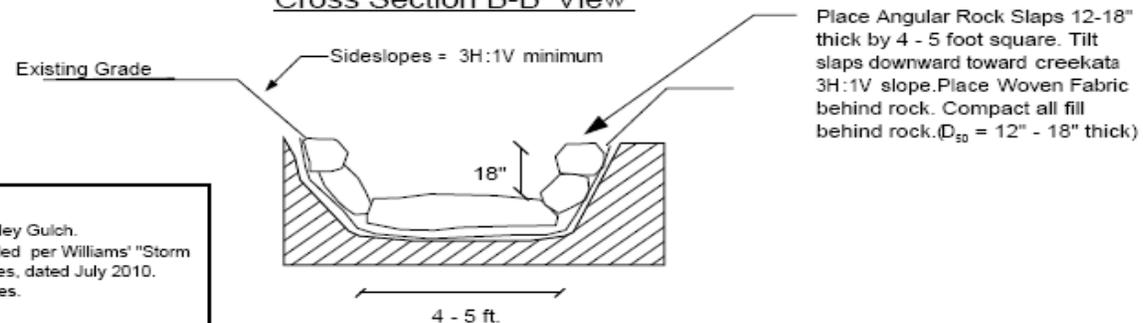
WPX Energy Rocky Mountain, LLC  
 GM 41-4 Well Pad  
 Section 4, T7S, R96W, 6th PM  
 Cross Section Schematic



Cross Section A-A' View



Cross Section B-B' View



- Notes:**
- \* Keep all work above the ordinary high water line of Riley Gulch.
  - \* Storm water and erosion control BMP's shall be installed per Williams' "Storm Water and 404 Handbook of Best Management Practices, dated July 2010.
  - \* Field verify location of gas, water and condensate lines.
  - Call Before You Dig - Ph: 811
  - \* Verify and field fit all dimensions.
  - \* Not to Scale.

Prepared by: Fox Engineering Solutions, Inc.  
 May 21, 2012

Figure 4a. Drainage Realignment Profile

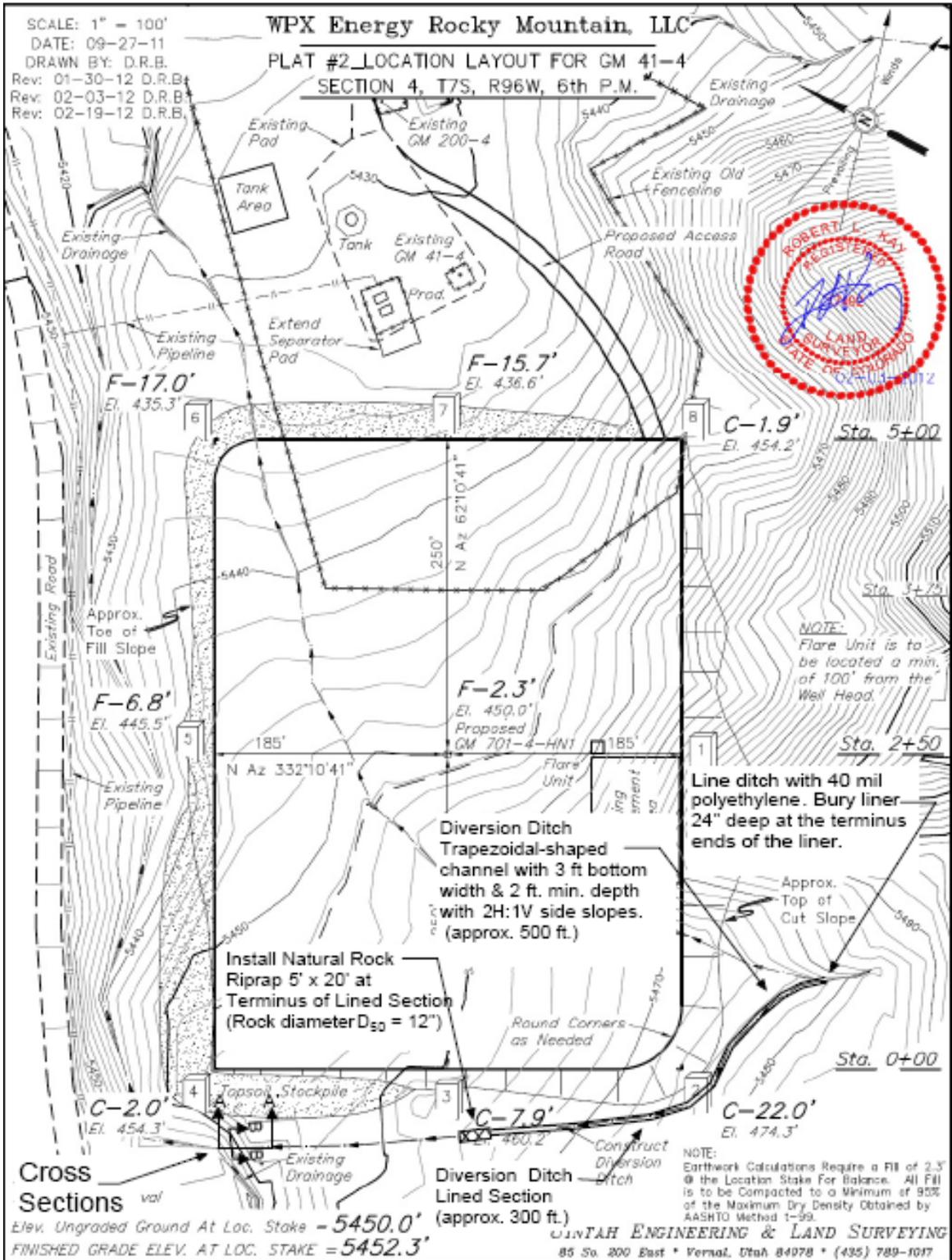


Figure 4b. Drainage Realignment Profile

Topsoil would be stripped during the initial earthwork and windrowed around the pad perimeter and be designed to serve as storm water controls. The pad would be designed to limit any excess material from pad construction. Diversion ditches would be constructed to direct surface flow around the pad perimeter.

The road, pipeline, and pad construction work would follow the guidelines established in the BLM Gold Book, *Surface Operating Standards for Oil and Gas Exploration and Development* (USDI and USDA 2007). A road maintenance program would be required during the production phase of the well which includes, but is not limited to blading, ditching, culvert installation and cleanout, weed control, and gravel surfacing where excessive rutting or erosion may occur. Roads would be maintained in a safe and usable condition.

The Proposed Action would include well drilling and well completion, production of natural gas and associated liquid condensate, proper handling and disposal of produced water, and interim and final reclamation.

The Proposed Action would be implemented consistent with the Federal oil and gas lease, Federal regulations (43 CFR 3100), and the operational measures included in the Applications for Permit to Drill (APDs). Appendix A lists the specific Surface Use Conditions of Approval (COAs) to be implemented as mitigation measures for this project. The operator would be responsible for continuous inspection and maintenance of the access roads, pads and pipelines.

The Proposed Action project area lies in proximity to potentially suitable habitat for DeBeque phacelia (*Phacelia submutica*). Informal consultation with US Fish and Wildlife Service (USFWS) personnel in Grand Junction, Colorado has been initiated by BLM, CRVFO staff (Judy Perkins). WPX has retained WestWater Engineering (WWE) of Grand Junction, Colorado, to prepare the Biological Assessment for the consultation process. Special Status Species section provides discussion of the measures designed to mitigate project impacts to the DeBeque phacelia potential habitat.

### **NO ACTION ALTERNATIVE**

The Proposed Action involves Federal subsurface minerals encumbered with Federal oil and gas leases that 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.

Under the premise of the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied. No new surface disturbance associated with the drilling of the Williams GM 701-4-HN1 well would occur on private land.

### **PURPOSE AND NEED FOR THE ACTION**

The purpose of the Proposed Action is to develop oil and gas resources on Federal lease COC24603 consistent with existing Federal lease rights. The action is needed to increase the development of oil and gas resources for commercial marketing to the public.

### **SUMMARY OF LEASE STIPULATIONS**

The Federal well would be horizontally drilled from the expanded GM 41-4 pad located on private surface owned by WPX with underlying fee mineral estate. Because the Federal well is accessing the

nearby Federal lease from a private surface/private mineral location, the Federal lease terms are not applicable to the construction, drilling, completion, or well production operations at the GM 41-4 pad.

### **PLAN CONFORMANCE REVIEW**

The Proposed Action and No Action Alternative are subject to and have been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

Name of Plan: The current land use plan is the *Glenwood Springs Resource Management Plan* (RMP), approved in 1984 and revised in 1988 (BLM 1984). Relevant amendments include the *Oil and Gas Plan Amendment to the Glenwood Springs Resource Management Plan* (BLM 1991) and the *Oil & Gas Leasing & Development Record of Decision and Resource Management Plan Amendment* (BLM 1999a).

Decision Language: The 1991 Oil and Gas Plan Amendment (BLM 1991) included the following at page 3: “697,720 acres of BLM-administered mineral estate within the Glenwood Springs Resource Area are open to oil and gas leasing and development, subject to lease terms and (as applicable) lease stipulations” (BLM 1991, page 3). This decision was carried forward unchanged in the 1999 ROD and RMP amendment at page 15 (BLM 1999b): “In areas being actively developed, the operator must submit a Geographic Area Proposal (GAP) [currently referred to as a Master Development Plan, MDP] that describes a minimum of 2 to 3 years of activity for operator controlled leases within a reasonable geographic area.”

Discussion: The Proposed Action is in conformance with the 1991 and 1999 RMP amendments cited above because the Federal mineral estate proposed for development is open to oil and gas leasing and development. The 1999 RMP amendment requires multi-year development plans known at that time as Geographic Area Plans (GAPs) for lease development over a large geographic area. However, the 1999 RMP amendment also provides exceptions to that requirement for individual or small groups of exploratory wells drilled in relatively undrilled areas outside known high production areas. The Proposed Action, as such, is in conformance with the exception to the requirement to require operators to submit Master Development Plans (MDPs), previously known as Geographic Area Plans (GAPs).

### **STANDARDS FOR PUBLIC LAND HEALTH**

In January 1997, Colorado BLM approved the Standards for Public Land Health. The five standards cover upland soils, riparian systems, plant and animal communities, threatened and endangered species, and water quality. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands.

Environmental analysis of proposed projects on BLM land must address whether the Proposed Action or alternatives being analyzed would result in impacts that would maintain, improve, or deteriorate land health conditions identified in the applicable Land Health Assessment (LHA). However, because no component of the Proposed Action would involve BLM surface lands, an LHA does not apply, and conformance with the land health standards is not evaluated in this EA.

### **AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

During its internal scoping process for this Environmental Assessment (EA), pursuant to the National Environmental Policy Act (NEPA), BLM resource specialists identified the following elements of the natural and human environment as present in the project vicinity and potentially affected by the project:

Access and Transportation	Native American Religious	Vegetation
Air Quality	Concerns	Visual Resources
Cultural Resources	Noise	Wastes, Hazardous and Solid
Geology and Minerals	Socioeconomics	Water Quality, Surface and Ground
Invasive Non-Native Plants	Soils	Wildlife, Aquatic and Terrestrial
Migratory Birds	Special Status Species	

**Access and Transportation**

Affected Environment

The project area is accessed from the BLM office in Silt, Colorado, by driving west on Interstate 70 (I-70) to the Parachute exit (#75) then northwest on Parachute Creek Road (County Road [CR] 215) approximately 4.3 miles and across oil and gas development roads for another 1.5 miles across Parachute Creek to the base of Riley Gulch. No public access is available to the project site as it lies wholly on private lands.

Environmental Consequences

*Proposed Action*

Constructing 287 feet of new 18-foot wide access road with a 30-foot wide disturbance corridor would create 0.2 acre of new surface disturbance. After reclamation of the road cuts and fills, the long-term disturbance for the new road would total 0.1 acre. All disturbances would occur on private land.

The Proposed Action would result in a substantial increase in truck traffic related to the development of the initial well and potentially the 10 to 14 additional wells that could be drilled at the location. The largest increase would be during rig-up, drilling, and completion activities. Data indicate that approximately 1,160 truck trips over a 30-day period would be required to support the drilling and completion of each well (Table 3). Once the wells are producing, traffic would decrease to occasional visits for monitoring or maintenance activities. Each well may have to be recompleted once per year, requiring three to five truck trips per day for approximately seven days.

<b>Table 3. Traffic Associated with Drilling and Completion Activities</b>		
<i>Vehicle Class</i>	<i>Number of trips per well</i>	<i>Percentage of total</i>
16-wheel tractor trailers	88	7.6%
10-wheel trucks	216	18.6%
6-wheel trucks	452	39.0%
Pickup trucks	404	34.8%
Total	1,160	100.0%
Source: BLM 2006. Note: Trips by different vehicle types are not necessarily distributed evenly during the drilling process. Drilling and completion period is approximately 30 days per well.		

Degradation of field development roads may occur due to heavy equipment travel and fugitive dust and noise would be created. Mitigation measures (Appendix A) would be required as Conditions of Approval (COAs) to ensure adequate dust abatement and road maintenance occur.

### *No Action Alternative*

Under this alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied. No new surface disturbance associated with the drilling of the Williams GM 701-4-HN1 well would occur on private land.

## **Air Quality**

### Affected Environment

Colorado Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) are health-based criteria for the maximum acceptable concentrations of air pollutants in areas of public use. Although specific air quality monitoring has not been conducted within the project area, regional air quality monitoring has been conducted in Rifle and elsewhere in Garfield County. Air pollutants measured in the region for which ambient air quality standards exist include carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter less than 10 microns ( $\mu$ ) in diameter (PM<sub>10</sub>), and particulate matter less than 2.5  $\mu$  in diameter (PM<sub>2.5</sub>).

The project area lies within Garfield County, which has been described as an attainment area under CAAQS and NAAQS. An attainment area is an area where ambient air pollution quantities are below (i.e., better than) NAAQS standards. Regional background values are well below established standards, and all areas within the cumulative study area are designated as attainment for all criteria pollutants. Federal air quality regulations are enforced by the CDPHE. The Prevention of Significant Deterioration (PSD) program within CDPHE is designed to limit incremental increases for specific air pollutant concentrations above a legally defined baseline level, as defined by an area's air quality classification. Incremental increases in PSD Class I areas are strictly limited.

Federal air quality regulations adopted and enforced by CDPHE limit incremental emissions increases to specific levels defined by the classification of air quality in an area. The PSD Program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict.

The project area and surrounding areas are classified as PSD Class II, as is Dinosaur National Monument, located approximately 180 miles to the northwest. PSD Class I areas located within 100 miles of the project area are Flat Tops Wilderness (approximately 25 miles north), Maroon Bells – Snowmass Wilderness (approximately 35 miles south), West Elk Wilderness (approximately 60 miles southeast), Black Canyon of the Gunnison National Park (approximately 65 miles south), and Eagles Nest Wilderness (approximately 60 miles east).

### Environmental Consequences

#### *Proposed Action*

The CDPHE, under delegated authority from the U.S. Environmental Protection Agency (EPA) and in conformance with Colorado's State Implementation Plan (SIP), is the agency with primary responsibility for air quality regulation and enforcement in conjunction with industrial developments and other air pollution sources in Colorado. Unlike the conceptual "reasonable but conservative" engineering designs used in NEPA analyses, any CDPHE air quality preconstruction permitting is based on site-specific, detailed engineering values, which are assessed in CDPHE's review of the permit application.

The GM 41-4 pad includes constructing, drilling, completing, and operating one horizontal well in one planned visit. The pad may accommodate up to 10-14 future directional or horizontal wells. Although the impacts to air quality from these wells are disclosed in this EA, the drilling and operation is permitted with the approval of an APD for each well. Horizontal wells would require approximately 15-30 days to drill and 10-45 days to complete. Individual wells would require approximately 7 to 10 days to drill and approximately 5 to 15 days to complete. Air quality would decrease during construction of access roads, pads, and pipelines and drilling and completing the wells.

Pollutants generated during construction activities would include combustion emissions and fugitive dust associated (PM<sub>10</sub> and PM<sub>2.5</sub>) with construction equipment and vehicles. Construction activities for the well pad, access road, and pipelines would occur between the hours of 7:00 a.m. and 6:00 p.m. each day. Once construction activities are complete, air quality impacts associated with these activities would also cease. Fugitive dust from mobilization and rigging up the drill rig would also occur however impacts associated would be minor and short lived. Emissions associated with drilling and completing the wells would also be greatly reduced to emissions associated with long-term natural gas and condensate production.

A regional air model addressing air quality impacts of current and future oil and gas activities within the CRVFO has recently been completed for the BLM by Tetra Tech, Inc. and its subcontractor, URS Corporation. The methods and results of that modeling are presented in an Air Resources Technical Support Document (ARTSD) (BLM 2011). The air quality model addressed impacts associated with emissions of greenhouse gases (GHGs), “criteria pollutants” (CO, NO<sub>2</sub>, SO<sub>2</sub>, ozone, PM<sub>10</sub>, and PM<sub>2.5</sub>), hazardous air pollutants (HAPs) including BTEX (benzene, ethylbenzene, toluene, and xylenes), formaldehyde, and n-hexane.

The modeling also addressed potential impacts on visibility due to particulates and “photochemical smog” (caused by chemical reactions in the atmosphere) and on lake chemistry of selected pristine lakes due to modeled deposition rates of sulfur and resultant impacts on acid neutralizing capacity of the lake waters. The visibility analysis predicted a slight impact (one day per year with a reduction in visibility of 1 deciview or greater) in the Flat Tops Wilderness and no days with 1 deciview or greater reduction in visibility at all other modeled Class I and II receptors. For the remaining pollutants analyzed, modeled levels of future oil and gas development within the CRVFO would have no or negligible long-term adverse impacts on air quality. Since the Proposed Action is within the scope of the future development modeled, no significant adverse impacts on air quality are anticipated.

The air quality model incorporated assumptions about various development and mitigation scenarios, many of which have been integrated into the Proposed Action by Encana or would be imposed by the BLM as COAs (Appendix A). These include use of directional drilling to reduce the number of well pads, piping instead of trucking of fluids to a centralized collection facility, flaring instead of venting of natural gas during well completions, self-contained flare units to minimize emissions to the atmosphere, and use of closed-loop drilling. Closed-loop drilling minimizes emissions by recycling drilling muds and separating fluids and drill cuttings, thus eliminating open pits containing petroleum fluids. In addition to minimizing emissions associated with drilling and completion activities, these mitigation measures would also significantly reduce fugitive dust and vehicle tailpipe emissions by greatly reducing the volume of truck traffic required to support the operations.

Generation of fugitive dust as a result of construction activities and travel on unpaved access roads would be further reduced by BLM’s requirement that the operator apply gravel to a compacted depth of 6 inches on the access road, apply water to the access road during the development phase, and apply a dust suppressant surfactant approved by the BLM throughout the long-term production phase (Appendix A).

Emissions of volatile organic compounds (VOCs) such as the BTEX constituents of condensate vary depending on the characteristics of the condensate, the volume produced, and tank operations. Operators are required to control emissions of VOCs from condensate tanks under CDPHE Regulation 7. If deemed necessary by the State, WPX may be required to install a vapor recovery or thermal destruction system to further reduce VOC concentrations.

Ongoing scientific research has identified the potential impacts of “greenhouse gases” (GHGs) and their effects on global atmospheric conditions. These GHGs include carbon dioxide, methane, nitrous oxide, water vapor, and several trace gases. Through complex interactions on a global scale, these GHG emissions are believed by many experts to cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) predicted that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (NAS) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. In 2007, the IPCC also concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic (man-made) greenhouse gas concentrations” (NAS 2007). Other theories about the effect of GHGs on global climate change exist.

The recent air modeling for the CRVFO inventoried and assessed GHG emissions associated with various scenarios of future oil and gas development. In all scenarios modeled, the GHG emissions would not increase the total U.S. natural gas sector emissions by more than 0.5%. The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts of climate change on the specific area of the Proposed Action. While any oil and gas development project may contribute GHGs to the atmosphere, these contributions would not have a significant effect on a phenomenon occurring at the global scale believed by some to be due to more than a century of human activities.

#### *No Action Alternative*

Under this alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied resulting in no new impacts to air quality.

### **Cultural Resources**

#### **Affected Environment**

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to take in to account the effects their actions will have on cultural resources. As a general policy, an agency must consider effects to cultural resources for any undertaking that involves Federal monies, Federal permitting/authorization, or Federal lands.

A Class III cultural resource inventory (CRVFO# 1112-15) was conducted specifically for the proposed GM 41-4 well pad location and related linear route, and covered the entire proposed area of disturbance and vicinity. Three previously prepared Class III cultural resource inventories (CRVFO# 1285A, 9477 and 1107-33) covered portions of the proposed well pad and the linear route. The cultural inventories and pre-field file searches of the Colorado SHPO database and BLM Colorado River Valley Field Office cultural records identified five cultural resources within the project area. These cultural resources included one prehistoric site and four isolated finds. The prehistoric site (5GF.142) was determined as

officially not eligible (2007) for listing on the National Register of Historic Places (NRHP). The four isolated finds are by definition also not eligible to the NRHP. Eligible or potentially eligible sites are referred to in Section 106 of the National Historic Preservation Act as “historic properties.”

### Environmental Consequences

#### *Proposed Action*

No historic properties are located in the vicinity of the project area or will be affected by the construction of the proposed GM 41-4 well pad and associated linear route due to the project design. Therefore, the BLM made a determination of “**No Historic Properties Affected.**” This determination was made in accordance with the 2001 revised regulations [36CFR 800.4(d)(1)] for Section 106 of the National Historic Preservation Act (16U.S.C 470f), the BLM/State Historic Preservation Officer (SHPO) Programmatic Agreement (2012) and Colorado Protocol (2012)]. As the BLM has determined that the Proposed Action would have no direct impacts to known “historic properties,” no formal consultation was initiated with the SHPO.

A standard Education/Discovery COA for cultural resource protection will be attached to the Federal APDs. The importance of this COA would be stressed to the operator and its contractors, including informing them of their responsibilities to protect and report any cultural resources encountered during construction operations.

Indirect, long-term cumulative impacts from increased access and the presence of project personnel could result in a range of impacts to undiscovered cultural resources in the vicinity of the project location. These impacts could range from accidental damage or vandalism to illegal collection and excavation.

#### *No Action Alternative*

The Proposed Action involves Federal subsurface minerals encumbered with Federal oil and gas leases that 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.

Under the premise of the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied. No new surface disturbance associated with the drilling of the Williams GM 701-4-HN1 well would occur on private land. This would lessen the potential to expose buried cultural resources as well as lessen the potential for indirect effects from illicit collection or vandalism as well as reduce the cumulative impacts on cultural resources.

### Geology and Minerals

#### Affected Environment

The development area is located near the eastern margin of the Colorado Plateau physiographic province (Fenneman 1946), a region characterized by dissected plateaus of strong relief. A broad, asymmetric, southeast-northwest trending structural basin, the Piceance Basin contains stratified sediments ranging in age from Cambrian through middle Tertiary up to 20,000 feet thick. The Basin lies between the White River uplift to the northeast, the Gunnison uplift to the south, and the Uncompahgre swell to the west (George 1927, Weiner and Haun 1960).

Bedrock exposure within the proposed project area is the Tertiary Shire member of the Wasatch Formation. The Wasatch Formation, is described as: Interbedded, variegated reddish-brown, tan and white conglomerate, conglomeratic sandstone, siltstone, mudstone, and claystone unconformably overlying Mesaverde rocks (Shroba et al 1995). The Mesaverde Group is composed of mudstones and sandstones with interlayered coal beds and ranges in thickness from about 3,000 to over 7,000 feet. The Mesaverde Group has also been referred to as the Mesaverde Formation, which includes informal subdivisions based on gas productivity characteristics. Table 4 lists the surficial geologic formations present within the proposed project area.

The Mesaverde Group is the target zone of the proposed drilling program. Composed of the Williams Fork and Iles Formations, the Mesaverde Group consists of marine sandstones and transitional to non-marine beds of coal, shale, and sandstone. These sediments were deposited marginal to the great Cretaceous seaway. The oscillating shoreline of this sea, due to the rise and fall of sea level, left behind a complex of transgressive (encroaching toward land) and regressive (receding away from land) sedimentary sequences of nearshore and offshore sediments that define the Mesaverde Group.

<b>Table 4. Geologic Formations within the Study Area</b>				
<i>Map Symbol</i>	<i>Formation Name</i>	<i>Age</i>	<i>Characteristics</i>	<i>Location</i>
Qp	Pediment Gravel Deposits	Pleistocene	Pebble and cobble comprised of sandstone, siltstone and marlstone	Flood plains and river channels.
Tga	Green River formation Anvil points member	Eocene	Fine to coarse grained sandstone	Low terraces and stream channels
Tws	Wasatch formation	Eocene	See above	Bedrock exposures
Source: Donnell et al. 1986				

The proposed drilling program would target the sandstone sequences of the Upper Williams Fork Formation, which provide most of the natural gas production volumes (Lorenz 1989). Upper portions of the Williams Fork include fluvial point bar, floodplain, and swamp deposits. The Lower Williams Fork includes delta front, distributary channel, strandplain, lacustrine, and swamp environments (Hemborg 2000), while the sandstones and coalbeds of the Iles Formation were deposited in a wave-dominated coastal setting (Johnson 1989, Lorenz 1989). The source rocks are interbedded and thermally mature gas-prone shales, mudstones, siltstones, and coals. The reservoir rocks are the fine to medium-grained Williams Fork sandstones, varying in thickness from less than 10 feet to more than 50 feet (Spencer 1988), creating an interbedded relationship between source and reservoir. The trapping mechanism of the gas is both stratigraphic, related to vertical and lateral changes in the types of sediments being deposited, and diagenetic (post-depositional), related to changes in chemical and physical changes in the rocks during prolonged burial at great depth.

### Environmental Consequences

#### *Proposed Action*

If the proposed well prove feasible, initial production rates would be expected to be highest during the first few years of production, then decline during the remainder of the economic lives of the wells. Substantial reserves have been known to be trapped within the tight sands of these reservoirs since the late 1950s, but only within the last decade, and particularly within the last few years, has the integrated application of new technologies turned the tight gas sands of the Mesaverde Group into a profitable play

(Kuuskraa 1997). Natural fracture detection, advanced log analysis, more rigorous well completions and recompletions, and denser spacing have increased the amount of recoverable gas within these reservoirs.

Natural gas production from the proposed wells would contribute to the draining of hydrocarbon-bearing reservoirs within the Mesaverde Group in this area, an action that would be consistent with BLM objectives for mineral production. Hydraulic fracturing or “fracing” will be utilized to create fractures within the formation to allow gas production from the wells. Tight gas sands refer to low permeability sandstone reservoirs that produce primarily dry natural gas. Typically, these reservoirs cannot be produced at economic flow rates or volumes unless the well is stimulated by hydraulic fracture treatment (Holditch 2006). The amount of natural gas that may be potentially produced can only be estimated based on production rates from nearby wells and adjacent fields. Reserves have been estimated to approach 2 billion cubic feet (bcf) of natural gas per well (Vargas and Davis 2006).

Casing programs have been designed to specifically prevent hydrocarbon migration from gas-producing strata penetrated by the wellbore during drilling, initial production and after completion of the well. Identification of potential freshwater-bearing zones, aquifers, gas producing zones, and over- and under-pressured zones are incorporated into drilling scenarios for the proposed wells. Estimates of what depth these zones would be encountered are used to determine drilling fluids, fluid densities, surface casing depths, and production planning. If one of these identified zones is encountered during drilling, cement volumes will be adjusted to isolate that zone. This is designed to prevent accidental contamination or leakage of hydrocarbons or fracturing fluids into other productive zones within the wellbore.

#### *No Action Alternative*

Under the premise of the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied. No development of Federal minerals would occur.

#### **Invasive Non-Native Plants**

Cheatgrass (*Anisantha tectorum*) is widespread in the project area, but no other Colorado-listed noxious weeds are present. Invasive non-native species within the project area that are not listed as noxious weeds in Colorado but are nonetheless problematic in terms of overall habitat quality and potentially affecting reclaimed areas include Russian-thistle (*Salsola kali*) and kochia (*Bassia scoparia*) (WWE 2012a).

#### **Environmental Consequences**

##### *Proposed Action*

Surface-disturbing activities provide a niche for the invasion and establishment of invasive, non-native species particularly when these species are already present in the surrounding area. Because invasive, non-native species are present in the project area, the potential for increased establishment of these undesirable plants following construction activities is high. Consequently, the standard weed control COA would be attached to APDs to require periodic monitoring and weed control practices to ensure that these weedy plants are controlled (see Appendix A).

##### *No Action Alternative*

Under the No Action Alternative, the APD allowing horizontal drilling would be denied. No new surface disturbance would occur, and the invasive plant risk would remain the same as is currently present.

## Migratory Birds

### Affected Environment

The project area consists of Wyoming sagebrush (*Artemisia tridentata* subsp. *wyomingensis*) and rabbitbrush (*Ericameria nauseosa*) shrublands on the valley floor, rimmed with Utah juniper (*Juniperus osteosperma*) and scattered pinyon pine (*Pinus edulis*) along the slopes and ridgelines. Understory species include mountain mahogany (*Cercocarpus montanus*), serviceberry (*Amelanchier utahensis*), black sagebrush (*Artemisia nova*), arrowleaf balsamroot (*Balsamorhiza sagittata*), bottlebrush squirreltail grass (*Elymus elymoides*), bluegrass (*Poa* sp.), Indian ricegrass (*Oryzopsis hymenoides*), Patterson's milkvetch (*Astragalus pattersonii*), Utah sweetvetch (*Hedysarum boreale*), tansy aster (*Machaeranthera* sp.), snakeweed (*Gutierrezia sarothrae*), and cushion phlox (*Phlox hoodii*). Cheatgrass (*Anisantha tectorum*) is scattered and widespread throughout the project area.

Species on the BCC list that may be present in pinyon-juniper woodlands and sagebrush in the area include the pinyon jay (*Gymnorhinus cyanocephalus*), and juniper titmouse (*Baeolophus griseus*). None of these species was observed during the most recent survey (WWE 2012a). Other species associated with this habitat type include Neotropical migrants such as the broad-tailed hummingbird (*Selasphorus platycercus*), black-chinned hummingbird (*Archilochus alexandri*), western kingbird (*Tyrannus verticalis*), Say's phoebe (*Sayornis saya*), gray flycatcher (*Empidonax oberholseri*), mountain bluebird (*Sialia sialis*), plumbeous vireo (*Vireo plumbeus*), black-throated gray warbler (*Dendroica nigrescens*), chipping sparrow (*Spizella passerina*), lark sparrow (*Chondestes grammacus*), and lesser goldfinch (*Spinus psaltria*).

Sagebrush habitats may support one BCC species, Brewer's sparrow (*Spizella breweri*) as well as other migrants such as the western meadowlark (*Sturnella neglecta*) and vesper sparrow (*Pooecetes gramineus*). Based on the extent and quality of the sagebrush, the habitat is marginal for Brewer's sparrow and probably unsuitable for another sagebrush obligate, the sage sparrow (*Amphispiza bellii*).

A raptor survey was completed in March 2012. A total of five raptor nests were detected during the survey. The status of these nests could not be determined since the survey was conducted outside of the nesting season. Surveys conducted during the breeding season allow for an increased detection rate of occupied (active) nests as well as determination of species present. No evidence of recent occupancy (feathers, whitewash, prey remains, owl pellets) was discovered on or near any nest observed during the survey and the nests were generally in poor condition (WWE 2012a).

### Environmental Consequences

#### *Proposed Action*

The Proposed Action would result in a loss of nesting, roosting, perching, and foraging habitat for migratory birds on disturbed areas and reduce habitat effectiveness adjacent to areas where disturbance-related effects could be expected. The expansion of the well pad and access road as well as construction of the frac pad would remove approximately 7.6 acres of pinyon-juniper woodlands and sagebrush vegetation that would result in reduced habitat patch size. These changes to the habitat could negatively affect bird species that require large expanses of intact habitat. Habitat fragmentation could result in increased competition, increased exposure to predators, and a higher likelihood of nest parasitism. It is also possible that individual nests could be destroyed if well pads, roads, and production facilities are constructed during the nesting season.

In addition to the physical loss of habitat and habitat fragmentation, it is possible that during construction activities, individual birds could be displaced to adjacent habitats due to noise and human presence. Effects of displacement could include increased risk of predation or failure to reproduce if adjacent habitat is at carrying capacity. Furthermore, impacts to birds at the species or local population level could include a change in abundance and composition as a result of cumulative habitat fragmentation from energy development in the larger area. Impacts to migratory bird species that nest in pinyon-juniper and sagebrush habitats can be minimized by avoiding surface-disturbing activities during the nesting season. take place outside the nesting season.

All migratory bird species are protected by the Migratory Bird Treaty Act (MBTA), which makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition to the MBTA, Executive Order 13186 sets forth the responsibilities of Federal agencies to further implement the provisions of the MBTA by integrating bird conservation principles and practices into agency activities and by ensuring that Federal actions evaluate the effects of actions and agency plans on migratory birds. Consistent with Executive Order 13186 and BLM Colorado guidelines, CRVFO has established a COA (Appendix A) prohibiting initiation of vegetation removal or ground-disturbing activities during the period May 15 to July 15, the peak period for incubation and brood rearing among migratory birds. An exception to this COA can be granted if surveys by a qualified biologist during the nesting season of BCC species potentially present indicates no active nests within 30 meters (100 feet) of the disturbance area.

Also for the protection of migratory birds is a COA specifying that any pits containing fluids be fitted with one or more devices to avoid or minimize exposure to the fluids by migratory birds (Appendix A). Such exposures could result in acute toxicity or compromised insulation or buoyancy due to dissolution of protective oil on the feathers.

#### *No Action Alternative*

Under this alternative, the Federal APD to allow drilling horizontally into Federal minerals would be denied. No new surface disturbance associated with the drilling would occur on private land, therefore there would be no impacts to Migratory Birds.

### **Native American Religious Concerns**

#### Affected Environment

The Proposed Action is located within an area identified by the Ute Tribes as part of their ancestral homeland. Several Class III cultural resource inventories (see section on Cultural Resources) were conducted in the Proposed Action's vicinity to determine if any areas were known to be culturally sensitive to Native Americans. No sensitive areas were identified or are currently known in the proposed project area.

#### Environmental Consequences

##### *Proposed Action*

At present, no Native American concerns are known within the project area and none were identified during the inventories. The Ute Tribe of the Uintah and Ouray Bands, the primary Native American tribe in this area of the CRVFO, have indicated that they do not wish to be consulted for small projects or projects where no Native American areas of concern have been identified either through survey or past consultations. Therefore, formal consultation with Native American Tribes was not undertaken for the

current project. If new data are disclosed, new terms and conditions may have to be negotiated to accommodate their concerns.

Although the Proposed Action would have no direct impacts, increased access and personnel in the vicinity of the proposed project could indirectly impact unknown Native American resources ranging from illegal collection to vandalism.

The National Historic Preservation Act (NHPA) requires that if newly discovered cultural resources are identified during project implementation, work in that area must stop and the agency Authorized Officer notified immediately (36 CFR 800.13). The Native American Graves Protection and Repatriation Act (NAGPRA), requires that if inadvertent discovery of Native American Remains or Objects occurs, activity must cease in the area of discovery, a reasonable effort made to protect the item(s) discovered, and immediate notice made to the agency Authorized Officer, as well as the appropriate Native American group(s) (IV.C.2). Notice may be followed by a 30-day delay (NAGPRA Section 3(d)). Further actions also require compliance under the provisions of NHPA and the Archaeological Resource Protection Act. WPX Energy Rocky Mountain, LLC will notify its staff and contractors of the requirement under the NHPA, that work must cease if cultural resources are found during project operations. A standard Education/Discovery COA for the protection of Native American values would be attached to the Federal APDs (Appendix A). The importance of these COAs would be stressed to the operator and its contractors, including informing them of their responsibilities to protect and report any cultural resources encountered. The proponent and contractors would also be made aware of requirements under the NAGPRA.

#### *No Action Alternative*

The Proposed Action involves Federal subsurface minerals encumbered with Federal oil and gas leases that 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.

Under the premise of the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied. No new surface disturbance associated with the drilling of the Williams GM 701-4-HN1 well would occur on private land. This would lessen the potential to expose buried cultural resources as well as lessen the potential for indirect effects from illicit collection or vandalism as well as reduce the cumulative impacts on cultural resources.

### **Noise**

#### **Affected Environment**

The Proposed Action would lie within a rural setting approximately 5.5 miles northwest of Parachute and Interstate 70. Some office buildings and industrial facilities exist on the valley bottom and there are no residences near the project area. Noise levels in the project area are presently created by industrial operations and oil and gas development.

Noise is generally described as unwanted sound, weighted and noise intensity (or loudness) is measured as sound pressure in decibels (dBAs). The decibel scale is logarithmic, not linear, because the range of sound that can be detected by the human ear is so great that it is convenient to compress the scale to encompass all the sounds that need to be measured. Each 20-unit increase in the decibel scale increases the sound loudness by a factor of 10.

Sound levels have been calculated for areas that exhibit typical land uses and population densities. In rural recreational areas, ambient sound levels are expected to be approximately 30 to 40 dBA (EPA 1974, Harris 1991). As a basis for comparison, the noise level during normal conversation of two people 5 feet apart is 60 dBA.

Environmental Consequences

*Proposed Action*

The project would result in increased levels of noise during the construction, drilling, and completion phases. The noise would be most noticeable along the roads used to haul equipment and at the pad location. Drilling activities are subject to noise abatement procedures as defined in the COGCC Rules and Regulations (Aesthetic & Noise Control Regulations). Operations involving pipeline or gas facility installation or maintenance, the use of a drilling rig, completion rig, workover rig, or stimulation are subject to the maximum permissible noise levels for industrial zones. The 2006 revised COGCC noise control rules call for noise levels from oil and gas operations at any well site and/or gas facility to comply with the maximum permissible levels (Table 5) at a distance of 350 feet.

<i>Zone</i>	<i>7:00 A.M. to 7:00 P.M</i>	<i>7:00 P.M. to 7:00 A.M</i>
Light Industrial	70 dBA	65 dBA
Residential/Agricultural/Rural	55 dBA	50 dBA

Given the remote locations of the proposed project activities, with no reasonably close occupied structure or designated recreational area, the light industrial standard is applicable. The allowable noise level for periodic impulsive or shrill noises is reduced by 5 dBA from the levels shown (COGCC 2008). Short-term (7- to 14-day) increases in nearby noise levels would characterize road and well pad construction while the existing cuttings pit is re-opened. Based on the Inverse Square Law of Noise Propagation (Harris 1991) and an typical noise level for construction sites of 65 dBA at 500 feet (Table 6), project-related noise levels would be approximately 59 dBA at a distance of 1,000 feet, approximating active commercial areas (EPA 1974).

<i>Equipment</i>	<i>Noise Level (dBA)</i>		
	<i>50 feet</i>	<i>500 feet</i>	<i>1,000 feet</i>
Air Compressor, Concrete Pump	82	62	56
Backhoe	85	65	59
Bulldozer	89	69	63
Crane	88	68	62
Front End Loader	83	63	57
Heavy Truck	88	68	62
Motor Grader	85	65	59
Road Scraper	87	67	61
Tractor, Vibrator/Roller	80	60	54

Sources: BLM (1999a), La Plata County (2002)

Traffic noise would also be elevated as a consequence of the Proposed Action. The greatest increase would be along access roads during the drilling and completion phases. Based on the La Plata County data presented in Table 6 approximately 68 dBA of noise (at 500 feet) would be created by each fuel and water truck that travels these roads. Less noise would be created by smaller trucks and passenger vehicles such as pickup trucks and sport utility vehicles. Although the duration of increased noise from this source would be short, it would occur repeatedly during the drilling and completion phases.

Noise impacts would decrease during the production phase but would remain background noise levels. During maintenance and well workover operations, noise levels would temporarily increase above those associated with routine well production.

These increased noise levels would be in addition to levels of noise that are already above background levels due to current oil and gas developments in the area. As stated above, the nearest residence is less than 0.25 mile away. While exposure to these noise levels is not likely to be harmful, it is likely to be annoying to residents.

#### *No Action Alternative*

Under this alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied, and thereby no new noise impacts would occur.

### **Socioeconomics**

#### **Affected Environment**

The project area is located within Garfield County, Colorado. The total county land area is 2,947 square miles (DOLA 2012). The county seat is Glenwood Springs; other towns include Carbondale, New Castle, Silt, Rifle, Parachute, and Battlement Mesa. Highway I-70 transects the county from east to west. A network of county and private roads services the project area.

Since 2000, the population of Garfield County increased 28.8% from 44,259 to 56,389 residents (DOLA 2012). Population growth in Garfield County is expected to more than double over the ensuing 20 years to 119,979 in 2030 (DOLA 2012). Currently the population density is 19.1 people per square mile, which is low compared to the U.S. average. The county population in July 2009 was approximately 70% urban and 30% rural (USDOD 2012).

Unemployment was 10.7% in April 2010, slightly more than the State of Colorado, 9.2 percent. The total number of workers employed in oil and gas development is difficult to define since development-related occupations appear in a variety of economic sectors. However, oil and gas drilling and production have been one of the strongest forces driving recent economic growth. Other economic activities that occur in the project area include hay production and livestock grazing.

In 2009, Garfield County had an estimated 32,692 jobs. Industry groups with the highest percentage of total employment were construction (15%), tourism (14%), retail trade (13%), and education and health (8%) (Table 7).

<b>Job Sector</b>	<b>No. of Jobs</b>	<b>Percent of Total</b>
Agriculture	644	2.0
Mining	1,956	6.0
Oil and Gas Extraction	531	1.6
Construction	5,029	15.4
Retail Trade (retail & wholesale)	4,444	13.6
Tourism	4,692	14.3
Education and Health	2,797	8.5
Government	5,035	15.4

Personal income in Garfield County has also risen, growing approximately 6% per year from \$1.3 billion in 2000 to \$2.1 billion in 2009. Annual per capita income has grown in the same period approximately 3% per year, from \$29,080 to \$37,099 (USDOC 2012). There are 23,309 housing units in Garfield County and the homeownership rate is 67.2 percent. The per capita income in 2009 dollars was \$28,038. The communities of Parachute, Silt, and Rifle are considered to have the most affordable housing, while the communities of Battlement Mesa, New Castle, and Glenwood Springs are considered to have the least affordable housing, where the cost to rent or own similar housing may be 50% or more higher (BLM 2006).

Activities on public land in the vicinity of the project area are primarily ranching/farming, hunting, OHV travel, and the development of oil and gas resources. Hunters contribute to the economy because many require lodging, restaurants, sporting goods, guides and outfitting services, food, fuel, and other associated supplies. Big-game hunting, in particular, is viewed as critical to Garfield County, and especially the local community economies that depend on BLM and Forest Service public lands where most hunting occurs (BLM 2006). Expenditures by hunters in the Roan Plateau Planning Area alone have been estimated to be as much as \$1 million annually, with perhaps an additional \$1 million annually of indirect and local expenditures (CPW 1995, cited in BLM 2006).

The growth of the oil and gas industry in the past 10 years has been increasingly important to local economies (BLM 2006). Production of natural gas in Garfield County increased dramatically during recent years, from approximately 70 billion cubic feet (BCF) in 2000 to 576 BCF in 2009 (COGCC 2010). In addition, Garfield County is experiencing the fastest increase in oil and gas development in Colorado, with over 2,000 drilling permits currently approved between July 2009 and September 2010 (COGCC 2010). While the number of workers employed in the mining and extraction industry in Garfield County has been shown to be only 1.7%, this number is considered misleading because some oil and gas employment has been incorporated as part of the construction sector statistics instead (BLM 2006). For example, in the year 2005, an estimated 4,000 persons were directly employed by gas development companies and their subcontractors in Garfield County (Garfield County 2009).

Property tax revenue from oil and gas development has become the largest source of public revenue in Garfield County (BLM 2006) and is the primary revenue source for the General Fund, Capital Expenditures Fund, Road and Bridge Fund, Retirement fund, and Human Services Fund. Together these funds comprise 77% of the budget. In the year 2009, oil and gas assessed valuation in the County amounted to approximately \$3.8 billion, or about 74% of the total assessed value (Garfield County 2011). In 2010, the oil and gas assessed valuation amounted to \$2.0 billion, or about 60% of the total assessed value, reflecting the effects of low natural gas prices and the economic downturn on exploration and production. However, total tax revenues increased from \$135 million in 2009 to \$153 million in 2010.

Tax dollar distributions in 2010 were Schools 34.6%, County 30.4%, Special Districts 12.3%, Fire Districts 12.0%, Colleges 8.2%, and Towns 2.5%.

The Federal government makes Payments in Lieu of Taxes (PILT) to County governments to help offset property tax revenue lost on non-taxable Federal lands located within County boundaries (BLM 2006). The PILT distributions are based on acres for all Federal land management agencies (e.g., approximately 1.9 million acres in Garfield County). The amount may also be adjusted based on population and as apportioned by Congress. By formula, payments are decreased as other Federal funds, such as mineral royalty payments, increase. PILT amounts to Garfield County in the last 5 years are shown in Table 8 (USDI NBC 2011).

<i>Year</i>	<i>PILT Amounts</i>
2011	\$391,032
2010	\$391,649
2009	\$1,808,984
2008	\$654,453
2007	\$1,078,087

In addition to PILT distributions, BLM shares revenue generated by commercial activities on public lands with State and County governments (BLM 2006). Federal mineral royalties (FMLs) are collected on oil and gas production from Federal mineral leases. Oil and gas lessees pay royalties equal to 12.5% of the wellhead value of oil and gas produced from public lands. Half of the royalty receipts are distributed to Colorado. In 2008 and 2009, Garfield County received FML and Severance Direct Distribution Payments totaling \$2,744,802 and \$11,400,046 respectively (AGNC 2011). These funds are then allocated to fund County services, schools, and local communities.

NEPA requires a review of the environmental justice issues as established by Executive Order 12898 (February 11, 1994). The order established that each Federal agency identify any “disproportionately high and adverse human health or environment effects of its programs, policies, and activities on minority and low-income populations.” The Latino community is the only minority population of note in the vicinity of the project area. In 2010, 28.3% of the residents of Garfield County identified themselves as Hispanic or Latino, and this is slightly higher than for Colorado (20.7%). African Americans, American Indians, and Pacific Islanders account for less than 2% of the Garfield County population, which are below state levels (DOLA 2010).

### Environmental Consequences

#### *Proposed Action*

The Proposed Action would have minor positive impacts on the local economy of Garfield County through the creation of additional job opportunities in the oil and gas industry and in supporting trades and services. In addition, Garfield County would receive additional tax and royalty revenues.

The Proposed Action could result in negative social impacts including changing the recreational character of the area, reducing scenic quality, increasing dust levels especially during construction, and increasing traffic.

### *No Action Alternative*

Under this alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied, and no impacts, positive or negative, related to socio-economic conditions would occur.

## **Soils**

### Affected Environment

According to the *Soil Survey of Rifle Area, Colorado* (USDA 1985), the proposed activities would be located primarily on one soil complex, with a very small section of southern end of the pad on a second soil type. The well pad expansion, frac pad, access road and pipeline would be constructed on the Nihill channery loam. This deep, well-drained soil is found on alluvial fans, and sides of valleys at elevations from 5,000 to 6,500 feet and slopes of 6% to 25%. This soil is formed in alluvium derived from Green River shale and sandstone. Surface runoff is moderately rapid, and erosion hazard is severe. Primary uses for this soil is grazing and wildlife habitat.

A small section of the southern corner of the pad would be located on Torriorthents-Rock outcrop complex. This complex consists of exposed bedrock, loose stones, shallow soils over bedrock, and stony basaltic alluvium. These soils and rock outcrops are moderately steep to very steep and have slopes ranging from 15 to 70 percent. Primary uses for these soils are grazing, wildlife habitat and recreation.

### Environmental Consequences

The Proposed Action would result in approximately 6.02 new acres of short-term vegetation loss and soil disturbance, approximately 1.64 previously disturbed acres of short-term vegetation loss and soil disturbance, with a long-term loss of approximately 2.64 acres. The area generally contains adequate vegetation buffers that would minimize the potential for sediment transport. However, construction activities would cause slight increases in local soil loss, loss of soil productivity, and sediment available for transport to surface waters. Potential for such soil loss and transport would increase as a function of slope, feature (pad, road, or pipeline route) to be constructed, and proximity to drainages.

The proposed pad, access road and pipeline would be located on soils with moderate risk of erosion and an existing ephemeral drainage will be rerouted around the pad. Particular care should be taken during construction and reclamation to ensure that proper BMPs, including the COAs listed in Appendix A, are used to prevent erosion and slope instability due to construction activities and sediment transport.

### *No Action Alternative*

Under this alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied, and no impacts to the soil resource would occur.

## **Special Status Species**

### ***Federally Listed, Proposed, or Candidate Species***

### Affected Environment

According to the latest species list from the USFWS, four Federally listed, proposed, or candidate plant species may occur within or be impacted by actions occurring in Garfield County. These species and

information on their habitat associations, potential for occurrence in the project vicinity based on known geographic range and habitats present, and potential for adverse impacts are summarized in Table 9.

<b>Table 9. Potential for Occurrence of Threatened or Endangered Plant Species</b>				
<i>Species and Status</i>	<i>Occurrence</i>	<i>Habitat Association</i>	<i>Range or Habitat in Vicinity?</i>	<i>Potentially Affected?</i>
Parachute penstemon ( <i>Penstemon debilis</i> ) -- Threatened	Sparsely vegetated, south-facing, steep, white shale talus of the Parachute Creek Member of the Green River Formation; 8,000 to 9,000 feet	Other oil shale endemic species, such as Roan Cliffs blazing-star, Cathedral Bluffs meadow- rue, dragon milkvetch, Piceance bladderpod, and oil shale fescue	No	No
DeBeque phacelia ( <i>Phacelia submutica</i> ) – Threatened	Sparsely vegetated, steep slopes in chocolate-brown, gray, or red clay on Atwell Gulch and Shire Members, Wasatch Formation; 4,700 to 6,200 feet	Desert shrubland with four wing saltbush, shadscale, greasewood, broom snakeweed, bottlebrush squirreltail and Indian ricegrass, grading upward into scattered junipers	Yes	Yes
Colorado hookless cactus ( <i>Sclerocactus glaucus</i> ) – Threatened	Rocky hills, mesa slopes, and alluvial benches in salt desert shrub communities; often with well-formed microbiotic crusts; can occur in dense cheatgrass 4,500 to 6000 feet	Desert shrubland with shadscale, galleta grass, black sagebrush, Indian ricegrass grading upward into big sagebrush and sagebrush/pinyon-juniper	Yes	No
Ute ladies'-tresses orchid ( <i>Spiranthes diluvialis</i> ) – Threatened	Subirrigated alluvial soils along streams and in open meadows in floodplains; 4,500 to 7,200 feet	Box-elders, cottonwoods, willows, scouring rushes, and riparian grasses, sedges, and forbs	No	No

Eight species of Federally listed, proposed, or candidate threatened or endangered vertebrate species occur within Garfield County or may be affected by projects within the County. These species and their distribution, habitat associations, potential for occurrence, and potential to be affected by the project are summarized in Table 10 and described more fully following the table.

<b>Table 10. Potential for Occurrence of Threatened or Endangered Animal Species</b>				
<i>Species and Status</i>	<i>Distribution</i>	<i>Habitat Association</i>	<i>Range or Habitat in Vicinity?</i>	<i>Potentially Affected?</i>
Canada lynx ( <i>Lynx canadensis</i> ) – Threatened	Expanses of subalpine and upper montane coniferous forests	Spruce-fir forests; also lodgepole pine and aspen	No	No
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> ) – Candidate	North Fork of Gunnison, Colorado, Dolores, Yampa, and Rio Grande rivers	Large cottonwood stands along rivers	No	No

<b>Table 10. Potential for Occurrence of Threatened or Endangered Animal Species</b>				
<i>Species and Status</i>	<i>Distribution</i>	<i>Habitat Association</i>	<i>Range or Habitat in Vicinity?</i>	<i>Potentially Affected?</i>
Mexican spotted owl ( <i>Strix occidentalis lucida</i> ) – Threatened	No historic occurrence in area; present in southwestern Colorado and southern Front Range	Rocky cliffs within closed-canopy coniferous forests	No	No
Razorback sucker ( <i>Xyrauchen texanus</i> ) – Endangered	Occur in mainstem of the Colorado River and major tributary rivers – upstream to Rifle, Colorado, in CRVFO	Deep, slow runs, pools, and eddies; spawn over silt to gravel substrates in shallow water and in seasonally flooded overbank areas	Yes	Yes
Colorado pikeminnow ( <i>Ptychocheilus lucius</i> ) – Endangered			Yes	Yes
Humpback chub ( <i>Gila cypha</i> ) -- Endangered	Occur in mainstem of the Colorado River and major tributaries – upstream to Black Rocks near Utah line	Rocky runs, riffles, and rapids	No	No
Bonytail chub ( <i>Gila elegans</i> ) – Endangered		Shallow reaches of swift, deep rivers	No	No
Greenback cutthroat trout ( <i>Oncorhynchus clarki stomias</i> ) – Endangered	Native in South Platte drainage, recently documented in the CRVFO	Clear, cold mountain streams and headwaters lakes	No	No

Canada Lynx. Federally listed as threatened. Canada lynx occupy high-latitude or high-elevation coniferous forests characterized by cold, snowy winters and an adequate prey base (Ruggiero et al. 1999). The preferred prey of Canada lynx throughout their range is the snowshoe hare (*Lepus americanus*). In the western United States, lynx are associated with mesic forests of lodgepole pine, subalpine fir, Engelmann spruce, and quaking aspen in the upper montane and subalpine zones, generally between 8,000 and 12,000 feet in elevation. Although snowshoe hares are the preferred prey in Colorado, lynx in also feed on other species such as the mountain cottontail (*Sylvilagus nuttallii*), pine squirrel (*Tamiasciurus hudsonicus*), and dusky grouse (*Dendragapus obscurus*).

The U.S. Forest Service (USFS) has mapped suitable denning, winter, and other habitat for lynx within the White River National Forest (WRNF), portions of which are adjacent to BLM lands within the CRVFO. The mapped suitable habitat in the WRNF comprises several areas known as Lynx Analysis Units (LAUs). Several LAUs border BLM lands along the Interstate 70 corridor from east of Wolcott to west of DeBeque. While BLM lands within the CRVFO area are generally not suitable habitat, they may support movement by animals dispersing to a new area or, potentially, moving to lower elevations during severe winter weather in search of prey. The project area does not border any LAU, and this species is therefore not considered further in this document.

Mexican Spotted Owl. Federally listed as threatened. In Colorado, the Mexican spotted owl occurs in lower elevation forests, mostly in deeply incised, rocky canyons that contain complex coniferous forest structures. The project area does not contain suitable habitat and this species is therefore not considered further in this document.

Western Yellow-billed Cuckoo. Candidate for Federal listing. This secretive species occurs in mature riparian forests of cottonwoods and other large deciduous trees with a well-developed understory of tall riparian shrubs. Habitat along Parachute Creek appears too limited in extent and quality for use by the cuckoo. Although a more extensive riparian community occurs along the Colorado River a few miles

south of the project area, historic grazing use, and recent industrial use of the corridor have resulted in conditions seemingly unsuitable for this species. For these reasons, the western yellow-billed cuckoo is species is not considered further.

Razorback Sucker, Colorado Pikeminnow, Humpback Chub, and Bonytail Chub. Federally listed as endangered. These four species of Federally listed big-river fishes occur within the Colorado River drainage basin within and downstream from western Colorado. All four species tend to inhabit slower flowing reaches of the major rivers during high flows but may occur throughout the riverine habitat during low flows. Spawning occurs over shallower substrates ranging from silt to gravels, including gravel bars and shorelines, and in seasonally flooded overbank areas. Larvae remain in protected areas of shallow or flooded reaches. Designated Critical Habitat for the razorback sucker and Colorado pikeminnow includes the Colorado River and its 100-year floodplain west (downstream) from the town of Rifle. The humpback chub and bony tail inhabit the Colorado River downstream for Grand Junction, about 70 miles west of the project area.

Greenback Cutthroat Trout. Federally listed as threatened. The greenback cutthroat trout was not identified on the USFWS list for Garfield County; however, recent surveys have identified a population in a small stream that enters the Colorado River from the south several miles farther east than Parachute Creek. However, this species was not found during electrofishing surveys in Parachute Creek and is not considered potentially present.

### Environmental Consequences

#### *Proposed Action*

#### PLANTS

Plant surveys conducted in 2012 found no potential habitat for Parachute penstemon or Ute ladies'-tresses within or adjacent to the project area (WWE 2012a). All potential habitat for Colorado hookless cactus was surveyed in May 2012, and no plants were found. Therefore, the proposed project would have “**No Effect**” on these species and they were dropped from further analysis (WWE 2012b). Plant surveys did identify several areas of potential habitat for DeBeque phacelia located within 20 to 100 meters of the project disturbance areas. DeBeque phacelia is an annual species which germinates only in years with suitable soil moisture conditions. Due to the dry conditions in 2012, determination of DeBeque phacelia presence or absence was not possible. Therefore, for purposes of this analysis, all potential habitat is assumed to be occupied.

Potential direct effects to DeBeque phacelia plants could include direct mortality from construction equipment, and crushing from vehicle and pedestrian traffic. Indirect effects could result from increased erosion on the slopes where habitat occurs, or from increased dust settling on plant leaves and inhibiting photosynthesis. Introduction and spread of noxious weeds resulting from construction activities could also negatively impact DeBeque phacelia by increasing competition and altering the habitat.

To minimize potential negative effects on DeBeque phacelia, specific conservation and mitigation measures would be implemented. No new surface disturbing activities would occur within 20 meters of the edge of any potential habitat. To prevent vehicle or pedestrian trampling, a temporary fence would be installed during construction activities to delineate the 20 meter protection buffer. Dust control measures would be implemented within 100 meters of potential habitat, and standard weed protection measures would be implemented with modifications to control herbicide use within 100 meters of potential habitat.

## VERTEBRATES

The Canada lynx, Mexican spotted owl, and western yellow-billed cuckoo are not expected to occur in the project vicinity based on habitat types present and documented occurrences. Therefore, the Proposed Action would have “**No Effect**” on these species.

The endangered Colorado River fishes could potentially be affected by the consumptive use of water taken from the Colorado River basin to support activities associated with the Proposed Action. Depletions in flows in the Colorado River and major tributaries are a major source of impacts to these fishes due to changes in the flow regime that reduce the availability and suitability of spawning sites and habitats needed for survival and growth of the larvae. Principal sources of depletion in the Colorado River basin include withdrawals for agricultural or industrial uses, withdrawals for municipal water supplies, and evaporative losses from reservoirs. On average, approximately 0.7 acre-feet of Colorado River water is consumed during activities related to each oil and gas well.

In 2008, the BLM prepared a Programmatic Biological Assessment (PBA) addressing water-depleting activities associated with BLM’s fluid minerals program in the Colorado River Basin in Colorado. In response to this PBA, the USFWS issued a Programmatic Biological Opinion (PBO) (ES/GJ-6-CO-08-F-0006) on December 19, 2008. The PBO concurred with BLM’s effects determination of “**May Affect, Likely to Adversely Affect**” the Colorado pikeminnow, humpback chub, bonytail chub, or razorback sucker as a result of depletions associated with oil and gas projects. To offset the impacts, the BLM has set up a Recovery Agreement, which includes a one-time fee per well. The estimated depletions from the Proposed Action will be added to the CRVFO tracking log and submitted to the USFWS per the PBA/PBO at the end of the year to account for depletions associated with BLM’s fluid mineral program. The calculated mitigation fees are used by the USFWS for mitigation projects and contribute to the recovery of these endangered species through restoration of habitat, propagation, and genetics management, instream flow identification and protection, program management, non-native fish management, research and monitoring, and public education.

Other potential impacts to these species include inflow of sediments from areas of surface disturbance and inflow of chemical pollutants related to oil and gas activities on the well pads, associated with ancillary surface facilities, or resulting from an accident involving a haul truck in proximity to a stream. Stormwater controls required for the protection of surface water quality would also provide protection of aquatic organisms (see COAs in Appendix A). Even if sediment inflow were to occur, including incidental aerial deposition of fugitive dust from roadways and construction areas, these fishes are adapted to the naturally high sediment loads that characterize the Colorado River and its tributaries.

The inflow of chemical pollutants could impact the endangered big-river fishes if concentrations were sufficient to cause acute effects. The potential for adverse impacts would be limited to the Colorado pikeminnow and razorback sucker, the two species known to occur within the CRVFO area. Spills or other releases of chemical pollutants as a result of oil and gas activities are infrequent in the CRVFO area due to the various design requirements imposed by BLM and the State of Colorado. In the event of a spill or accidental release, the operator is required to implement its Spill Prevention, Control, and Countermeasures (SPCC) plan, including such cleanup and mitigation measures as required by BLM or the State. In addition, stormwater controls (Appendix A) would reduce the risk of transport of these substances as well as sediments to surface waters, including the Colorado River. For these reasons, and because any spills making their way into the Colorado River would be rapidly diluted to levels below that are not deleterious, or even detectable, the potential for adverse impacts from chemical releases is not considered significant. Consequently, the Proposed Action would have “**No Effect**” on the endangered big-river fishes from potential impacts to water quality.

*No Action Alternative*

Under the No Action Alternative, the APD allowing horizontal drilling would be denied. No new surface disturbance would occur, resulting “**No Effect**” on any Federally listed, proposed, or candidate plant or animal species.

***BLM Sensitive Plant and Animal Species***

Affected Environment

BLM sensitive plant species with habitat and/or occurrence records in Garfield County are listed in Table 10.

<b>Table 10. Potential for Occurrence of BLM Sensitive Plant Species</b>				
<i>Species and Status</i>	<i>Occurrence</i>	<i>Habitat Association</i>	<i>Range or Habitat in Vicinity?</i>	<i>Potentially Affected?</i>
Debeque milkvetch ( <i>Astragalus debequaeus</i> )	Varicolored, fine-textured, seleniferous or saline soils of Wasatch Formation- Atwell Gulch Member; 5,100 to 6,400 feet	Pinyon-juniper woodlands and desert shrub.	Yes	No
Naturita milkvetch ( <i>Astragalus naturitensis</i> )	Sandstone mesas, ledges, crevices and slopes in pinyon/juniper woodlands; 5,000 to 7,000 feet	Pinyon-juniper woodlands	No	No
Piceance bladderpod ( <i>Lesquerella parviflora</i> )	Shale outcrops of the Green River Formation, on ledges and slopes of canyons in open areas; 6,200 to 8,600 feet	Pinyon-juniper woodlands, shrublands; often with other oil shale endemic species	No	No
Roan cliffs blazing-star ( <i>Mentzelia rhizomata</i> )	Steep, eroding talus slopes of shale, Green River Formation; 5,800-9,000 feet	Pinyon-juniper woodlands, shrublands; often with other oil shale endemic species	No	No
Harrington's beardtongue ( <i>Penstemon harringtonii</i> )	Sagebrush shrublands, including invaded by pinyon/juniper, rocky loams and rocky clay loams derived from coarse calcareous parent materials (basalt); 6,200-9,200 feet	Sagebrush, with some scattered pinyon-juniper	No	No
Cathedral Bluffs meadow-rue ( <i>Thalictrum heliophilum</i> )	Endemic on sparsely vegetated, steep shale talus slopes of the Green River Formation; 6,300-8,800 feet	Pinyon-juniper woodlands, shrublands; often with other oil shale endemics; sometimes with rabbitbrush or snowberry	No	No

BLM sensitive animal species with habitat associations and potential for occurrence in the project vicinity are listed in Table 11 and described more fully following the table.

<b>Table 11. Special Status Vertebrate Species Present or Potentially Present in the Project Area</b>		
<i>Common Name</i>	<i>Habitat</i>	<i>Potential for Occurrence</i>
Fringed myotis ( <i>Myotis thysanodes</i> ) and Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> )	Breed and roost in caves, trees, mines, and buildings; hunt over pinyon-juniper, montane conifers, and semi-desert shrubs.	Possible
Northern goshawk ( <i>Accipiter gentilis</i> )	Predominantly uses spruce/fir forests but also use Douglas-fir, various pines, and aspens.	Possible
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Nests and roosts in mature cottonwood forests along rivers, large streams, and lakes.	Nests and roosts on Colorado River
Peregrine falcon ( <i>Falcon peregrinus</i> )	Nests on cliffs, usually near a river, large lake, or ocean. Hunts for waterfowl on water or upland fowl across grasslands and steppe.	Nests on Roan Cliffs
Brewer's sparrow ( <i>Spizella breweri</i> )	Nests in large stands of sagebrush, primarily Wyoming sagebrush on level or undulating terrain.	Possible
Midget faded rattlesnake ( <i>Crotalus viridis concolor</i> )	Cold desert dominated by sagebrush and with an abundance of rock outcrops and exposed canyon walls, typically farther west than the project area.	Possible
Great Basin spadefoot ( <i>Spea intermontana</i> )	Habitat includes pinyon-juniper woodlands and semi-desert shrublands, typically farther west than the project area.	Outside of geographic range
Northern leopard frog ( <i>Lithobates pipiens</i> )	Wet meadows and the shallows of marshes, ponds, lakes, streams, and irrigation ditches.	Possible
Flannelmouth sucker ( <i>Catostomus latipinnis</i> ) and roundtail chub ( <i>Gila robusta</i> )	Restricted to rivers and major tributaries.	Present in Colorado River
Bluehead sucker ( <i>Catostomus discobolus</i> )	Found in smaller streams with a rock substrate and mid to fast flowing waters.	Not present
Colorado River cutthroat trout ( <i>Oncorhynchus clarki pleuriticus</i> )	Headwaters streams and ponds with cool, clear waters and no non-native cutthroat subspecies	Possible in Parachute Creek

Fringed Myotis and Townsend's Big-eared Bat – No caves or other suitable roosting sites occur in the project area. Loss of large trees, potentially also used for roosting, would be negligible. No new loss of habitat above which the bats could search for aerial prey would occur, and the area they might avoid during nighttime drilling and completion activities would represent a small portion of their total feeding range, if present.

Northern Goshawk – This species is mostly limited to spruce/fir or aspen forests, such as atop the Roan Plateau, Battlement Mesa, and other areas that reach subalpine elevations. However, goshawks may migrate to lower elevation pinyon/juniper or Douglas-fir habitats during winter and therefore could make occasional, transitory use of the project area for winter foraging. Goshawks feed primarily on small birds but also on diurnal small mammals (rabbits, chipmunks, etc.).

Bald Eagle – Formerly listed as endangered, then downlisted to threatened, and eventually removed from the list of threatened or endangered species, the bald eagle remains protected by the Bald and Golden

Eagle Protection Act (BGEPA) as well as the MBTA. Bald eagles nest and roost along the Colorado and most likely occasionally venture into the Parachute Creek drainage for hunting activities. Bald eagles hunt primarily for fish and waterfowl but secondarily for rabbits, ground squirrels, or other upland prey, especially in winter. Any use of the Riley Gulch by this species would be expected to be infrequent and transitory.

Peregrine Falcon – Also formerly listed as endangered, then downlisted to threatened, and eventually removed from the list of threatened or endangered species, the peregrine falcon nests along the Roan Cliffs in the general project vicinity and hunts primarily for waterfowl along the Colorado River or upland fowl and other birds on nearby sagebrush-covered plateaus. No peregrine nests are known in the Riley Gulch area near the project area, and the creek is not suitable hunting habitat due to its small sizes and dense tree cover. Peregrines may hunt for birds on the sagebrush slopes of the canyon sides.

Brewer's Sparrow – This species is a near-obligate on sagebrush and is common in expansive stands, especially those dominated by Wyoming big sagebrush on level to rolling or undulating terrain. Smaller stands or those on steep mountainsides may also be used, and the species occasionally nests in stands of short willows near timberline. The sagebrush habitat on the sideslopes of Riley Gulch is marginally suitable for nesting by this Neotropical migrant.

Midget Faded Rattlesnake - This species is mostly limited to areas with rock outcrops that provide escape cover, thermal cover, and especially hibernacula. These are crucial components for reproduction and survival and are common in the project vicinity. The midget faded rattlesnake is known to occur in northwestern Colorado in a variety of habitats, including pinyon and juniper woodlands and shrublands, and it is possible that it occurs within the project area.

Northern Leopard Frog – The northern leopard frog is limited to perennial waters, including ponds and slow-flowing perennial streams or persistent portions of intermittent streams. It requires good water quality and abundant aquatic or shoreline vegetation. The habitat along Parachute Creek appears marginally suitable for the species, but no leopard frogs have been reported during fish surveys or other surveys of the stream. Because the project would not involve habitat disturbance near water sources, impacts to this species are not expected.

Flannelmouth Sucker, Bluehead Sucker, and Roundtail Chub – Similar to the endangered Colorado River fishes described previously, these species are vulnerable to alterations in flow regimes in the Colorado River that affect the availability and suitability of spawning sites and habitats needed for development of the larvae. The amount of consumptive water use associated with the Proposed Action would not be expected to cause discernible impacts to flows in the Colorado River.

Also similar to the endangered big-river fishes, these BLM sensitive species are adapted to naturally high sediment loads and therefore would not be affected by increased sediment transport to the Colorado River. However, these species are vulnerable to inflow of sediments into smaller streams by smothering the eggs of these species. The potential for adverse impacts from inflow of chemical pollutants is also greater in small streams due less dilution and the presence of larval or juvenile fishes, which are more susceptible to mortality from acute toxicity. The COAs for the protection of water quality (Appendix A) would minimize the potential for impacts from inflow of sediments or toxicants. Prompt implementation of the SPCC plan following any spill or other release of hydrocarbons, saline waters, or other contaminants would further reduce the risk of significant adverse impacts to these species and other aquatic life in affected waters.

Colorado River Cutthroat Trout – Remaining populations of this subspecies of cutthroat trout occur mostly in headwater streams and lakes of the Colorado River drainage. This includes the West Fork and

East Fork of Parachute Creek. Any individuals found in the mainstem of Parachute Creek would be from those two tributaries, although no managed population is present in the mainstem.

Unlike the BLM sensitive nongame species mentioned above, this species is not well adapted to high sediment loads and would therefore be potentially adversely affected by increased sediment transport to the Colorado River. This species is also vulnerable to inflow of sediments into the small streams it occupies by smothering the eggs of this species. The potential for adverse impacts from inflow of chemical pollutants is also greater in small streams due less dilution and the presence of larval or juvenile fishes, which are more susceptible to mortality from acute toxicity. The COAs for the protection of water quality (Appendix A) would minimize the potential for impacts from inflow of sediments or toxicants. Prompt implementation of the SPCC plan following any spill or other release of hydrocarbons, saline waters, or other contaminants would further reduce the risk of significant adverse impacts to this species and other aquatic life in affected waters.

### Environmental Consequences

#### *Proposed Action*

The results of plant surveys conducted in March and May 2012 indicate no BLM sensitive plant species or suitable habitat for these species in the project area (WWE 2012a). Therefore, the project would have no effect on any of these species. Based on information presented above, one BLM sensitive animal species, the midget faded rattlesnake, has more than a negligible risk of adverse impact. Direct mortality of this species could result from pad excavation or vehicle traffic on roads. However, any such loss would be expected to affect a small number of individuals and not significantly affect the viability of the local or species population.

#### *No Action Alternative*

Under the No Action Alternative, the APD allowing horizontal drilling would be denied. No new surface disturbance would occur, resulting in no effect on any BLM sensitive plant or vertebrate species.

### **Vegetation**

#### Affected Environment

The project area consists of Wyoming sagebrush (*Artemisia tridentata* subsp. *wyomingensis*) and rabbitbrush (*Ericameria nauseosa*) shrublands on the valley floor, rimmed with Utah juniper (*Juniperus osteosperma*) and scattered pinyon pine (*Pinus edulis*) along the slopes and ridgelines. Understory species include mountain-mahogany (*Cercocarpus montanus*), Utah serviceberry (*Amelanchier utahensis*), black sagebrush (*Artemisia nova*), arrowleaf balsamroot (*Balsamorhiza sagittata*), bottlebrush squirreltail grass (*Elymus elymoides*), bluegrass (*Poa* sp.), Indian ricegrass (*Oryzopsis hymenoides*), Patterson's milkvetch (*Astragalus pattersonii*), Utah sweetvetch (*Hedysarum boreale*), tansy-aster (*Machaeranthera* sp.), snakeweed (*Gutierrezia sarothrae*), and cushion phlox (*Phlox hoodii*). Cheatgrass (*Anisantha tectorum*) is scattered and widespread throughout the project area.

### Environmental Consequences

#### *Proposed Action*

Under the Proposed Action, 7.66 acres of surface disturbance would occur on private land. This disturbance would be reduced to 2.64 acres following successful interim reclamation. With

implementation of standard conditions of approval (Appendix A), desirable forbs and grasses on the unused portions of the pad, road, and pipeline could be established within 2 to 3 years. However, because of periodic workovers and the potential for additional well bores in the future, it is likely that repeated vegetation disturbance would occur during the life of the wells.

### *No Action Alternative*

Under the No Action Alternative, the APD allowing horizontal drilling would be denied. No new surface disturbance would occur, and there would be no new disturbance to vegetation.

## **Visual Resources**

### Affected Environment

The Proposed Action would take place entirely on private land in the lower Riley Gulch area approximately 5.5 miles northwest of Parachute, Colorado. Federal lease terms regarding visual concerns are not applicable on private land. Visual resource management objectives do not apply to non-BLM lands; visual values for those lands are only protected by landowner discretion. Although VRM objectives do not apply to non-BLM lands, the BLM maintains regulatory authority regarding protection of sensitive resources when Federal wells would be located on a Fee pad.

The project area sits in the lower (northeastern) reaches of Riley Gulch at the toe of two ridgelines that run in a southwest to northeast direction from the top of Mount Callahan towards Parachute Creek (Figures 5 and 6). These ridgelines embrace Riley Gulch and extend further to the northeast from the project location providing some visual screening into the project area from viewers located to the south and north of the project location from the Parachute Creek Valley. Casual observers traveling in the area would include oil and gas employees commuting to job locations and private landowners. The duration of their view would be limited as there is only a small window in which they would be able to see Riley Gulch from the Parachute Creek Valley.

The area is characteristic of rural ranch land and oil and gas development in the Parachute Valley bottom and within the immediate project vicinity, oil and gas development is predominant. Vegetation consists of a gray-green sagebrush flat valley bottom intermixed with scattered dark green pinyon juniper. As the topography begins to change the pinyon juniper becomes denser along the slopes of the ridgelines. Pockets of tan exposed soils are common throughout the project location. Existing structures include facilities associated with the existing GM 41-4 well pad.



**Figure 5. View from proposed GM 41-4 well pad expansion location looking northeast toward Wheeler Gulch.**

## Environmental Consequences

### *Proposed Action*

The GM 41-4 well pad would be expanded by 6.02 acres to the west of its present reclaimed footprint and would have a maximum cut slope of about 22 feet of at the south corner and a maximum fill slope of 17 feet at the north corner. Approximately 1.64 acres of re-disturbance of previously reclaimed lands would also occur. A short segment of new road would be constructed from the working area on the existing GM 41-4 well pad to the expanded pad. Two existing pipelines within the proposed construction footprint of the pad would be deepened prior to pad construction to avoid load-bearing conflicts on the lines.



**Figure 6. View from existing GM 41-4 pad looking northeast toward proposed frac pad location.**

The frac pad would be constructed near the mouth of Riley Gulch. The frac pad would be 1.28 acres in size. Temporary water supply lines would be installed on the ground surface between the GM 41-4 pad expansion and the new frac pad to support the remote frac operations.

An ephemeral side drainage that flows across the pad footprint into Riley Gulch would be re-routed around the western edge of the pad using earthen berms constructed to accommodate the expected flows.

Short-term visual impacts due to pad and access road construction, existing pipeline deepening, drilling and completion activities would occur within the project area. The existing landscape would be changed by the introduction of contrasting elements within the landscape in the form of new lines, colors, forms, and textures. The new pad, surface facilities, road improvements, and pipeline would increase the presence of drilling rigs, heavy equipment (e.g., dozers, graders, etc.), and vehicular traffic with an associated increase in dust, light pollution, and well flaring.

The standard BMPs related to reclamation and facility paint colors would largely mitigate long-term impacts for the Proposed Action on private land and are applied as COAs (Appendix A).

### *No Action Alternative*

The Proposed Action involves Federal subsurface minerals encumbered with Federal oil and gas leases that 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.

Under the premise of the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied. No new surface disturbance or impacts to visual resources would occur.

### **Wastes, Hazardous or Solid**

#### **Affected Environment**

The affected environment for hazardous materials includes air, water, soil, and biological resources that may potentially be affected by an accidental release of hazardous materials during transportation to and from the project area, storage, and use in construction and operations. Sensitive areas for hazardous materials releases include areas adjacent to water bodies, above aquifers, and areas where humans or wildlife would be directly impacted.

BLM Instruction Memoranda numbers WO-93-344 and CO-97-023 require that all National Environmental Policy Act documents list and describe any hazardous and/or extremely hazardous materials that would be produced, used, stored, transported, or disposed of as a result of a proposed project. The Glenwood Springs Resource Area, Oil & Gas Leasing & Development, Draft Supplemental Environmental Impact Statement (June 1998), Appendix L, Hazardous Substance Management Plan, contains a comprehensive list of materials that are commonly used for oil and gas projects. It also includes a description of the common industry practices for use of these materials and disposal of the waste products. These practices are dictated by various Federal and State laws and regulations, and the BLM standard lease terms and stipulations that would accompany any authorization resulting from this analysis. The most pertinent of the Federal laws dealing with hazardous materials are as follows:

- The Oil Pollution Act (Public Law 101-380, August 18, 1990) prohibits discharge of pollutants into Waters of the U.S., which by definition would include any tributary, including any dry wash that eventually connects with the Colorado River.
- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Public Law 96-510 of 1980) provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment. It also provides national, regional, and local contingency plans. Applicable emergency operations plans in place include the National Contingency Plan (40 CFR 300, required by section 105 of CERCLA), the Region VIII Regional Contingency Plan, the Colorado River Sub-Area Contingency Plan (these three are Environmental Protection Agency produced plans), the Mesa County Emergency Operations Plan (developed by the Mesa County Office of Emergency Management), and the BLM Grand Junction Field Office Hazardous Materials Contingency Plan.
- The Resource Conservation and Recovery Act (RCRA) (Public Law 94-580, October 21, 1976) regulates the use of hazardous substances and disposal of hazardous wastes. Note: While oil and gas lessees are exempt from RCRA, right-of-way holders are not. RCRA strictly regulates the management and disposal of hazardous wastes.

Emergency response to hazardous materials or petroleum products on BLM lands are handled through the BLM Grand Junction Field Office contingency plan. BLM would have access to regional resources if justified by the nature of an incident.

## Environmental Consequences

### *Proposed Action*

Possible pollutants that could be released during the construction phase of this project would include diesel fuel, hydraulic fluid, and lubricants. These materials would be used during construction of the pads, roads, and pipelines, and for refueling and maintaining equipment and vehicles. Potentially harmful substances used in the construction and operation phases would be kept onsite in limited quantities and trucked to and from the site as required. No hazardous substance, as defined by 40 CFR 355 would be used, produced, stored, transported, or disposed of in amounts above threshold quantities. Waste generated by construction activities would not be exempt from hazardous waste regulations under the oil and gas exploration and production exemption of RCRA. Exempt wastes include those associated with well production and transmission of natural gas through the gathering lines and the natural gas itself.

With the exception of produced hydrocarbons, ethylene glycol (antifreeze), lubricants, and amine compounds, chemicals subject to reporting under Title III of the Superfund Amendments and Reauthorization Act in quantities of 10,000 pounds or more would not be used, produced, stored, transported, or disposed of during construction or operation of the facilities. None of the chemicals that would be used in construction meet the criteria for an acutely hazardous material/substance, or meet the quantities criteria per BLM Instruction Memorandum No. 93-344. In addition, no extremely hazardous substance, as defined in 40 CFR 355, in amounts above threshold planning quantities would be produced, used, stored, transported, or disposed of during construction or operation of the facilities.

Solid waste (human waste, garbage, etc.) would be generated during construction activities and, to a larger extent, during drilling and completion operations since a man camp would be created on the southern edge of the pad. While providing food and lodging for the workers, support services such as bear-proof trash storage, potable and sewer water storage, generator and transformer settings, a fuel storage area and a freezer for food storage would be provided to complete the plans for the man camp. Potable water (one 4,200 gallon water supply tank and three 3,300 gallon water supply tanks) and septic service (seven 2,000 gallon above-ground septic tanks with overflow tanks and alarms) would be provided every 2-3 days by certified water and septic providers licensed by the State (Appendix A).

Surface water or groundwater could be affected under the Proposed Action. Pollutants that might be released during the operational phase of the project could include condensate, produced water (if the wells in the area produce water) and glycol (carried to the site and used as antifreeze). While uncommon, an accident could occur that could result in a release of any of these materials. A release could result in contamination of surface water or soil. Improper casing and cementing procedures could result in the contamination of groundwater resources. In the case of any release, emergency or otherwise, the responsible party would be liable for cleanup and any damages. Depending on the scope of the accident, any of the above referenced contingency plans would be activated to provide emergency response. At a minimum, the BLM Grand Junction Field Office contingency plan would apply.

These laws, regulations, standard lease stipulations, and contingency plans and emergency response resources are expected to adequately mitigate any potential hazardous or solid waste issues associated with the Proposed Action.

### *No Action Alternative*

Under the premise of the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied, and no impacts from waste generation would occur.

## **Water Quality, Surface and Ground**

### *Surface Water*

#### Affected Environment

The project lies approximately 5.5 miles northwest of Parachute, Colorado in the lower reaches of Riley Gulch, an ephemeral drainage. The ephemeral drainages and Riley Gulch in the vicinity of the project flow east and approximately half a mile to Parachute Creek and on to the Colorado River, approximately 3 miles to the southeast. According to the *Stream Classifications and Water Quality Standards* (CDPHE, Water Quality Control Commission [WQCC] Regulation No. 37) (CDPHE 2007) the mainstem Parachute Creek, including all tributaries and wetlands, from confluence of the west and east forks to the confluence with the Colorado River are within segment 11h. The following is a brief description of segments 11h.

- Segment 11h – This segment has been classified aquatic life cold 2, recreation P, and agriculture. Aquatic life cold 2 indicates that this water course is not capable of sustaining a wide variety of cold or warm water biota due to habitat, flows, or uncorrectable water quality conditions. Recreation class P refers to waters that have the potential to be used for primary contact recreation. This segment is suitable or intended to become suitable for agricultural purposes that include irrigation and livestock use.

All streams within segment 4h are not on the State of Colorado's 303(d) List of Impaired Waters and Monitoring and Evaluation List (CDPHE, WQCC Regulation No. 93) (CDPHE 2010). The Colorado River which Parachute Creek flows to is currently considered impaired due to naturally high levels of selenium. Colorado's Monitoring and Evaluation List identifies water bodies where there is reason to suspect water quality problems, but uncertainty also exists regarding one or more factors. No stream segments on Riley Gulch or Parachute Creek are on the State of Colorado's Monitoring and Evaluation List (CDPHE 2010).

Sediment is a pollutant of concern for the Colorado River Basin (CDPHE, WQCC Regulation No. 94). The closest downstream sediment measuring station on the Colorado River is USGS station 9093700 near De Beque, Colorado. For the period of 1974 to 1976 the mean sediment yield was 1,818 tons per day and varied between 8 and 41,300 tons per day. The median value for the same period was 267 tons/day. (USGS 2007).

At this time, there are minimal water quality data for Riley Gulch near the GM 41-4 pad site. BLM collected a sample from Riley Gulch on 4/16/2004 and the results indicated a temperature of 21 degree C, a conductivity of 1,372 uS/cm and a pH of 8.7. Data have been collected on Parachute Creek to which Riley Gulch drains and presented in Table 12.

#### Environmental Consequences

##### *Proposed Action*

The planned pad expansion would involve the rerouting of an ephemeral drainage that flows across the pad footprint into Riley Gulch. The drainage would be routed around the western edge of the pad using earthen berms and a lined channel constructed to accommodate the expected flows. The new drainage interface with Riley Gulch would feature a rock-lined channel and structures to achieve the necessary drop in elevation to the existing channel (Figures 4a and 4b).

<b>Table 12. Selected Water Quality Data for Two Sampling Locations near the Project Area</b>		
<i>Parameter</i>	<i>Parachute Creek near Parachute, CO USGS Site #09093000</i>	
	<i>7/29/1981</i>	<i>5/09/1980</i>
Instantaneous discharge (cfs)	4.4	420
Temperature, water (°C)	12.5	
Field pH (standard units)	9.2	8.3
Specific conductance (µS/cm/cm at 25°C)	913	460
Total Dissolved Solids (mg/L)	576	400
Hardness as CaCO <sub>3</sub> (mg/L)	340	200
Chloride (mg/L)	22	4.6
Selenium (µg/L)	2	1
Dissolved oxygen (mg/L)	7.8	10
Note: NA = data not available Source: USGS 2007		

Potential impacts to surface water associated with the Proposed Action include increased erosion and sedimentation of streams, changes in channel morphology due to road and pipeline crossings, and contamination by drilling fluids, produced water, or condensate. Surface waters would be most susceptible to sedimentation during construction, drilling, and completion activities. After this period, reclamation activities would substantially reduce surface exposure, decreasing the risk to surface waters over the long-term. In addition, the rerouting of the drainage could cause long-range sediment transport if not installed and maintained properly.

Although surface waters would be most susceptible to sedimentation over the short-term, access roads and the diversion ditches would remain in place over the life of the well (i.e., 20 to 30 years) and would channel runoff during periods of precipitation. Sedimentation and stream channel impacts associated with roads would be reduced through the implementation of Best Management Practices (BMPs) and other preventative measures. As proposed, these measures would include limiting cut slope steepness, step-cutting, limiting road grade to 10%, crowning road surfaces, installing culverts and drainage systems, and applying gravel to all new or upgraded BLM roads in the project area to a compacted thickness of 6 inches (Appendix A).

Other elements of the Proposed Action are designed to mitigate risks to surface waters associated with the release of drilling fluids, produced water, and condensate. A closed-loop drilling system would be implemented which recycles drilling fluids; cuttings would be dried through the use of a shaker system and be stacked in a cuttings trench. A traditional reserve pit would not be constructed.

Tanks used to store produced water and condensate would be placed in secondary containment to prevent offsite release. In the event of an accidental release, produced water and condensate would be confined for cleanup in a containment area and would not migrate to surrounding soils or surface waters. Pipelines associated with the transport of these liquids would be pressure tested to detect leakage prior to use. Cuttings must be decontaminated to COGCC standards prior to pit closure; the table of applicable standards can be found at [http://cogcc.state.co.us/RR\\_docs\\_new/rules/900Series.pdf](http://cogcc.state.co.us/RR_docs_new/rules/900Series.pdf)

Refer to Appendix A for standard Conditions of Approval that would mitigate impacts to surface water. Through the use of COAs and BMPs associated with construction activities, prompt interim reclamation, and the implementation of the preventative measures associated with the treatment of fluids, impacts to surface waters would be minimized and should be minor.

#### *No Action Alternative*

Under the premise of the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied, and thereby no new impacts to water quality would occur.

#### ***Waters of the U.S.***

##### Affected Environment

Waters of the U.S. located in the project vicinity include the mainstem and tributaries to the Riley Gulch and Parachute Creek. The existing access road parallels Riley Gulch and the pad will be constructed on a small ephemeral tributary. Filling and diverting this tributary would require a USACE 404 permit. Section 404 of the Clean Water Act requires a Department of the Army permit from the USACE prior to discharging dredged or fill material into waters of the United States as defined by 33 CFR Part 328. A permit is required for both permanent and temporary discharges into waters of the United States; larger discharges require an individual permit; smaller discharges may be granted a nationwide permit (NWP).

##### Environmental Consequences

#### *Proposed Action*

Filling and rerouting of the small ephemeral tributary to Riley Gulch, a potential Waters of the U.S., would be included in the Proposed Action and authorized by the USACE. A COA listed in Appendix A requires that the operator obtain a formal jurisdictional determination by USACE prior to any construction that could affect Waters of the U.S., and/or verification that the impacts do not require a permit.

Improperly designed crossings of small ephemeral drainages, in particular any undersized or poorly aligned culverts, could result in soil degradation, including erosion at culvert outlets. This could potentially supply sediment to the Colorado River approximately 3 miles to the southwest. However, standard and site-specific surface-use COAs listed in Appendix A would be implemented to protect Riley Gulch, Parachute Creek, the Colorado River, and any other Waters of the U.S. potentially impacted by long-distance stormflow transport.

#### *No Action Alternative*

Under this alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied, resulting in no new impacts to Waters of the U.S. would occur.

#### ***Groundwater***

##### Affected Environment

The proposed project area is located within the Division of Water Resources (DWR) Water Division 5, which encompasses Garfield County (Topper et al. 2003). The groundwater in this division is generally

found in alluvial and sedimentary aquifers. The major alluvial aquifer in the project area is the Colorado River Basin (CRB). The Colorado River represents the largest surface water outflow in the state. Alluvial groundwater is tributary to the stream system and is managed as if it were surface water. The alluvium in the Colorado River Basin generally consists of unconsolidated boulders, cobbles, gravel, sand, silt and clay. The thickness of the alluvium is variable, but tends to be thinner in the upper reaches and thicker in the lower reaches. Generally, alluvial well depths are less than 200 feet and typically range from 20 to 40 feet. The quality of alluvial groundwater in the CRB can vary widely, and is affected by return flow quality, mineral weathering and dissolution, cation-anion exchange with alluvial minerals and organic compound loading from fertilizer and pesticide leaching.

The major sedimentary aquifer in the project area is the Piceance Basin. The basin is a structural basin, geologically downwarped and surrounded by uplifts. The uplifting has resulted in the filling of the basin with sediments eroded from highlands. The sediments are derived from rocks of Tertiary and Late Cretaceous age. The project area lies in the southern portion of the Piceance Basin, which is drained by a number of tributary creeks that flow into the Colorado River. Most of the groundwater recharge is provided by winter precipitation and stored as snowpack at higher elevations. The sources of Piceance Basin groundwater resources in the project area are from the Mesaverde Group.

The Colorado Division of Water Resources shows no completed water wells within a ½-mile radius of the project area.

### Environmental Consequences

#### *Proposed Action*

Groundwater resources in the project area could be adversely affected by the drilling operations and water storage components of the Proposed Action. Contamination of groundwater could result from drilling fluids or petroleum constituents. However, isolation of water-bearing formations during the installation of production casing would minimize the effects. A review of the 10-point drilling plan associated with the Proposed Action indicates that any shallow groundwater zones encountered during drilling would be adequately protected. It is highly unlikely that the deeper groundwater resources would be affected, as the thick impermeable layers of rock at the top of the Williams Fork Formation would prevent water or hydrocarbons produced from migrating to potable water zones.

#### *No Action Alternative*

Under the premise of the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals in Sections 4 and 10, T7S, R96W would be denied, and thereby no new impacts to groundwater would occur.

### **Wildlife, Aquatic**

#### Affected Environment

Parachute Creek, a perennial stream and tributary of the Colorado River, is located approximately 0.5 miles from the proposed pad. Fish surveys in the upper reaches of Parachute Creek conducted by CPW and BLM have documented a small population of Colorado River cutthroat trout, a native trout listed as sensitive by the BLM and discussed in the section on Special Status Species. The brown trout, a non-native sportfish widely stocked throughout the region, also occupies the creek. This trout of eastern North America has been widely introduced in mountainous areas of Colorado because of its tolerance for

slightly warmer waters than the cutthroat trout and its ability to reproduce successfully in streams with small flows.

Aquatic macroinvertebrates living in perennial streams such as Parachute Creek during a portion of their lifecycles include larvae of stoneflies, mayflies, and some caddisflies in fast-flowing reaches with rocky or detrital substrates. Both the aquatic larvae and winged adults of these insects are the primary prey for trout in Parachute Creek. Terrestrial invertebrates that land or fall onto the water surface or are carried into the stream in runoff from adjacent uplands provide a secondary prey base. Slow-flowing portions of Parachute Creek with fine substrates, aquatic macroinvertebrates are likely to support the larvae of midges, mosquitoes, and some caddisflies. These species are able to tolerate relatively warm, turbid, and poorly oxygenated waters, and their more abbreviated larval stages allow them to reproduce in intermittent streams and in seasonally inundated overbank areas.

### Environmental Consequences

#### *Proposed Action*

Habitat for the present fish population of Parachute Creek, including the stream and adjacent riparian corridor, is not expected to be affected by the Proposed Action due to the various measures applied as COAs for the protection of water quality (Appendix A).

#### *No Action Alternative*

Under the premise of the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals would be denied. No new surface disturbance associated with the drilling would occur on private land, therefore there would be no impacts to Aquatic Wildlife Species.

### **Wildlife, Terrestrial**

#### Affected Environment

Terrestrial wildlife habitats and the baseline conditions that affect habitat availability and quality are presented in the Vegetation section of this EA. The project vicinity provides habitats for various species of big game, small game, and nongame mammals and birds that are found in low- to mid-elevation habitats of west-central Colorado.

#### *Large Mammals*

The site is located within winter range and severe winter range for both mule deer (*Odocoileus hemionus*) and Rocky Mountain elk (*Cervus elaphus nelsoni*) as mapped by CPW (2011), as well as a winter concentration area for elk. Winter range is that part of the overall range of a species where 90% of the individuals are located during the average five winters out of ten from the first heavy snowfall to spring green-up, or during a site-specific period of winter as defined for each data analysis unit (DAU) (CPW 2011). Severe winter range is that part of the range of a species where 90% of the individuals are located when the annual snowpack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten (CPW 2006). Elk winter concentration areas are that part of the winter range of a species where densities are at least 200% greater than the surrounding winter range density during the same period used to define winter range in the average five winters out of ten. Field surveys indicate that the project area is occupied winter range for elk and that mule deer occupy on a year-round basis.

Large carnivores present in the project vicinity include the mountain lion (*Puma concolor*) and black bear (*Ursus americanus*). CPW (2009) has mapped all of the analysis area as black bear (*Ursus americanus*) overall range. Mountain lions move seasonally to generally follow migrations of their preferred prey, mule deer. Two medium-sized carnivores, the coyote (*Canis latrans*) and bobcat (*Lynx rufus*), are also present throughout the region in open habitats and broken or wooded terrain, respectively, where they hunt for small mammals, reptiles, and ground-dwelling birds. Smaller carnivores in habitats similar to those near the project site include the ringtail (*Bassariscus astutus*) and spotted skunk (*Spilogale gracilis*).

Small mammals present within the planning area include rodents such as the rock squirrel (*Spermophilus variegatus*), golden-mantled ground squirrels (*Spermophilus lateralis*), least chipmunk (*Neotamias minimus*), and packrat (bushy-tailed woodrat) (*Neotoma cinerea*), as well as the mountain cottontail (*Sylvilagus nuttallii*). Rodents and, to a lesser extent rabbits, are the primary prey base for a variety of avian and mammalian predators.

#### *Resident Raptors and Other Birds*

As mentioned in the section on Migratory Birds, raptors potentially nesting in the large pinyon and juniper trees throughout the project vicinity include two small resident hawks (Cooper's hawk [*Accipiter cooperii*] and sharp-shinned hawk [*A. striatus*]) and, where taller conifers are present for nesting or perching, three larger resident raptors (red-tailed hawk [*Buteo jamaicensis*], Swainson's hawk [*B. swainsoni*], and great horned owl [*Bubo virginiana*]). Other birds of prey potentially present include three small owls: the migratory flammulated owl (*Otus flammeolus*) and the resident northern pygmy owl (*Glaucidium gnoma*) and northern saw-whet owl (*Aegolius acadicus*), the latter two primarily where tall conifers are tall deciduous trees are present among the shrubs.

Other resident or short-distance migratory species in the project vicinity include the northern flicker (*Colaptes auratus*), common raven (*Corvus corax*), black-billed magpie (*Pica hudsonia*), American robin (*Turdus migratorius*), blue-gray gnatcatcher (*Polioptila caerulea*), and house finch (*Carpodacus mexicanus*). See the sections on Migratory Birds and Special Status Species for discussions of other birds in the area.

#### *Reptiles and Amphibians*

Species most likely to occur include the western fence lizard (*Sceloporus undulatus*) and gopher snake (bullsnake) (*Pituophis catenifer*) in xeric shrublands or grassy clearings and the western terrestrial garter snake (*Thamnophis elegans*) along creeks. Other reptiles potentially present along creeks, although more commonly found at lower elevations than the site, are the milk snake (*Lampropeltis triangulum*) and smooth green snake (*Ophedryx vernalis*). The surrounding area is also possible habitat for the Great Basin spadefoot (see the section on Special-Status Species) and two additional amphibians, the Woodhouse's toad (*Bufo woodhousii*), and western chorus frog (*Pseudacris triseriata*). Within the CRVFO and vicinity, the spadefoot toad and Woodhouse's toad occur primarily along ephemeral washes that do not support fish and contain pools of water for a period of at least a few weeks every spring. The chorus frog occurs primarily in cattail and bulrush wetlands and along the vegetated margins of seasonal or perennial ponds and slow-flowing streams.

### Environmental Consequences

#### *Proposed Action*

Direct impacts to terrestrial wildlife from the Proposed Action may include mortality, disturbance, nest abandonment/nesting attempt failure, or site avoidance/displacement from otherwise suitable habitats.

These effects could result from the 7.66 acres of habitat loss or modification, increased noise from vehicles and operation of equipment, increased human presence, and collisions between wildlife and vehicles. Impacts would be more substantial during critical seasons, such as winter (deer and elk) or the spring/summer breeding season (raptors, songbirds, amphibians). Deer and elk are often restricted to smaller areas during the winter months and may expend high amounts of energy to move through snow, locate food, and maintain body temperature. Disturbance during the winter can displace wildlife, depleting much-needed energy reserves and may lead to decreased over winter survival.

The greatest impact on wildlife, especially big game and raptors, would be the disturbance caused by increased human activity, equipment operation, vehicle traffic, harassment by any dogs brought to the site by contractors, and noise related to drilling and completion activities. Most species of wildlife are relatively secretive and distance themselves from these types of disturbance or move to different areas screened by vegetation screening or topographic features. This avoidance, referred to as displacement, results in underuse of habitat near the disturbance. Avoidance of forage and cover resources adjacent to disturbance reduces habitat utility and the capacity of the affected acreage to support wildlife populations.

#### *No Action Alternative*

Under the No Action Alternative, the Federal APD to allow drilling horizontally into Federal minerals would be denied. No new surface disturbance associated with the drilling would occur on private land, resulting in no new impacts to terrestrial wildlife species.

### **SUMMARY OF CUMULATIVE IMPACTS**

Historically, habitat loss or modification in the CRVFO areas was characteristic of agricultural, ranching lands, rural residential, with localized industrial impacts associated with the railroad and I-70 corridors and the small communities. More recently, the growth of residential and commercial uses, utility corridors, oil and gas developments, and other rural industrial uses (e.g., gravel mining along the Colorado River) has accelerated the accumulation of impacts in the area. Cumulative impacts have included (1) direct habitat loss, habitat fragmentation, and decreased habitat effectiveness; (2) increased potential for runoff, erosion, and sedimentation; (3) expansion of noxious weeds and other invasive species; (4) increased fugitive dust from construction of oil and gas pads, roads, and pipelines and associated truck travel; (5) increased noise, especially along access and haul roads; (6) increased potential for spills and other releases of chemical pollutants; and (7) decreased scenic quality.

Although none of the cumulative impacts was described in the 1999 FSEIS (BLM 1999a) as significant, and while new technologies and regulatory requirements have reduced the impacts of some land uses, it is clear that past, present, and reasonably foreseeable future actions have had and would continue to have adverse effects on various elements of the human environment. Anticipated impacts for existing and future actions range from negligible to locally major, and primarily negative, for specific resources.

The primary bases for this assessment are twofold: First, the rate of development, particularly oil and gas development, has generally been increasing in the area, resulting in an accelerated accumulation of individually nominal effects. Second, residential and commercial expansion, as well as most of the oil and gas development, has occurred on private lands where mitigation measures designed to protect and conserve resources may not be in effect to the same extent as on BLM lands. Recent COGCC regulations have closed considerably the gap between the potential environmental impacts associated with development of private versus Federal fluid mineral resources.

It is clear that the Proposed Action would contribute to the collective adverse impact for some resources. Although the contribution would be minor, the Proposed Action would contribute incrementally to the collective impact to air quality, vegetation, migratory birds, terrestrial wildlife, and other resources.

**PERSONS AND AGENCIES CONSULTED**

U.S. Fish and Wildlife Service: Charlie Sharp

WPX Energy: April Mestas, Heather Hancock, Bryan Hotard, Kris Meil, Joe Weaver, Jr, Kent Hejl, Adam Tankersley, Kevin Moore

WestWater Engineering: Mike Klish, Van Graham, Nick Jaramillo

**INTERDISCIPLINARY REVIEW**

BLM staff from the CRVFO who participated in the preparation of this EA, including review of survey results submitted by the operator’s consultants, evaluation of impacts likely to occur from implementation of the Proposed Action, and identification of appropriate COAs to be attached and enforced by BLM, are listed in Table 12.

<b>Table 12. BLM Interdisciplinary Team Authors and Reviewers</b>		
<i>Name</i>	<i>Title</i>	<i>Areas of Participation</i>
John Brogan	Archaeologist	Cultural Resources, Native American Religious Concerns
Jim Byers	Natural Resource Specialist	EA Project Lead, Access & Transportation, Socioeconomics, Wastes-Hazardous or Solid
Allen Crockett.	Supervisory Natural Resource Specialist	Technical Review, NEPA Review
Bob Hartman	Petroleum Engineer	Downhole COAs
Shauna Kocman.	Hydrologist	Air Quality, Noise, Soils, Surface Water, Waters of the U.S.
Julie McGrew	Natural Resource Specialist	Visual Resources
Judy Perkins	Botanist	Invasive Non-native Species, Special Status Plants, Vegetation
Sylvia Ringer	Wildlife Biologist	Migratory Birds, Special Status Species Animals, Aquatic and Terrestrial Wildlife
Todd Sieber	Geologist	Geology and Minerals, Groundwater, Paleontology

**REFERENCES CITED**

Associated Governments of Northwest Colorado (AGNC). 2011. Report on Direct Distribution Payments: 2008-2009 Comparison. Available online (<http://agnc.org/reports.html>)

Bureau of Land Management (BLM). 1984. Glenwood Springs Resource Management Plan. Glenwood Springs Field Office, Colorado.

\_\_\_\_\_. 1991. Record of Decision, Oil and Gas Plan Amendment. Glenwood Springs Field Office, Colorado.

\_\_\_\_\_. 1999a. Oil & Gas Leasing & Development – Final Supplemental Environmental Impact Statement. Glenwood Spring Field Office, Colorado.

\_\_\_\_\_. 1999b. Oil & Gas Leasing & Development – Record of Decision and Resource Management Plan Amendment. Glenwood Spring Field Office, Colorado.

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

\_\_\_\_\_. 2011. Air Resources Technical Support Document. Colorado River Valley Field Office, CO <http://www.blm.gov/co/st/en/fo/crvfo.html>

Colorado Department of Public Health and Environment (CDPHE). 2007. Water Quality Control Commission (WQCC), Regulation No. 37 Classifications and numeric standards for Lower Colorado River basin and tables. Amended February 8, 2010; effective June 3, 2010. Available online.

\_\_\_\_\_. 2010. Water Quality Control Commission (WQCC), Regulation No. 93, 2006 Section 303(d) List Water-Quality-Limited Segments Requiring TMDLs.

Colorado Division of Local Affairs (DOLA). 2010. Population Totals for Colorado Counties; 1 year increments, 2000 – 2040. Available online.

\_\_\_\_\_. 2012. State Demography Office, County Profile System. Online: <https://dola.colorado.gov/index.html>.

Colorado Parks and Wildlife (CPW). . 2009. Black bear, elk and mule deer habitat GIS data.

\_\_\_\_\_.2011. National Diversity Information Source (CPW-NDIS). Elk and mule deer habitat GIS data.

Colorado Geological Survey (CGS). 2003. Ground Water Atlas of Colorado, Special Publication 53, pgs. 97-106.

Colorado Oil and Gas Commission (COGCC). 2008. Amended Rules. 800 Series Aesthetic and Noise Control Regulations Regulation 801. <http://cogcc.state.co.us/>

\_\_\_\_\_. 2010. Colorado Oil and Gas Information System (COGIS) Production. <http://cogcc.state.co.us/>.

Donnell, J.R., Yeend, W.E. and Smith, M.C. 1989. Geologic of the North Mamm Peak Quadrangle, Garfield County, Colorado. USGS Map MF-2093, scale 1:24,000.

Fenneman, N. M. 1946. Physical subdivisions of the United States (Map): U.S. Geological Survey, 1:700,000, 1 sheet.

Garfield County. 2009. Abstract of Assessment and Tax Levies. Available online.

\_\_\_\_\_. 2011. 2009 Abstract of Assessment and Tax Levies. Available online.

George, R.D. 1927. Geology and Natural Resources of Colorado. University of Colorado, Boulder.

- Harris, C.M. 1991. Handbook of acoustical measurements and noise control, McGraw-Hill, Inc., New York.
- Hemborg, T.H. 2000. Gas production characteristics of the Rulison, Grand Valley, Mamm Creek, and Parachute Fields, Garfield County, Colorado: Turning marginally economic basin-centered tight-gas sands into profitable reservoirs in the Southern Piceance Basin. Colorado Geological Survey, Resource Series 39. Denver.
- Holditch, S.A. 2006. Tight gas sands. Society of Petroleum Engineers Paper 103356, Journal of Petroleum Technology.
- Johnson, R.C. 1989. Geologic history and hydrocarbon potential of late Cretaceous-age, low-permeability reservoirs, Piceance Basin, western Colorado: U.S. Geological Survey Bulletin 1787, Evolution of sedimentary basins-Uinta and Piceance Basins, chapter E, 51 p.
- Kuuskras, V.A. 1997. Producing massively stacked lenticular sands of Colorado's Piceance Basin: Gas Tips – A Publication of Gas Research Institute GRI-97/0206:4-11.
- La Plata County, Colorado. 2002. Final La Plata County Impact Report. October.
- Lorenz, J.C. 1989. Reservoir sedimentology of rocks of the Mesaverde Group, multiwall experiment site and east-central Piceance Basin, northwest Colorado. *In* B.E. Law and C.W. Spencer, C.W. (Eds.), Geology of tight gas reservoirs in the Pinedale Anticline area, Wyoming, and at the multiwall experiment site, Colorado: U.S. Geological Survey Bulletin 1886:K1-K24.
- National Academy of Sciences (NAS). 2007. Weather and climate extremes in a changing climate. National Academies Press. <http://dels.nas.edu/globalchange/reportDetail.php?id=4288&c=clim&t=pubs>.
- Ruggiero, L.F., K.B. Aubrey, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.M. Squires (Eds). 1999. The scientific basic for lynx conservation in the contiguous United States. Gen. Tech. Rpt. RMRS-GTR-30. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT.
- Shroba, R.R., Green, W.W., and Fairer, G.M. 1995. Preliminary geologic map of the rifle quadrangle, Garfield County, CO. 1:24,000 Scale. Open-File report 95-52.
- Spencer, C.W., and Wilson, R.J., 1988. Petroleum geology and principal exploration plays in the Uinta-Piceance-Eagle Basins Province, Utah and Colorado: U.S. Geological Survey Open-File Report 88-450-G, 35 p.
- U.S. Department of Agriculture (USDA). 1985. Soil survey of Rifle area, Colorado: parts of Garfield and Mesa Counties. Soil Conservation Service [Natural Resources Conservation Service].
- U.S. Department of Commerce (USDOC). 2012. Census Bureau. Available Online: <http://www.city-data.com/city/Rifle-Colorado.html>.
- U.S Department of the Interior, National Business Center (USDI NBC). 2011. Payments in Lieu of Taxes to Garfield County (2007-2011) Available online (<http://www.nbc.gov/pilt/search.cfm#search> with Search for Colorado Counties).

U.S. Department of the Interior and U.S. Department of Agriculture (USDI and USDA). 2007. Surface operating standards and guidelines for oil and gas exploration and development. The Gold Book. Fourth edition.

U.S. Environmental Protection Agency (EPA). 1974. Information on noise levels identified as requisite to protect public health and welfare with an adequate margin of safety. EPA-550/9-74-004, Arlington, VA.

U.S. Geological Survey (USGS). 2007. Water resources of the United States, NWISWeb. Water quality samples for the nation, Colorado River near DeBeque. Available online.

Vargas, M.F., and T.L. Davis. 2006. Characterization and 3-D reservoir modeling of fluvial tight-gas sandstones in the Williams Fork Formation, Rulison Field, Piceance Basin, Colorado, USA. American Association of Petroleum Geologists, Annual Convention, (SEPM) Technical Program Abstracts.

Weiner, R.J., and J.D. Haun. 1960. Guide to the Geology of Colorado. Geological Society of America.

WestWater Engineering (WWE) 2012a. Biological Survey Report – WPX Energy, Parachute, Colorado, GM 41-4 Fracture Pad Location.

WestWater Engineering (WWE) 2012b. Biological Assessment - WPX Energy GM 41-4 Pad, Frac Facilities and Pipelines, Garfield County, Colorado.

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**APPENDIX A**

**Surface Use and Downhole Conditions of Approval  
GM 41-4 Pad**

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## **SURFACE USE CONDITIONS OF APPROVAL FOR APPLICATION FOR PERMIT TO DRILL**

### **GM 41-4 PAD, DOI-BLM-CO-N040-2012-0061-EA**

1. Administrative Notification. The operator shall notify the BLM representative at least 48 hours prior to initiation of construction. If requested by the BLM representative, the operator shall schedule a pre-construction meeting, including key operator and contractor personnel, to ensure that any unresolved issues are fully addressed prior to initiation of surface-disturbing activities or placement of production facilities. No construction activities shall commence without staking of pad construction limits, pad corners, and road/pipeline centerlines and disturbance corridors.
2. Pad and Road Construction and Maintenance. The 287 feet of new access road shall be constructed with an 18-foot running surface and 4-foot ditch as staked on the ground. Roads shall be crowned, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards. Initial gravel application shall be a minimum of 6 inches. The operator shall provide timely year-round road maintenance and cleanup on the access roads. A regular schedule for maintenance shall include, but not be limited to, blading, ditch and culvert cleaning, road surface replacement, and dust abatement. When rutting within the traveled way becomes greater than 6 inches, blading and/or gravelling shall be conducted as approved by the BLM.

The diversion ditch to be constructed around the west side of the GM 41-4 pad shall be constructed based on the specifications shown on the Construction Schematic (Figures 4a and 4b of this EA).

3. Drill Cuttings Management. Cuttings generated from the numerous planned well bores shall be worked through a shaker system on the drill rig, mixed with a drying agent, if necessary, and deposited in the planned cuttings trench or piled on location against the cut slope for later burial during the interim reclamation earthwork. The cuttings shall be remediated per COGCC regulations (Table 910-1 standards) prior to earthwork reshaping related to well pad interim reclamation.
4. Dust Abatement. The operator shall implement dust abatement measures as needed to prevent fugitive dust from vehicular traffic, equipment operations, or wind events. The BLM may direct the operator to change the level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) if dust abatement measures are observed to be insufficient to prevent fugitive dust.
5. Drainage Crossings and Culverts. Construction activities at perennial, intermittent, and ephemeral drainage crossings (e.g. burying pipelines, installing culverts) shall be timed to avoid high flow conditions. Construction that disturbs any flowing stream shall utilize either a piped stream diversion or a cofferdam and pump to divert flow around the disturbed area.

Culverts at drainage crossings shall be designed and installed to pass a 25-year or greater storm event. On perennial and intermittent streams, culverts shall be designed to allow for passage of aquatic biota. The minimum culvert diameter in any installation for a drainage crossing or road drainage shall be 24 inches. Crossings of drainages deemed to be jurisdictional Waters of the U.S. pursuant to Section 404 of the Clean Water Act may require additional culvert design capacity. Due to the flashy nature of area drainages and anticipated culvert maintenance, the U.S. Army Corps of Engineers (USACE) recommends designing drainage crossings for the 100-year event. Contact the USACE Colorado West Regulatory Branch at 970-243-1199 ext. 17.

Pipelines installed beneath stream crossings shall be buried at a minimum depth of 4 feet below the channel substrate to avoid exposure by channel scour and degradation. Following burial, the channel grade and substrate composition shall be returned to pre-construction conditions.

6. Jurisdictional Waters of the U.S. The operator shall obtain appropriate permits from the U.S. Army Corps of Engineers (USACE) prior to discharging fill material into Waters of the U.S. in accordance with Section 404 of the Clean Water Act. Waters of the U.S. are defined in 33 CFR Section 328.3 and may include wetlands as well as perennial, intermittent, and ephemeral streams. Permanent impacts to Waters of the U.S. may require mitigation. Contact the USACE Colorado West Regulatory Branch at 970-243-1199 ext. 17. Copies of any printed or emailed approved USACE permits or verification letters shall be forwarded to the BLM.
7. Reclamation. The goals, objectives, timelines, measures, and monitoring methods for final reclamation of oil and gas disturbances are described in Appendix I (Surface Reclamation) of the 1998 Draft Supplemental EIS (DSEIS). Specific measures to follow during interim and temporary (pre-interim) reclamation are described below.
  - a. Reclamation Plans. In areas that have low reclamation potential or are especially challenging to restore, reclamation plans will be required prior to APD approval. The plan shall contain the following components: detailed reclamation plans, which include contours and indicate irregular rather than smooth contours as appropriate for visual and ecological benefit; timeline for drilling completion, interim reclamation earthwork, and seeding; soil test results and/or a soil profile description; amendments to be used; soil treatment techniques such as roughening, pocking, and terracing; erosion control techniques such as hydromulch, blankets/matting, and wattles; and visual mitigations if in a sensitive VRM area.
  - b. Deadline for Interim Reclamation Earthwork and Seeding. Interim reclamation to reduce a well pad to the maximum size needed for production, including earthwork and seeding of the interim reclaimed areas, shall be completed within 6 months following completion of the last well planned to be drilled on that pad as part of a continuous operation. If a period of greater than one year is expected to occur between drilling episodes, BLM may require implementation of all or part of the interim reclamation program.

Reclamation, including seeding, of temporarily disturbed areas along roads and pipelines, and of topsoil piles and berms, shall be completed within 30 days following completion of construction. Any such area on which construction is completed prior to December 1 shall be seeded during the remainder of the early winter season instead of during the following spring, unless BLM approves otherwise based on weather. If road or pipeline construction occurs discontinuously (e.g., new segments installed as new pads are built) or continuously but with a total duration greater than 30 days, reclamation, including seeding, shall be phased such that no portion of the temporarily disturbed area remains in an unreclaimed condition for longer than 30 days. BLM may authorize deviation from this requirement based on the season and the amount of work remaining on the entirety of the road or pipeline when the 30-day period has expired.

If requested by the project lead NRS for a specific pad or group of pads, the operator shall contact the NRS by telephone or email approximately 72 hours before reclamation and reseeding begin. This will allow the NRS to schedule a pre-reclamation field visit if needed to ensure that all parties are in agreement and provide time for adjustments to the plan before work is initiated.

The deadlines for seeding described above are subject to extension upon approval of the BLM based on season, timing limitations, or other constraints on a case-by-case basis. If the BLM

approves an extension for seeding, the operator may be required to stabilize the reclaimed surfaces using hydromulch, erosion matting, or other method until seeding is implemented.

- c. Topsoil Stripping, Storage, and Replacement. All topsoil shall be stripped following removal of vegetation during construction of well pads, pipelines, roads, or other surface facilities. In areas of thin soil, a minimum of the upper 6 inches of surficial material shall be stripped. The BLM may specify a stripping depth during the onsite visit or based on subsequent information regarding soil thickness and suitability. The stripped topsoil shall be stored separately from subsoil or other excavated material and replaced prior to final seedbed preparation. The BLM best management practice (BMP) for the Windrowing of Topsoil (COA #16) shall be implemented for well pad construction whenever topography allows.
- d. Seedbed Preparation. For cut-and-fill slopes, initial seedbed preparation shall consist of backfilling and recontouring to achieve the configuration specified in the reclamation plan. For compacted areas, initial seedbed preparation shall include ripping to a minimum depth of 18 inches, with a maximum furrow spacing of 2 feet. Where practicable, ripping shall be conducted in two passes at perpendicular directions. Following final contouring, the backfilled or ripped surfaces shall be covered evenly with topsoil.

Final seedbed preparation shall consist of scarifying (raking or harrowing) the spread topsoil prior to seeding. If more than one season has elapsed between final seedbed preparation and seeding, and if the area is to be broadcast-seeded or hydroseeded, this step shall be repeated no more than 1 day prior to seeding to break up any crust that has formed.

If directed by the BLM, the operator shall implement measures following seedbed preparation (when broadcast-seeding or hydroseeding is to be used) to create small depressions to enhance capture of moisture and establishment of seeded species. Depressions shall be no deeper than 1 to 2 inches and shall not result in piles or mounds of displaced soil. Excavated depressions shall not be used unless approved by the BLM for the purpose of erosion control on slopes. Where excavated depressions are approved by the BLM, the excavated soil shall be placed only on the downslope side of the depression.

If directed by the BLM, the operator shall conduct soil testing prior to reseeding to identify if and what type of soil amendments may be required to enhance revegetation success. At a minimum, the soil tests shall include texture, pH, organic matter, sodium adsorption ratio (SAR), cation exchange capacity (CEC), alkalinity/salinity, and basic nutrients (nitrogen, phosphorus, potassium [NPK]). Depending on the outcome of the soil testing, the BLM may require the operator to submit a plan for soil amendment. Any requests to use soil amendments not directed by the BLM shall be submitted to the CRVFO for approval.

Seedbed preparation is not required for topsoil storage piles or other areas of temporary seeding.

- e. Seed Mixes. A seed mix consistent with BLM standards in terms of species and seeding rate for the specific habitat type shall be used on all BLM lands affected by the project (see Attachment 1 of the letter provided to operators dated April 6, 2012).. Note that temporary seeding no longer allows the use of sterile hybrid non-native species.

For private surfaces, the menu-based seed mixes are recommended, but the surface landowner has ultimate authority over the seed mix to be used in reclamation. The seed shall contain no noxious, prohibited, or restricted weed seeds and shall contain no more than 0.5% by weight of other weed seeds. Seed may contain up to 2.0% of "other crop" seed by weight, including the

seed of other agronomic crops and native plants; however, a lower percentage of other crop seed is recommended. Seed tags or other official documentation shall be submitted to BLM at least 14 days before the date of proposed seeding for acceptance. Seed that does not meet the above criteria shall not be applied to public lands.

- f. Seeding Procedures. Seeding shall be conducted no more than 24 hours following completion of final seedbed preparation.

Where practicable, seed shall be installed by drill-seeding to a depth of 0.25 to 0.5 inch. Where drill-seeding is impracticable, seed may be installed by broadcast-seeding at twice the drill-seeding rate, followed by raking or harrowing to provide 0.25 to 0.5 inch of soil cover or by hydroseeding and hydromulching. Hydroseeding and hydromulching shall be conducted in two separate applications to ensure adequate contact of seeds with the soil.

If interim revegetation is unsuccessful, the operator shall implement subsequent reseeding until interim reclamation standards are met.

- g. Mulch. Mulch shall be applied within 24 hours following completion of seeding. Mulch may consist of either hydromulch or of certified weed-free straw or certified weed-free native grass hay crimped into the soil.

NOTE: Mulch is not required in areas where erosion potential mandates use of a biodegradable erosion-control blanket (straw matting).

- h. Erosion Control. Cut-and-fill slopes shall be protected against erosion with the use of water bars, lateral furrows, or other measures approved by the BLM. Cut-and-fill slopes along drainages or in areas with high erosion potential shall also be protected from erosion using hydromulch designed specifically for erosion control or biodegradable blankets/matting, bales, or wattles of weed-free straw or weed-free native grass hay. A well-anchored fabric silt fence shall also be placed at the toe of cut-and-fill slopes along drainages or to protect other sensitive areas from deposition of soils eroded off the slopes. Additional BMPs shall be employed as necessary to reduce soil erosion and offsite transport of sediments.
- i. Site Protection. The pad shall be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species are firmly established, whichever comes later. The seeded species will be considered firmly established when at least 50% of the new plants are producing seed. The BLM will approve the type of fencing.
- j. Monitoring. The operator shall conduct annual monitoring surveys of all sites categorized as “operator reclamation in progress” and shall submit an annual monitoring report of these sites to the BLM by **December 31** of each year. The monitoring program shall use the four Reclamation Categories defined in Appendix I of the 1998 DSEIS to assess progress toward reclamation objectives. The annual report shall document whether attainment of reclamation objectives appears likely. If one or more objectives appear unlikely to be achieved, the report shall identify appropriate corrective actions. Upon review and approval of the report by the BLM, the operator shall be responsible for implementing the corrective actions or other measures specified by the BLM.
8. Weed Control. The operator shall regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the Glenwood Springs Field Office *Noxious and Invasive Weed Management Plan for Oil and Gas Operators*, dated March 2007. A Pesticide Use Proposal

(PUP) must be approved by the BLM prior to the use of herbicides. Annual weed monitoring reports shall be submitted to BLM by **December 1**.

9. Bald and Golden Eagles. It shall be the responsibility of the operator to comply with the Bald and Golden Eagle Protection Act (Eagle Act) with respect to “take” of either eagle species. Under the Eagle Act, “take” includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest and disturb. “Disturb” means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior. Avoidance of eagle nest sites, particularly during the nesting season, is the primary and preferred method to avoid a take. Any oil or gas construction, drilling, or completion activities planned within 0.5 mile of a bald or golden eagle nest, or other associated activities greater than 0.5 miles from a nest that may disturb eagles, should be coordinated with the BLM project lead and BLM wildlife biologist and the USFWS representative to the BLM Field Office (970-876-9051).
10. Raptor Nesting. To protect nesting raptors, a survey shall be conducted prior to construction, drilling, or completion activities that are to begin during the raptor nesting season (**February 1 to August 15**). The survey shall include all potential nesting habitat within 0.25 mile of a well pad or 0.125 mile of an access road, pipeline, or other surface facility. Results of the survey shall be submitted to the BLM. If a raptor nest is located within the buffer widths specified above, a 60-day raptor nesting TL will be applied by the BLM to preclude initiation of construction, drilling, and completion activities during the period **April 1 to May 31**. The operator is responsible for complying with the MBTA, which prohibits the “take” of birds or of active nests (those containing eggs or young), including nest failure caused by human activity (see COA for Migratory Birds).
11. Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all surface-disturbing activities are prohibited from **May 1 to July 1** to reduce impacts to Birds of Conservation Concern (BCC). An exception to this TL will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate that no BCC species are nesting within 30 meters (100 feet) of the area to be disturbed. Nesting shall be deemed to be occurring if a territorial (singing) male is present within the distance specified above. Nesting surveys shall include an aural survey for diagnostic vocalizations in conjunction with a visual survey for adults and nests. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 AM under favorable conditions for detecting and identifying a BCC species. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 1 and continue into the 60-day period at the same location.
12. Migratory Birds. It shall be the responsibility of the operator to comply with the Migratory Bird Treaty Act (MBTA) with respect to “take” of migratory bird species, which includes injury and direct mortality resulting from human actions not intended to have such result. To minimize the potential for the take of a migratory bird, the operator shall take reasonable steps to prevent use by birds of fluid-containing pits associated with oil or gas operations, including but not limited to reserve pits, produced-water pits, hydraulic fracturing flowback pits, evaporation pits, and cuttings trenches. Liquids in these pits—whether placed or accumulating from precipitation—may pose a risk to birds as a result of ingestion, absorption through the skin, or interference with buoyancy and temperature regulation.

Based on low effectiveness of brightly colored flagging or spheres suspended over a pit, the operator shall install netting with a mesh size of 1 to 1.5 inches, and suspended at least 4 feet above the fluid surface, on all pits into which fluids are placed, except for storage of fresh water in a pit that contains

no other material. The netting shall be installed within 24 hours following fluids release. In addition, oil slicks and oil sheens shall be promptly skimmed off the fluid surface. The requirement for prompt skimming of oil slicks and oil sheens also applies to cuttings trenches in which precipitation has accumulated. To minimize the potential for violation of the MBTA, the BLM recommends installation of netting at cuttings trenches left open for more than 24 hours following cessation of drilling and completion activities during a continuous development cycle on a pad. The recommendation for prompt netting does not apply to cuttings trenches during periods of active manipulation for cuttings management, remediation of contaminated materials, or other purposes.

All mortality or injury to birds shall be reported immediately to the BLM project lead and to the USFWS representative to the BLM Field Office at 970-243-2778 x28 and visit <http://www.fws.gov/mountain-prairie/contaminants/oilpits.htm>.

13. Fossil Resources. All persons associated with operations under this authorization shall be informed that any objects or sites of paleontological or scientific value, such as vertebrate or scientifically important invertebrate fossils, shall not be damaged, destroyed, removed, moved, or disturbed. If in connection with operations under this authorization any of the above resources are encountered the operator shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the BLM of the findings. The discovery must be protected until notified to proceed by the BLM.

Where feasible, the operator shall suspend ground-disturbing activities at the discovery site and immediately notify the BLM of any finds. The BLM will, as soon as feasible, have a BLM-permitted paleontologist check out the find and record and collect it if warranted. If ground-disturbing activities cannot be immediately suspended, the operator shall work around or set the discovery aside in a safe place to be accessed by the BLM-permitted paleontologist.

14. Cultural Education/Discovery. All persons in the area who are associated with this project shall be informed that if anyone is found disturbing historic, archaeological, or scientific resources, including collecting artifacts, the person or persons will be subject to prosecution.

Pursuant to 43 CFR 10.4(g), the BLM shall be notified by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4 (c) and (d), activities shall stop in the vicinity of the discovery, and the discovery shall be protected for 30 days or until notified by the BLM to proceed.

If in connection with operations under this contract, the operator, its contractors, their subcontractors, or the employees of any of them discovers, encounters, or becomes aware of any objects or sites of cultural value or scientific interest such as historic ruins or prehistoric ruins, graves or grave markers, fossils, or artifacts, the operator shall immediately suspend all operations in the vicinity of the cultural resource and shall notify the BLM of the findings (16 USC 470h-3, 36 CFR 800.112). Operations may resume at the discovery site upon receipt of written instructions and authorization by the BLM. Approval to proceed will be based upon evaluation of the resource. Evaluation shall be by a qualified professional selected by the BLM from a Federal agency insofar as practicable. When not practicable, the operator shall bear the cost of the services of a non-Federal professional.

Within five working days, the BLM will inform the operator as to:

- whether the materials appear eligible for the National Register of Historic Places

- what mitigation measures the holder will likely have to undertake before the site can be used (assuming that *in-situ* preservation is not necessary)
- the timeframe for the BLM to complete an expedited review under 36 CFR 800.11, or any agreements in lieu thereof, to confirm through the SHPO State Historic Preservation Officer that the findings of the BLM are correct and that mitigation is appropriate

The operator may relocate activities to avoid the expense of mitigation and delays associated with this process, as long as the new area has been appropriately cleared of resources and the exposed materials are recorded and stabilized. Otherwise, the operator shall be responsible for mitigation costs. The BLM will provide technical and procedural guidelines for relocation and/or to conduct mitigation. Upon verification from the BLM that the required mitigation has been completed, the operator will be allowed to resume construction.

Antiquities, historic ruins, prehistoric ruins, and other cultural or paleontological objects of scientific interest that are outside the authorization boundaries but potentially affected, either directly or indirectly, by the Proposed Action shall also be included in this evaluation or mitigation. Impacts that occur to such resources as a result of the authorized activities shall be mitigated at the operator's cost, including the cost of consultation with Native American groups.

Any person who, without a permit, injures, destroys, excavates, appropriates or removes any historic or prehistoric ruin, artifact, object of antiquity, Native American remains, Native American cultural item, or archaeological resources on public lands is subject to arrest and penalty of law (16 USC 433, 16 USC 470, 18 USC 641, 18 USC 1170, and 18 USC 1361).

15. Visual Resources. To the extent practicable, existing vegetation shall be preserved when clearing and grading for the GM 41-4 well pad expansion and frac pad construction

Above-ground facilities shall be painted **Shadow Gray** to minimize contrast with existing surrounding vegetation.

16. Windrowing of Topsoil. Topsoil shall be windrowed around the pad perimeter to create a berm that limits and redirects stormwater runoff and extends the viability of the topsoil per BLM Topsoil Best Management Practices (BLM 2009 PowerPoint presentation available upon request from Glenwood Springs Field Office). Topsoil shall also be windrowed, segregated, and stored along pipelines and roads for later spreading across the disturbed corridor during final reclamation. Topsoil berms shall be promptly seeded to maintain soil microbial activity, reduce erosion, and minimize weed establishment.

17. Interim Reclamation Related to Drilling Phases. Within 1 year of completion of all exploratory wells proposed on a pad or within one year of completion of all development wells on a pad (whichever the situation may be), the operator would stabilize the disturbed area by recontouring, mulching, providing run-off and erosion control, replacing topsoil as directed, and seeding with BLM-prescribed native seed mixes (or landowner requested seed mix on Fee surface), and conducting weed control, as necessary. In cases where the exploratory drilling and development drilling on a single pad occur more than 1 year apart, slopes shall be recontoured to the extent necessary to accommodate seeding, and seed mixes required by BLM or requested by the private landowner shall be applied to stabilize the soil between visits per direction of the BLM.

18. Road and Pad Construction Details. Install culverts in the existing irrigation ditches to allow unabated flows of ditches during seasons of use.

During prework meeting for road, implement run-on protection and diversion of surface water flow at northeast pad corner.

Design excess material stockpile from pit excavation to serve as light and noise barrier/berm reducing potential impacts to the neighboring residence.

Southwest pad corner shall allow for existing drainage to flow unabated through and around the excess material pile.

Fence the pad prior to construction to avoid conflicts with pastured animals nearby.

19. Measures to Protect DeBeque Phacelia Habitat. The Operator shall incorporate the following steps to avoid and minimize impacts to DeBeque phacelia:

- a) Buffer Protection. No new surface disturbing activities shall occur within 20 meters of the edge of delineated potential habitat. A temporary fence shall be installed along the edge of this buffer to prevent vehicle and pedestrian traffic across the potential habitat and its buffer.
- b) Dust Prevention. Surface disturbing activities located between 20 meters and 100 meters of delineated potential habitats shall have dust control measures implemented.
- c) Weed Control. A Pesticide Use Permit (PUP), specific to areas within 100 meters of DeBeque phacelia potential habitat, shall be obtained from the BLM prior to any herbicide treatment of noxious weeds within this buffer area. Treatments within this 100 meter buffer shall be limited to spot spraying or wicking. No broadcast spraying is permitted. A botanist approved by the BLM Botanist/Ecologist shall be on-site during any pesticide application within this 100 meter buffer.

**DOWNHOLE CONDITIONS OF APPROVAL**  
**Applications for Permit to Drill**

**Company/Operator: WPX Energy Rocky Mountain**

**Grand Valley Field**

**Well Pad Surface Location:** Williams GM 701-4-HN1, NENE, Sec 4, T7S, R96W

**Lease COC24603**

See list of wells following the COAs.

1. Twenty-four hours *prior* to (a) spudding, (b) conducting BOPE tests, (c) cementing/running casing strings, and (d) within 24 hours *after* spudding, the CRVFO shall be notified. One of the following CRVFO inspectors shall be notified by phone. The contact number for all notifications is: 970-876-9064. The BLM CRVFO inspectors are Julie King, Lead PET; David Giboo, PET; Greg Rios, PET; and Tim Barrett, PET.
2. A CRVFO petroleum engineer shall be contacted for a verbal approval prior to commencing remedial work, plugging operations on newly drilled boreholes, changes within the drilling plan, sidetracks, changes or variances to the BOPE, deviating from conditions of approval, and conducting other operations not specified within the APD. Contact Bob Hartman at 970-244 3041 (office) or 970-210-2374 (cell) for verbal approvals.
3. If a well control issue or failed test (e.g. kick, blowout, water flow, casing failure, or a bradenhead pressure increase) arises during drilling or completions operations, Bob Hartman at 970-244 3041 (office) or 970-210-2374 (cell) shall be notified within 24 hours from the time of the event. IADC/Driller's Logs and Pason Logs (mud logs) shall be forwarded to CRVFO – Petroleum Engineer, 2300 River Frontage Road, Silt, CO 81652 within 24 hours of a well control event.
4. The BOPE shall be tested and conform to Onshore Order No. 2 for a 5M system and recorded in the IADC/Driller's log. **Any deviation from Onshore Order No. 2 must be applied for and approved prior to spudding of the well.**
5. An electrical/mechanical mud monitoring equipment shall be function tested prior to drilling out the surface casing shoe. As a minimum, this equipment shall include a trip tank, pit volume totalizer, stroke counter, and flow sensor.
6. Prior to drilling out the surface casing shoe, gas detecting equipment shall be installed in the mud return system. The mud system shall be monitored for hydrocarbon gas/pore pressure changes, rate of penetration, and fluid loss.
7. A gas buster shall be functional and all flare lines effectively anchored in place, prior to drilling out the surface casing shoe. The discharge of the flare lines shall be a minimum of 100 feet from the wellhead and targeted at bends. The panic line shall be a separate line (not open inside the buffer tank) and effectively anchored. All lines shall be downwind of the prevailing wind direction and directed into a flare pit, which cannot be the reserve pit. The flare system shall use an automatic ignition. Where noncombustible gas is likely or expected to be vented, the system shall be provided supplemental fuel for ignition and maintain a continuous flare.

8. As a minimum, cement shall be brought to 200 feet above the Mesaverde. After WOC for the production casing, a CBL shall be run to verify the TOC and an electronic copy in .las and .pdf format shall be submitted to CRVFO – Petroleum Engineer, 2300 River Frontage Road, Silt, CO 81652 within 48 hours. If the TOC is lower than required or the cement sheath of poor quality, a CRVFO petroleum engineer shall be notified for remedial operations within 48 hours from running the CBL and prior to commencing fracturing operations,
9. On the first well drilled on this pad, a triple combo open-hole log shall be run from the base of the surface borehole to surface and from TD to bottom of surface casing shoe. This log shall be in submitted within 48 hours in .las and .pdf format to: CRVFO – Todd Sieber, 2300 River Frontage Road, Silt, CO 81652. Contact Todd Sieber at 970-876-9000 or [asieber@blm.gov](mailto:asieber@blm.gov) for clarification.
10. Submit the (a) mud/drilling log (e.g. Pason disc), (b) driller's event log/operations summary report, (c) production test volumes, (d) directional survey, and (e) Pressure Integrity Test results within 30 days of completed operations (i.e. landing tubing) per 43 CRF 3160-9 (a).
11. Prior to commencing fracturing operations, the production casing shall be tested to the maximum anticipated surface treating/fracture pressure and held for 15 minutes without a 2% leak-off. If leak-off is found, Bob Hartman shall be notified within 24 hours of the failed test, but prior to proceeding with fracturing operations. The test shall be charted and set to a time increment as to take up no less than a quarter of the chart per test. The chart shall be submitted with the well completion report.
12. During hydraulic frac operations, monitor the bradenhead/casing head pressures throughout the frac job. Frac operations shall be terminated upon any sharp rise in annular pressure (+/- 40 psi or greater) in order to determine well/wellbore integrity. Notify BLM Bob Hartman at 970-244 3041 (office) or 970-210-2374 (cell) immediately.

**FONSI**  
**DOI-BLM-CO-N040-2012-0061-EA**

The Environmental Assessment (EA) analyzing the environmental effects of the Proposed Action has been reviewed. The project design and approved mitigation measures result in a Finding of No Significant Impact (FONSI) on the human environment. Therefore, an Environmental Impact Statement (EIS) is not necessary to further analyze the environmental effects of the Proposed Action.

**DECISION RECORD**

DECISION: It is my decision to approve the Proposed Action as described and analyzed in this EA. This decision will provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on a valid Federal oil and gas lease.

RATIONALE: The bases for this decision are as follows:

1. Approval of the Proposed Action is validating the rights granted with the Federal oil and gas leases to develop the leasehold to provide commercial commodities of oil and gas.
2. The environmental impacts would be avoided, minimized, or offset with the mitigation measures incorporated into the Proposed Action or attached and enforced by BLM as Conditions of Approval (COAs).
3. This Decision does not authorize the initiation of surface-disturbing activities on BLM lands or of drilling activities associated with any Federal oil and gas well. Initiation of activities related to the new Federal oil and gas well to be added to the existing well pad may commence only upon approval by BLM of the Application for Permit to Drill (APD).

MITIGATION MEASURES: Mitigation measures presented in Appendix A of the EA will be incorporated as COAs for both surface and drilling operations and attached to APD for the Federal well drilled on the expanded GM 41-4 well pad.

NAME OF PREPARER: Jim Byers, Natural Resource Specialist

SIGNATURE OF AUTHORIZED OFFICIAL:



Allen B. Crockett, Ph.D., J.D.  
Supervisory Natural Resource Specialist

DATE:

June 18, 2012