

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

## **ENVIRONMENTAL ASSESSMENT**

**NUMBER:** DOI-BLM-CO-N040-2011-0103-EA

**CASEFILE NUMBER:** Surface holes are located on private land; bottomholes fall within Federal Leases COC27874 and COC49513

**PROJECT NAME:** Proposal by Williams Production RMT Company LLC to drill six Federal oil and gas wells from existing GV 18-23 pad and to improve the access road entry onto the pad; located on private land approximately 1 mile southwest of Parachute, CO.

**LOCATION:** Township 7 South (T7S), Range 96 West (R96W), Section 23, NE $\frac{1}{4}$  NW  $\frac{1}{4}$ , Sixth Principal Meridian (Figure 1). Pad elevation is 5,133.4 feet above mean sea level (MSL).

**LEGAL DESCRIPTIONS:** Surface and bottomhole locations of the proposed Federal wells addressed in this Environmental Assessment (EA) are listed in Table 1.

| <b>Table 1. Surface and Bottomhole Location of Proposed Federal Wells</b> |   |   |
|---|---|---|
| <i>Proposed Wells</i>   | <i>Surface Location<br/>(Section 23, T7S, R96W)</i>               | <i>Bottomhole Location<br/>(Section 14, T7S, R96W)</i>          |
| 11-23 (GV 18-23)  | NE $\frac{1}{4}$ NW $\frac{1}{4}$ , 1,166 feet FNL 1,483 feet FWL | NW $\frac{1}{4}$ NW $\frac{1}{4}$ , 323 feet FNL 568 feet FWL   |
| 414-14 (GV 18-23)   | NE $\frac{1}{4}$ NW $\frac{1}{4}$ , 1,121 feet FNL 1,481 feet FWL | SW $\frac{1}{4}$ SW $\frac{1}{4}$ , 582 feet FSL 490 feet FWL   |
| 514-14 (GV 18-23)   | NE $\frac{1}{4}$ NW $\frac{1}{4}$ , 1,106 feet FNL 1,490 feet FWL | SW $\frac{1}{4}$ SW $\frac{1}{4}$ , 265 feet FSL 467 feet FWL   |
| 524-14 (GV 18-23)   | NE $\frac{1}{4}$ NW $\frac{1}{4}$ , 1,114 feet FNL 1,490 feet FWL | SE $\frac{1}{4}$ SW $\frac{1}{4}$ , 181 feet FSL 1,848 feet FWL |
| 314-14 (GV 18-23)   | NE $\frac{1}{4}$ NW $\frac{1}{4}$ , 1,106 feet FNL 1,480 feet FWL | SW $\frac{1}{4}$ SW $\frac{1}{4}$ , 886 feet FSL 552 feet FWL   |
| 311-23 (GV 18-23)   | NE $\frac{1}{4}$ NW $\frac{1}{4}$ , 1,174 feet FNL 1,483 feet FWL | NW $\frac{1}{4}$ NW $\frac{1}{4}$ , 792 FNL 260 feet FWL        |

**APPLICANT:** Williams Production RMT Company LLC. Contact: Greg Davis, 1515 Arapaho Street, Tower 3, Suite 1000, Denver, CO 80202.

### **PROPOSED ACTION**

Williams Production RMT Company LLC (“Williams”) proposes to drill and develop 6 Federal oil and gas wells from the existing GV 18-23 well pad located on private land approximately 1 mile southwest of Parachute, CO (Figure 1). The Federal wells would be directionally drilled from the pad into Federal Leases COC27874 and COC49513. The pad has four existing wells drilled into Fee minerals. Lease terms applicable to the proposed Federal wells are presented in the Lease Stipulations section.

The pad is situated at the southeast-facing toe of the Mount Callahan foothills. The existing pad lies within open sagebrush-greasewood shrublands and bunchgrass grasslands with scattered junipers.

Cuttings generated during drilling would be managed partially on the surface of the pad and within the COGCC (Colorado Oil and Gas Conservation Commission)-permitted cuttings trench area along the

northwester edge of the pad (Figure 1). In cases where emergencies such as weather conditions, safety concerns, or operational constraints exist, cuttings may be temporarily stored at another location in accordance with COGCC waste management and CDPHE stormwater regulations. The cuttings trench would be well constructed and would not be allowed to leak and would not be located on natural drainages. Wastewater or discharge would not be allowed to enter any drainage.

No public access exists to the site; the existing access road is predominantly on private land (approximately 3 miles). A small segment of the existing access road (approximately ¼ mile) is located on lands administered by the BLM. To accommodate access to the pad the existing access road would be used with a slight modification to the elevation as it enters the pad (Figure 2). Construction, maintenance, and reclamation would conform to 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 drilling, completion and production phases 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. The access road would be maintained in a safe and usable condition. Surface and subsoil materials within the proposed construction areas would be used. Gravel or pit lining material (if required) would be obtained from the Una gravel pit located in the NW¼ of section 34-T6S-R96W or Latham-Burkett gravel pit located in the SW¼ of section 34, T8S, R97W, and sometimes in the Mamm Creek gravel pit located in the SE¼ of section 11, T6S, R93W.

All of the pipelines are in place and are within the existing disturbance. The existing pipeline tie-in located on the pad would be upgraded to 8-inch with the valve set next to the pad (Figure 3).

All production equipment would be located on the pad. For completions, fracing would occur offsite from the GM 34-14 pad or from the proposed Bosely frac pad GV 33-22. Three 4.5-inch steel surface frac lines would run along the access roads from the remote frac pad (either the GM 33-22 or GM 34-14 pad) to the GV 18-23 pad (Figure 3). The frac water would be hauled by truck and would be supplied from the Grand Valley Evaporation Pond located in the SW¼ of section 36, T6S, R96W. If allowed by the surface owner, a 10-inch poly surface water line would be installed to the frac pad (either the GM 33-22 or GM 34-14 pad) and tie-in to existing infrastructure located SWSW, Section 34. Drilling fluids would be recycled. The site would be kept free of trash and debris at all times.

The pad would be less than 5 acres (approximate dimensions of 230 feet in width and 280 feet in length). The modification to the access road as it enters the pad would amount to less than an acre of disturbance. Interim reclamation would reduce the pad sized through standard earthwork and reclamation practices to a footprint expected to be less than 2 acres during the long-term production of the wells on the pad (Figure 4). Topsoil conservation practices would be implemented during pad construction to salvage as much suitable growth medium as practical and to segregate the topsoil and suitable subsoil media around the pad perimeter, where topography allows, in a windrow. Windrowing of topsoil is intended to enhance viability of the soil during storage by facilitating the infiltration of moisture and maintaining an aerobic condition. The windrow would also serve as stormwater retention structure for the pad.

### **NO ACTION ALTERNATIVE**

The Proposed Action involves Fee surface with directional 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. The No Action Alternative constitutes denial of the APD associated with the Proposed Action and, consequently, no development associated with those wells.

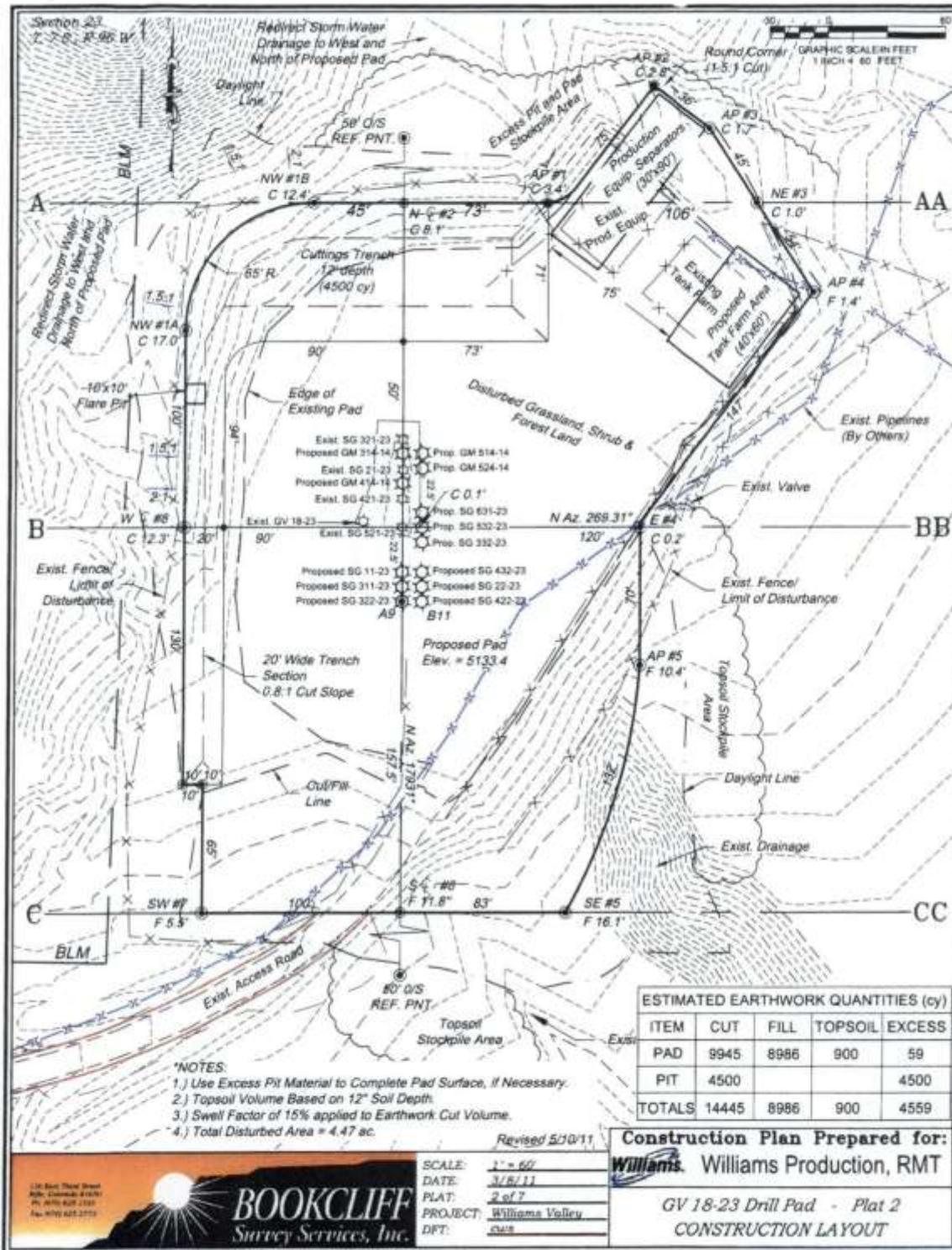


Figure 1. GV 18-23 Construction Layout

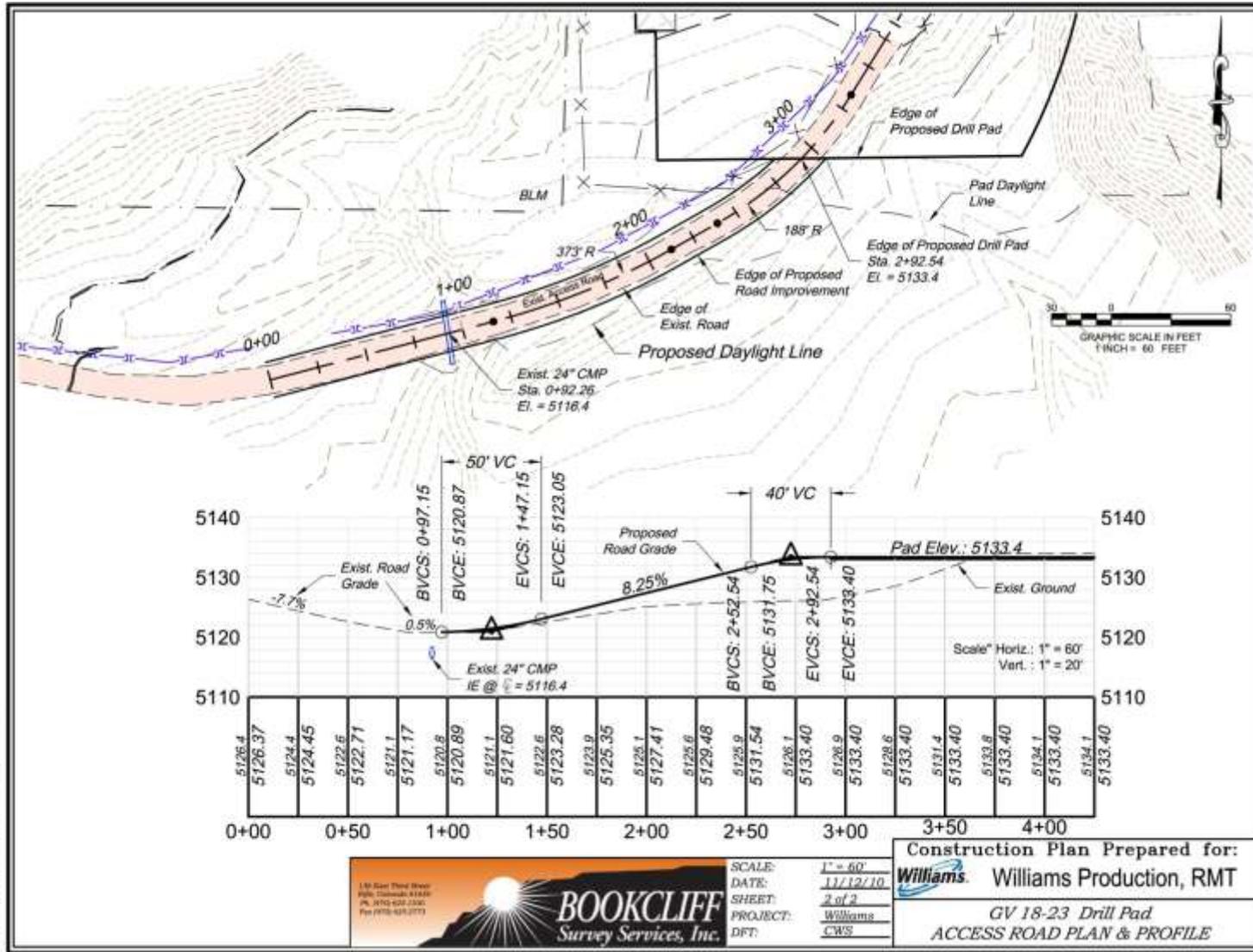


Figure 2. GV 18-23 Access Road Plan and Profile

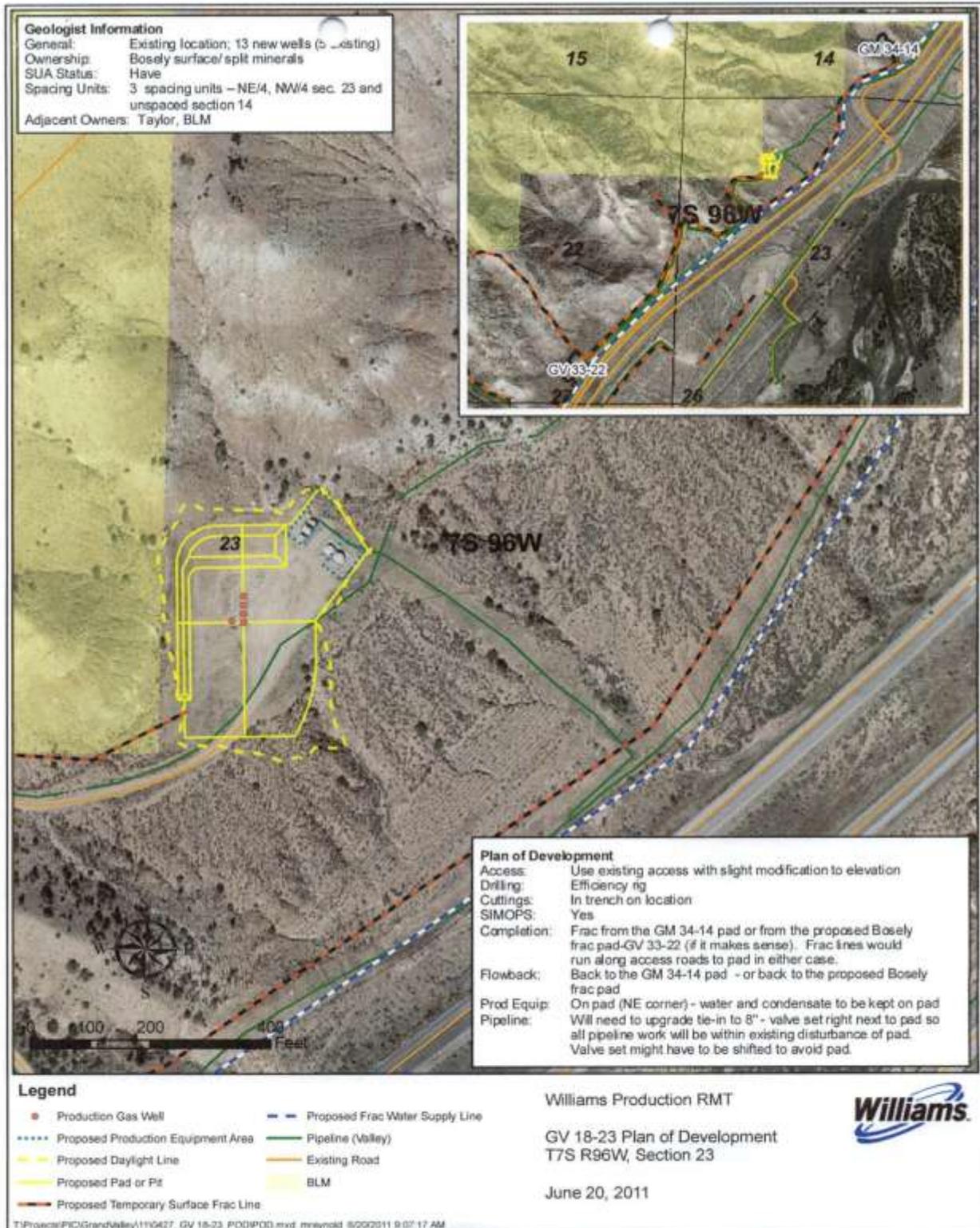


Figure 3. GV 18-23 Plan of Development



**PURPOSE AND NEED FOR THE ACTION**

The purpose of the action is to develop oil and gas resources on Federal leases COC49513 and COC27874 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 wells drilled from the GV 18-23 pad location would access Federal Lease COC49513 and COC27874. The surface hole locations are on private land and the bottomhole locations are within the boundaries of Federal Lease COC049513 and COC27874 (Figure 5). Table 2 lists the lease stipulations associated with the Proposed Action.

| <b>Table 2. Lease Stipulations Applicable to the GV 18-23 Pad and Vicinity</b> |  |  |
|--|--|--|
| <i>Lease Number</i>  | <i>Description of Lands (T7S, R96W, 6<sup>th</sup> PM)</i>                                   | <i>Lease Stipulations</i>  |
| <b>COC49513</b><br>(1989)  | Sec. 23: NW¼NW¼<br>Does not apply to fee surface locations not overlying the affected lease. | <b>Timing Limitation:</b> Big Game Winter Habitat (1/16 - 4/29). Exception may be granted under mild winter conditions for the last 60 days after consultation with CDPW.  |
| <b>COC27874</b><br>(1979)  | Sec. 14: NE ¼, W1/2, NW1/4SE1/4  | <b>Surface Disturbance Stipulation:</b> The plan of operation must assure adequate protection of drainages, waterbodies, springs, or fish and wildlife habitat, steep slopes, or fragile soil. The lessee agrees that during periods of adverse conditions due to the climactic factors such as thawing, heavy rains, or flooding, all activities creating irreparable or extensive damage, as determined by the surface managing agency, will be suspended or the plan of operation modified and agreed upon.<br><br><b>Timing Limitation:</b> Big Game Winter Habitat (1/1 -5/31). Exceptions may be granted |

The proposed area of disturbance would be located predominantly on private land (approximately 2.7 acres) with a small portion (less than .01 acre) being within BLM (Figure 5). In order to use this pad, the wells would have to be placed within the 150-foot COGCC setback from the BLM property boundary. The wells, as currently planned, would be 139 feet from the boundary. Williams would request a waiver from the BLM, exempting Williams from this rule.

**PLAN CONFORMANCE REVIEW**

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

Name of Plan: Glenwood Springs Resource Management Plan (BLM 1984).

Dates Amended: November 1991 – Oil and Gas Plan Amendment (BLM 1991); March 1999 – Oil & Gas Leasing & Development Record of Decision and Resource Management Plan Amendment (BLM 1999b).

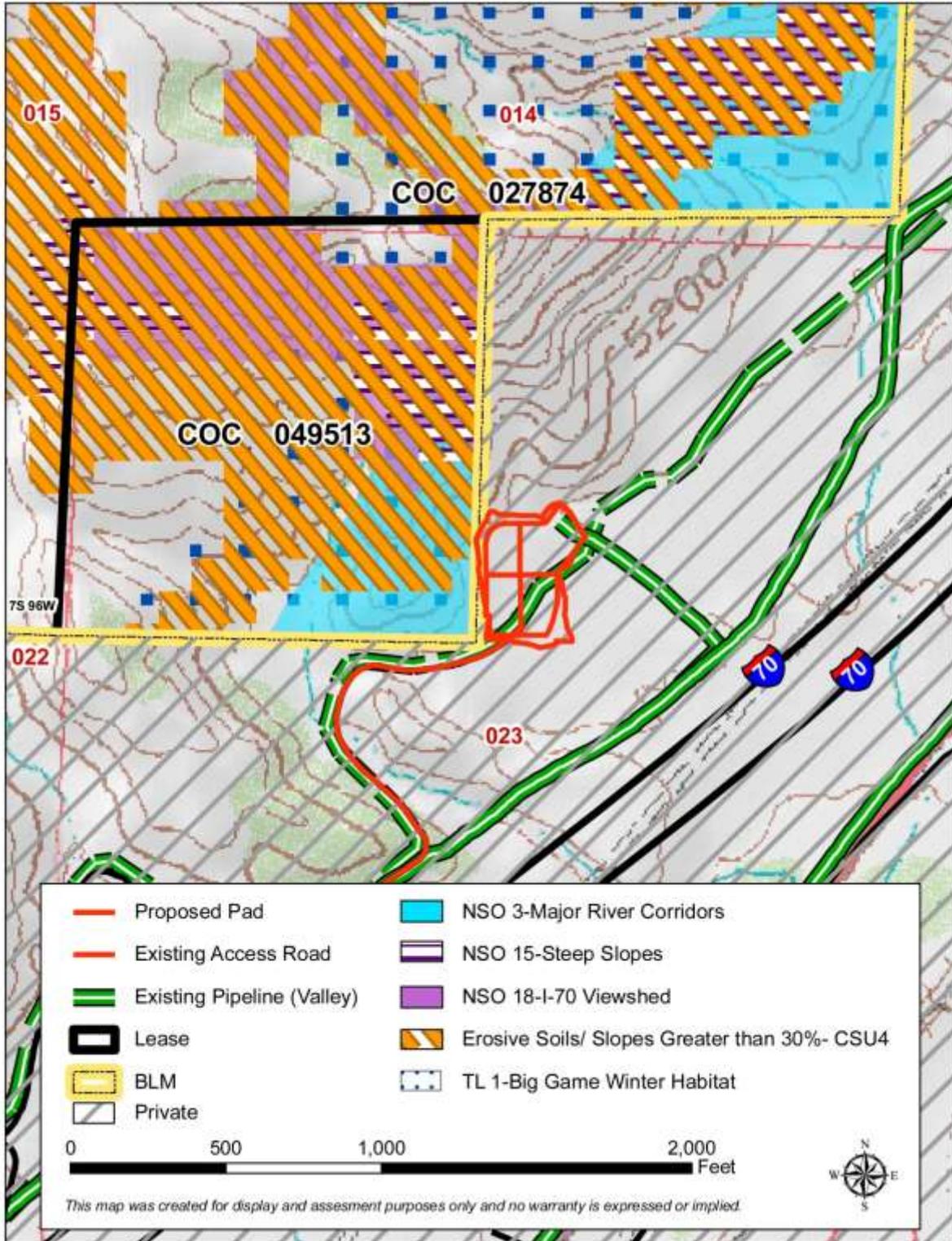


Figure 5. Proposed Action in Relationship to CRVFO Stipulations (BLM 1999)

Decision Number/Page: Record of Decision, Glenwood Springs Resource Management Plan Amendment, November 1991, page 3.

Decision Language: “697,720 acres of BLM-administrated 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.” This decision was carried forward unchanged in the 1999 RMP amendment (BLM 1999).

Discussion: The Proposed Action is in conformance with the 1991 and 1999 oil and gas RMP amendments because the Federal mineral estate proposed for development is open for oil and gas leasing and development.

### **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 less than 0.01 acre of the Proposed Action would involve BLM surface lands, a 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          | Recreation                        |
| Air Quality                        | Socio-Economics                   |
| Cultural Resources                 | Soils                             |
| Geology and Minerals               | Special Status Species            |
| Invasive Non-Native Plants         | Vegetation                        |
| Migratory Birds                    | Visual Resources                  |
| Native American Religious Concerns | Wastes, Hazardous and Solid       |
| Noise                              | Water Quality, Surface and Ground |
| Range Management                   | Wildlife, Aquatic and Terrestrial |

#### **Access and Transportation**

##### Affected Environment

The project area is accessed from the town of Parachute from the intersection of First Street and County Road 215 (CR215). Proceed in a southwesterly direction through the town of Parachute along First Street, which transitions into U.S. Highway 6 for approximately 5.5 miles. U.S. Highway 6 crosses I-70 after approximately 2.5 miles and then parallels I-70 for approximately 3 miles to an intersection with a dirt/gravel road. Proceed right under I-70 in a northwesterly direction. At the intersection, proceed right

in a northeasterly direction along the north R.O.W. of I-70 for approximately 2.5 miles to the GV 18-23 pad location (Figure 6).

### Environmental Consequences

#### *Proposed Action*

Public access is not allowed in the area, since the access road to the area crosses private land. This area is accessed by vehicles serving oil and gas development, including traffic related to construction, drilling, completion, and well production. To support access to the pad, the existing access road would be used and would include a slight modification to the elevation as it enters the pad. The R.O.W. north of I-70 is a gravel-surface road that provides access to the project area from U.S. Highway 6.

The Proposed Action would result in an increase in truck traffic on State Highway 6 and the R.O.W. north of I-70. The largest increase would be during rig-up, drilling, and completion activities. An estimated 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 well is in production, traffic would decrease to occasional visits for monitoring or maintenance activities. The well is assumed to require recompletion once per year. Each recompletion would require three to five truck trips per day for approximately 7 days. Fluids generated during the life of the well would be stored in tanks onsite, increasing truck traffic related to haulage of fluids.

| <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%                      |
| <b>Total</b>   | <b>1,160</b>                    | <b>100.0%</b>              |

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 the access road to the pad may occur due to heavy equipment travel and fugitive dust and noise would be created. Mitigation measures to be applied as Conditions of Approval (COAs) (Appendix A) would be required as conditions of approval to ensure adequate dust abatement and road maintenance.

#### *No Action Alternative*

The No Action Alternative would not affect access or transportation, because the development described above for the Proposed Action would not occur.

### **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

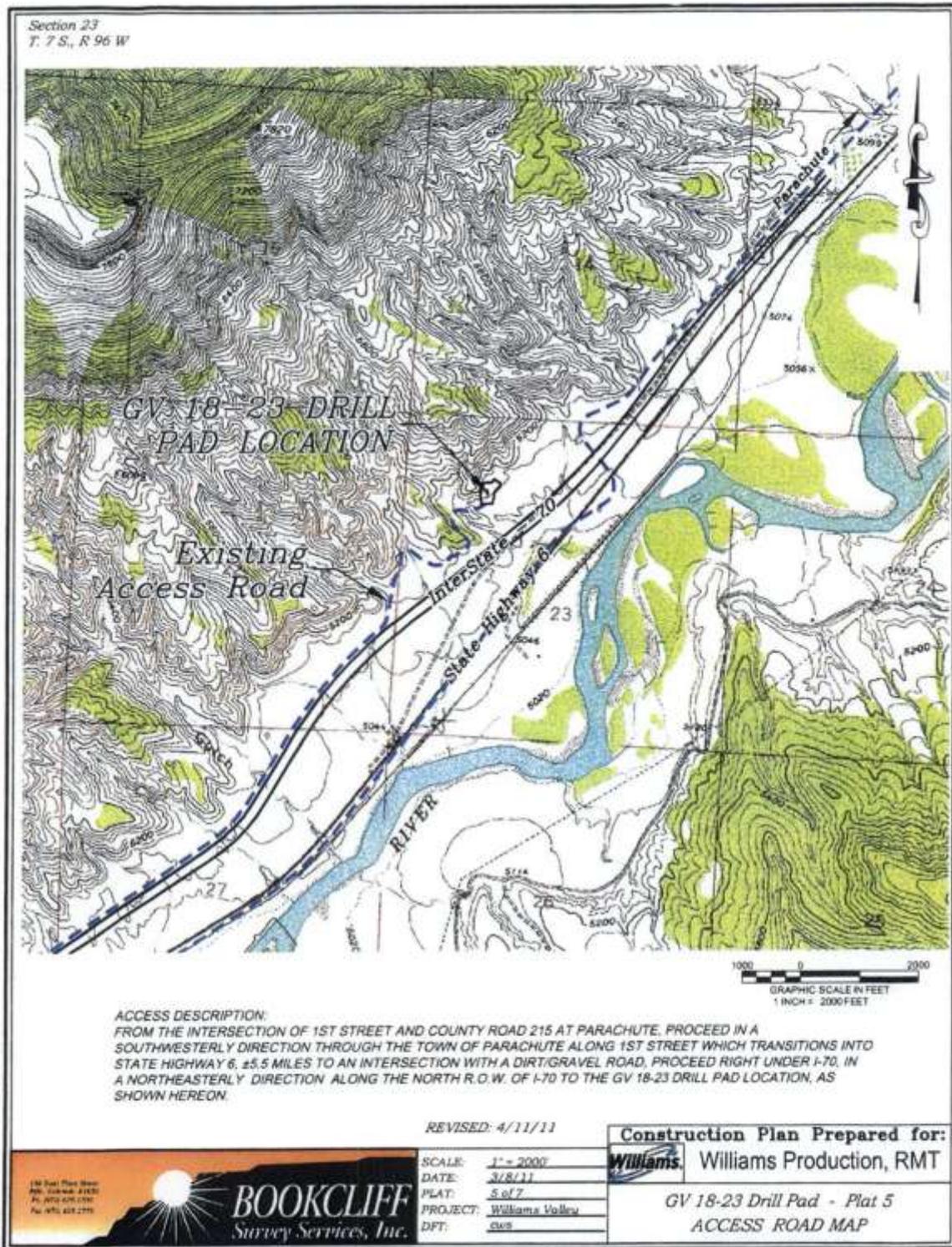


Figure 6. GV 18-23 Access Road Map

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 (μ) in diameter (PM<sub>10</sub>), and particulate matter less than 2.5 μ 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. As shown in Table 4, 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 Colorado Department of Public Health and Environment (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, while increases allowed in Class II areas are less strict.

The areas surrounding the project are classified as PSD Class II. The 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 Monument (approximately 65 miles south), and Eagles Nest Wilderness (approximately 60 miles east). Dinosaur National Monument (approximately 80 miles northwest) is listed as a Federal Class II area but is regulated as a Class I area for SO<sub>2</sub> by CDPHE. Regional background pollutant concentrations and applicable standards or limits are listed in Table 2.

| <b>Table 2. Air Pollutant Background Concentrations, Colorado and National Ambient Air Quality Standards, and Prevention of Significant Deterioration Increments.</b> |                        |                              |   |  |                       |
|---|------------------------|------------------------------|---|--|-----------------------|
| <i>Pollutant/Averaging Time</i>   |                        | <i>Measured Background</i>   | <i>CAAQS/or NAAQS</i>                         | <i>Incremental Increase Above Legal Baseline</i> |                       |
|   |                        |                              |   | <i>Class I</i>                                   | <i>Class II</i>       |
| Carbon Monoxide (CO) <sup>1</sup>   | 1-hour                 | 4,656 μg/m <sup>3</sup>      | 40,000 μg/m <sup>3</sup> (35 ppm)             | n/a  | n/a                   |
|   | 8-hour                 | 2,328 μg/m <sup>3</sup>      | 10,000 μg/m <sup>3</sup> (9 ppm)              | n/a  | n/a                   |
| Nitrogen Dioxide (NO <sub>2</sub> ) <sup>2</sup>  | Annual Arithmetic Mean | 0.016 ppm                    | 0.053 ppm                                     | 2.5 μg/m <sup>3</sup>                            | 25 μg/m <sup>3</sup>  |
| Ozone <sup>1</sup>  | 8-hour                 | 0.065 ppm (Rifle)            | 0.075 ppm                                     | n/a  | n/a                   |
| Particulate Matter (PM <sub>10</sub> ) <sup>3</sup>   | 24-hour                | 67 μg/m <sup>3</sup> (Rifle) | 150 μg/m <sup>3</sup>                         | 8 μg/m <sup>3</sup>                              | 30 μg/m <sup>3</sup>  |
|   | Annual                 | 25.7 (Rifle)                 | 50 μg/m <sup>3</sup>                          | 4 μg/m <sup>3</sup>                              | 17 μg/m <sup>3</sup>  |
| Particulate Matter (PM <sub>2.5</sub> ) <sup>1</sup>  | 24-hour                | 34.5 μg/m <sup>3</sup> (GJ)  | 35 μg/m <sup>3</sup>                          | 2 μg/m <sup>3</sup>                              | 9 μg/m <sup>3</sup>   |
|   | Annual                 | 9.3 μg/m <sup>3</sup> (GJ)   | 15 μg/m <sup>3</sup>                          | 1 μg/m <sup>3</sup>                              | 4 μg/m <sup>3</sup>   |
| Sulfur Dioxide (SO <sub>2</sub> ) <sup>4</sup>  | 3-hour                 | 66.7 μg/m <sup>3</sup>       | 700 μg/m <sup>3</sup> (0.27 ppm) <sup>5</sup> | 25 μg/m <sup>3</sup>                             | 512 μg/m <sup>3</sup> |
|   | 24-hour                | 34.6 μg/m <sup>3</sup>       | 365 μg/m <sup>3</sup> (0.14 ppm)              | 5 μg/m <sup>3</sup>                              | 91 μg/m <sup>3</sup>  |
|   | Annual                 | 5.3 μg/m <sup>3</sup>        | 80 μg/m <sup>3</sup> (0.03 ppm)               | 2 μg/m <sup>3</sup>                              | 20 μg/m <sup>3</sup>  |

<sup>1</sup> Background data collected in Rifle, 2010 (Chick 2011)  
<sup>2</sup> Background data collected by Encana at site north of Parachute, 2007 (CDPHE 2008)  
<sup>3</sup> Background data collected in Grand Junction, 2010 (Chick 2011)  
<sup>4</sup> Background data collected at Unocal site, 1983-1984 (CDPHE 2008).  
<sup>5</sup> Colorado 3-hour AAQS = 700 μg/m<sup>3</sup>.

## Environmental Consequences

### *Proposed Action*

The CDPHE, under its EPA-approved State Implementation Plan (SIP), is the primary air quality regulatory agency responsible for determining potential impacts once detailed industrial development plans have been made; those development plans are subject to applicable air quality laws, regulations, standards, control measures, and management practices. CDPHE has the ultimate responsibility for reviewing and permitting any project's air quality impacts prior to its operation. Unlike the conceptual "reasonable but conservative" engineering designs used in NEPA analyses, any CDPHE air quality preconstruction permitting required would be based on site-specific, detailed engineering values, which would be assessed in CDPHE's review of the permit application.

The GV 18-23 includes constructing, drilling, completing, and operating up to six new federal wells on an existing pad with five existing private 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. 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 1deciview 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 Williams 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.

To mitigate dust generated by construction and vehicular travel on unpaved access roads, the operator would be required to implement dust abatement strategies as needed by applying gravel to a compacted depth of 6 inches on the access road, watering the access road and construction areas and/or by applying a surfactant approved by the Authorized Officer (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, Williams may be required to install a vapor recovery or thermal destruction system to reduce VOC concentrations further.

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 (2007) 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” (National Academy of Sciences 2007). Other theories about the effect of GHGs on global climate change exist.

The ARTSD inventoried and assessed the GHG emissions associated with various scenarios of future oil and gas development. In all scenarios modeled, the GHG emissions would not increase the total US 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*

The No Action Alternative constitutes denial of the Federal APDs described in the Proposed Action. However, the pad, access road and five wells exist on this site on private land. Therefore, the reduced air impacts of the No Action Alternative would be associated with drilling, completing, and producing the federal wells only.

### **Cultural Resources (Archaeology)**

#### Affected Environment

Two Class III cultural resource inventories (CRVFO# 1111-4 and 5409-3) were conducted in the project area and covered the GV18-23 well pad location. The inventory and pre-field file searches of the Colorado SHPO database and BLM Colorado River Valley Field Office cultural records identified one

isolated find within the project area. One eligible linear site is also located in the project vicinity but outside the area of potential effect (APE). An “eligible” determination means that the site is thought to have characteristics that make it eligible for inclusion on the National Register of Historic Places (NRHP). Isolated finds are by definition no eligible for 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 will be affected by the well pad construction as it is currently proposed. 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 (1997) and Colorado Protocol (1998)]. 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 APD’s Conditions of Approval. The importance of this COA should 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 known and 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 No Action Alternative constitutes denial of the APD associated with the Proposed Action. Under this alternative, the Federal wells proposed and described in the Proposed Action would not be drilled.

### **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 exposed within the proposed development project is the Tertiary Wasatch Formation. The Wasatch Formation consists of variegated siltstone, claystone, and sandstones and ranges from 1,000 to 2,500 feet thick. The Wasatch Formation is underlain unconformably by the Mesaverde Group. 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 5 lists the geologic formations present within the proposed project area.

The Mesaverde Group is the target zone of the proposed drilling program. Made up of the Williams Fork and Iles Formations, sediments of the Mesaverde Group are composed 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.

| <i>Map Symbol</i> | <i>Formation Name</i>                          | <i>Age</i>        | <i>Characteristics</i>                                    | <i>Location</i>  |
|-------------------|--|-------------------|---|--|
| Tgp               | Green River Formation – Parachute Creek Member | Eocene            | Black, brown, and gray marlstone.                         | Cliffs.  |
| Tga               | Green River Formation – Anvil Points Member    | Eocene            | Fine to coarse grained gray and brown sandstones.         | Cliff faces and slopes   |
| Tws               | Wasatch Formation – Shire Member               | Eocene, Paleocene | Variegated (purple, lavender, gray, and brown) claystone. | Base of Mesas and predominant surface exposures both north and south of the Colorado River |

Source: Donnell et al. 1986

Production is derived from three reservoir intervals, which include the Wasatch, Williams Fork, and Iles Formations. The latter two make up the Upper Cretaceous Mesaverde Group. 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). The upper portions of the Williams Fork include fluvial point bar, floodplain, and swamp deposits. The Lower Williams Fork Formation 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

If the proposed wells prove productive, production rates are expected to be highest during the first few years and to decline during the remainder of the economic lives of the wells. Substantial reserves have been known since the late 1950s to be trapped within the tight sands of these reservoirs, but only within the last decade 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 fresh water 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*

The Proposed Action involves Fee surface with directional 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. The No Action Alternative constitutes denial of the APD associated with the Proposed Action. Under the No Action Alternative, the Federal wells proposed and described in the Proposed Action would not be drilled.

### **Invasive Non-Native Species**

#### Affected Environment

Eight species of noxious or other invasive weeds were detected during biological surveys in the project area in 2010. However, the project area does not support extensive stands of noxious weeds. Whitetop (hoary cress) (*Cardaria draba*), the most common species, was found primarily along the access road corridor, typically in areas with higher soil moisture content within sagebrush shrublands. Tamarisk (*Tamarix ramosissima*), also known as salt-cedar, was found also found in areas of elevated soil moisture such as soil slumps and depressions where water precipitation accumulates.

#### 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 numerous invasive non-native species are present along the roadside corridor, the potential for invasion into the surrounding area following construction activities is high. Adherence to standard surface use COAs (Appendix A) would minimize the spread of invasive non-native species and reduce impacts from these species on other natural resources.

##### *No Action Alternative*

Under the No Action Alternative, none of the proposed ground disturbance would occur. Therefore, the potential for weed invasion and expansion would be less than under the Proposed Action.

## **Migratory Birds**

### **Affected Environment**

The Migratory Bird Treaty Act (MBTA) includes native passerines (flycatchers and songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. Within the context of the MBTA, “migratory” birds include non-migratory “resident” species as well as true migrants, essentially encompassing virtually all native bird species. For most migrant and resident species, nesting habitat is of special importance because it is critical for supporting reproduction in terms of both nesting sites and food. In addition, because birds are generally territorial during the nesting season, their ability to access and utilize sufficient food is limited by the quality of the territory occupied. During non-breeding seasons, birds are generally non-territorial and able to feed across a larger area and wider range of habitats.

Numerous migratory bird species occupy, or have the potential to occupy, the project area. Migratory bird species that are Federally listed under the Endangered Species Act of 1973, as amended, or classified by the BLM as sensitive species, are addressed under the section on Special Status Species. The current section addresses migratory birds that may inhabit the proposed project area. Emphasizing the need to conserve declining species, the U.S. Fish and Wildlife Service (USFWS) has published a list of Birds of Conservation Concern (BCC) that deserve prompt conservation attention to stabilize or increase populations or to secure threatened habitats. This section also addresses species within the project area that listed as BCC species (USFWS 2008). This analysis focuses on BCC species, non-BCC species that are Neotropical (long-distance) migrants, and raptors—three groups highly vulnerable to habitat loss or modification on their breeding grounds.

The project area is composed of broken terrain with numerous incised washes and ravines typically separated by narrow ridges. Overstory vegetation is largely Utah juniper with scattered pinyon pines. A large portion of the project area is characterized by open sagebrush-greasewood shrublands and bunch grass grasslands with scattered junipers.

Sagebrush shrublands in the project area provide potential habitat for the Brewer’s sparrow. Other migratory birds associated with sagebrush shrublands but are not BCC species include the western meadowlark (*Sturnella neglecta*), vesper sparrow (*Pooecetes gramineus*), and lark sparrow (*Chondestes grammacus*). Stands or scattered individuals of Utah juniper provide some habitat for three pinyon-juniper obligate species on the BCC list: the pinyon jay, juniper titmouse, and gray vireo. Of these, the last species is unlikely to occur because of the location of the project area outside the known nesting range, located farther to the west. Other migrants potentially occurring in the limited pinyon-juniper include neotropical migrants such as the gray flycatcher (*Empidonax wrightii*), Say’s phoebe (*Sayornis saya*), mountain bluebird (*Sialia sialis*), blue-gray gnatcatcher (*Polioptila caerulea*), and black-throated gray warbler (*Dendroica nigrescens*). During winter, three additional species—Clark’s nutcracker (*Nucifraga columbiana*, Townsend’s solitaire (*Myadestes townsendi*), and the cedar waxwing (*Bombycilla cedrorum*)—may congregate in pinyon-juniper habitats in search of pine nuts (the nutcracker) or juniper berries (the solitaire and waxwing).

Raptors use the project area for nesting and hunting activities. Species most likely to nest within or near the project area include the golden eagle (*Aquila chrysaetos*), American kestrel (*Falco sparverius*), peregrine falcon (*Falco peregrinus*), Cooper’s hawk (*Accipiter cooperii*), sharp-shinned hawk (*A. striatus*), red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginiana*), and long-eared owl (*Asio otus*). Four unoccupied nests were found within 0.25 mile of the Proposed Action during raptor surveys in the project area (Figure 7)(WestWater 2011).

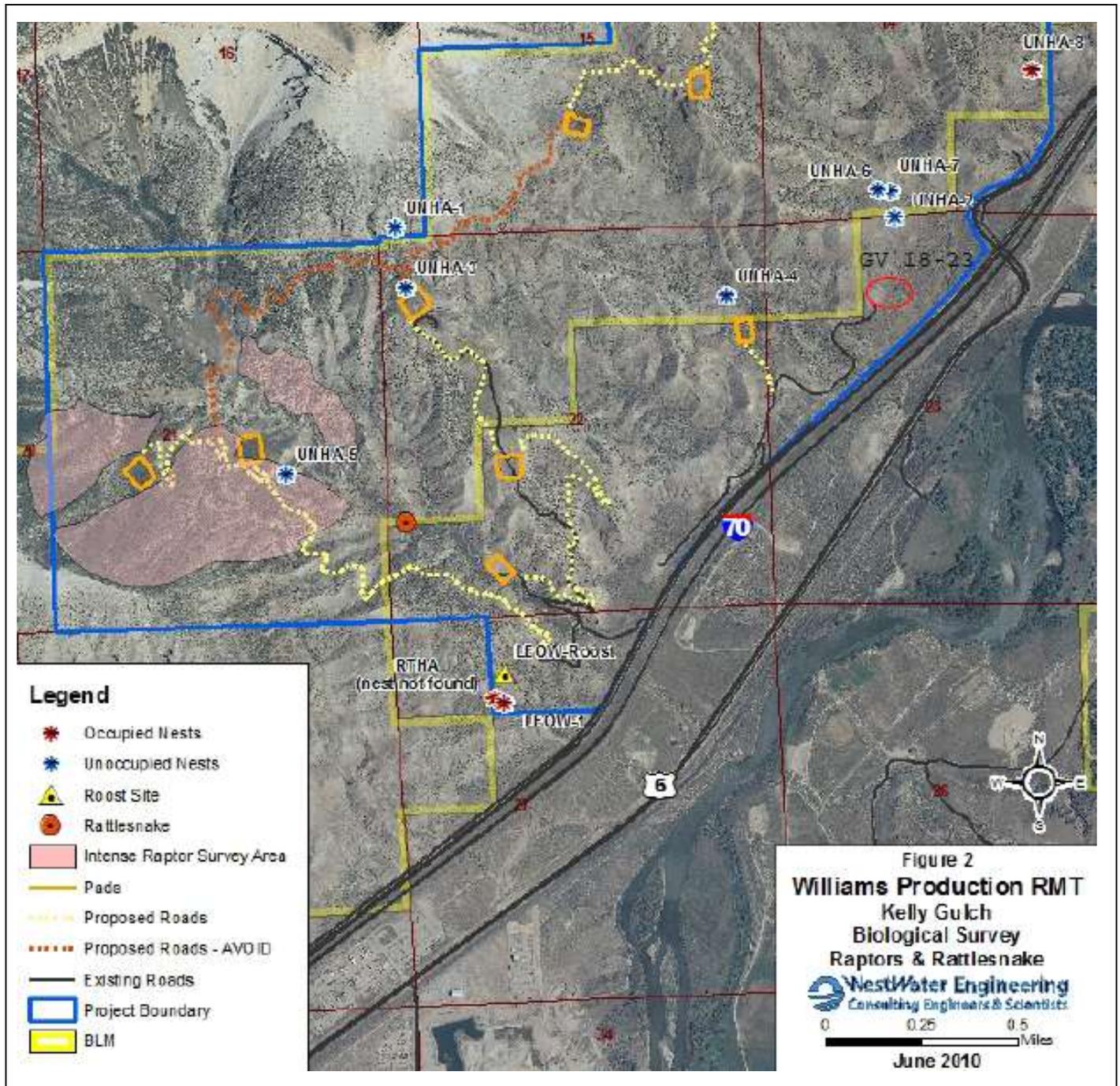


Figure 7. Results of 2011 Raptor Survey for the GV 18-23 (WestWater 2011).

The sandstone bluffs that are a short distance north of and parallel I-70 appear to be preferred nesting habitat for raptors. No active nests were found, but the majority of stick nests found in the area were found in this habitat. Active nests of the common raven (*Corvus corax*) were also observed in this area, making it difficult to determine if the sticknests belonged to ravens or red-tailed hawks.

### Environmental Consequences

#### *Proposed Action*

The existing surface disturbance of the pad is 2 acres on private land. Under the Proposed Action, 4.5 acres of new disturbance would occur on private land as a result of existing pad expansion. Following successful interim reclamation, the disturbance would be reduced to less than 2 acres.

Removal of pinyon-junipers and sagebrush would result in loss of existing and potential nesting sites for perching birds. While habitat loss and fragmentation may affect individual birds, it is not expected to adversely impact a species as a whole. If construction, drilling, or completion activities occur during the nesting season, visual and noise disturbance near active nests could cause nest abandonment and failure, reducing the productivity of affected species. Construction activity during the nesting season could also result in the destruction of clutches and/or mortality of nestlings.

A Timing Limitation (TL) applied as a COA (Appendix A) would be applied to prohibit vegetation removal during the period May 1 to July 1 as a means of reducing adverse impacts to migratory birds such as BCC species. A raptor nesting TL, also described in Appendix A, would preclude construction, drilling, or completion activities during the period May 1 to July 1 to minimize disturbance to nesting raptors. In addition to these restrictions, the operator is subject to the MBTA, administered by the USFWS, which precludes the “take” of any raptor or most other native species. Under the Act, the term “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The USFWS interprets “harm” and “kill” to include loss of eggs or nestlings due to abandonment or reduced attentiveness by one or both adults as a result of disturbance by human activity, as well as physical destruction of an occupied nest. Adherence to the 60-day TL period does not ensure compliance with the MBTA.

#### *No Action Alternative*

Under the No Action Alternative, the Federal wells proposed and described in the Proposed Action would be denied. Thus, no disturbance would occur as a result of the project.

### **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. A number of 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 was 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. 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 on Native American religious concerns, increased access and personnel in the vicinity of the project area could indirectly impact unknown Native American resources for reasons ranging inadvertent damage to illegal collection or 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. Williams Production RMT Company 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 APDs (Appendix A). The importance of these COAs should 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 should also be aware of requirements under the NAGPRA.

### *No Action Alternative*

The No Action Alternative constitutes denial of the APD associated with the Proposed Action. Under this alternative, the Federal wells proposed and described in the Proposed Action would not be drilled.

## **Noise**

### Affected Environment

Noise is generally described as unwanted sound, weighted and noise intensity (or loudness) is measured as sound pressure in units of 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. The project would be located in a rural, unpopulated area with background noise from Interstate 70 and current oil and gas development.

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 7) at a distance of 350 feet. Periodically the noise level may increase to 10 dBA above levels in Table 7 for no more than 15 minutes in a 1-hour period. Operations involving pipeline or gas facility installation or maintenance, the use of a drilling rig, completion rig, workover rig, or stimulation is subject to the maximum permissible noise levels for industrial zones.

| <b>Table 7. Noise Standards for Light industrial, Residential/Agriculture/Rural</b> |                              |                              |
|---|------------------------------|------------------------------|
| <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 2006).

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 8), project-related noise levels would be approximately 59 dBA at a distance of 1,000 feet, approximating active commercial areas (EPA 1974). 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.

| <b>Table 8. Noise Levels at Typical Construction Sites and along Access Roads</b> |                          |                 |                   |
|---|--------------------------|-----------------|-------------------|
| <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                       | 83              | 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)                                      |                          |                 |                   |

Noise impacts from drilling and completion activities would last approximately 30 to 45 days at each well. Noise would occur continuously, 24 hours per day, during the drilling and completion period. Based on a measured noise level of 68 dB(A) at 500 feet, actions associated with drilling and completion would generate approximately 62 dB(A) at 1,000 feet. This level of noise approximates that associated with light industrial activities (EPA 1974). 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.

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 8, 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. Traffic noise levels would affect residences located along County roads that provide primary access into the area. While exposure to these noise levels is not likely to be harmful, it is likely to be annoying to residents.

#### *No Action Alternative*

Under the No Action Alternative, none of the project-related noise impacts would occur.

### **Range Management**

#### Affected Environment

The GV 18-23 well pad and access road would be located on private land adjacent to the Kelly Gulch Allotment #08921. Table 8 summarizes the permitted grazing use on the allotment.

| <b>Allotment</b>   | <b>Authorization Number</b> | <b>Livestock and Number</b> | <b>Season of Use</b> | <b>% Public Land</b> | <b>Animal-Unit Months (AUMs)</b> |
|--------------------|-----------------------------|-----------------------------|----------------------|----------------------|----------------------------------|
| Kelly Gulch #08921 | 0500161                     | 580 Sheep                   | 10/20 – 11/20        | 59%                  | 72                               |

The allotment has not been used for a while but will be transferred to a new permittee. The sheep would most likely be on the lower flatter slopes of the allotment and adjacent private lands.

#### Environmental Consequences

##### *Proposed Action*

Oil and gas development within the project area would result in less than .01 acre of total short-term disturbance on land administered by the BLM. The remaining 4.5 acres of disturbance would be on private land. This disturbance and resulting loss of vegetation would last for approximately 3 to 5 years or until grasses and forbs seeded during interim reclamation become productive. Rehabilitation of the

short-term disturbance areas would replace some of the livestock forage. Long-term loss of vegetation from the working areas of the well pad, access road, and pipeline, amounting to approximately 1.2 acres, would be expected to last 20 to 30 years until the wells lose their productivity. With final reclamation of the wells sites and access roads, full productivity of the rangeland would be reestablished.

Production of grasses and forbs on successfully rehabilitated sites is often greater than occurred prior to disturbance; this would mitigate some of the initial loss of forage. Since the oil and gas development would take place over time, the reduction in available livestock forage at any one time would be less than the total reduction in forage if the Proposed Action were to be implemented all at once.

Additional effects from oil and gas development on livestock grazing could include increased human activity, spread of noxious weeds, and livestock mortality as a result of collisions with vehicles. The sheep could be stressed due to increased development activities, resulting in changes in use patterns and trailing routes.

An increase in human activity related to development and maintenance of the development would cause sheep to avoid certain areas of the allotment. Effects from increased human activity also could include the introduction and spread of noxious weeds and the subsequent degradation of rangeland health. The section on Invasive Non-native Species describes in detail the effects of invasive species and lists mitigation measures related to the Proposed Action.

It is not anticipated that impacts from implementation of the Proposed Action would require adjustments to the livestock stocking rate. The level of forage utilization would be monitored on the allotment and, if necessary, adjustments in livestock use would be made to protect land health. Range improvements (fences, gates, reservoirs, pipelines, etc.) would be avoided during development of oil and gas resources to the maximum extent possible. If range improvements are damaged during exploration and development, the operator would be responsible for repairing or replacing the damaged range improvements (Appendix A).

The sheep would be accompanied by a herder to keep them out of the construction and production areas, but fencing is recommended. Fencing with sheep-friendly fencing should be required around the perimeter of the area of disturbance for the pad to deter grazing impacts before construction begins. The pipeline corridor and pipeline valves should also be fenced to keep the sheep out. Associated oil and gas activity should be limited during those times when sheep may be within the project area due to pasturing.

#### *No Action Alternative*

Under the No Action Alternative, none of the project-related impacts on the Federal grazing program analyzed for the Proposed Action would occur.

### **Recreation**

#### Affected Environment

No public access is available to the project location or adjacent BLM land. The area is not managed for recreation. However, the adjacent BLM lands are designated as “open” for OHV use.

## Environmental Consequences

### *Proposed Action*

The Proposed Actions could shift visitor use patterns, particularly big game hunters, who may have permission to hunt on adjacent private lands. Impacts to visitors within the project area would be minor depending on timing of implementation.

### *No Action Alternative*

The No Action Alternative would not affect recreation because the proposed oil and gas development would not occur.

## **Socio-Economics**

### Affected Environment

The DMDP project area is located entirely within Garfield County, Colorado. The total county land area is 2,947 square miles (City Data 2011). The county seat is in 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.

The population of the county grew by an average of approximately 3% per year from 2000 to 2010, resulting in a total increase of more than 27% from 44,259 to 56,298 residents (USDOC 2011). Population growth in Garfield County is expected to more than double over the ensuing 20 years to 119,979 in 2030 (DOLA 2010). Currently the population density is 10 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 (City Data 2011). 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 9).

| <i>Job Sector</i>                 | <i>No. of Jobs</i> | <i>Percent of Total</i> |
|-----------------------------------|--------------------|-------------------------|
| 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                    |

Employment in agriculture, forestry, hunting, and mining accounted for 8% of the total employment. Jobs in the oil and gas extraction industry numbered 531 (Colorado Department of Labor and Employment 2010). This number, representing 1.6% of total jobs, 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. The number of natural gas related jobs is projected to peak at 5,278 in 2017 (Garfield County 2007).

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 2011). 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).

In 2009, industry groups in Garfield County with the highest percentage of total employment were Construction 15%, Tourism 12%, Retail Trade 13%, and Education and Health 20% (Colorado Department of Labor and Employment 2010). An estimated 13.3% of the population was retired in the year 2000 and did not earn wages (Garfield County 2000). Employment in agriculture, forestry, hunting, and mining accounted for 8% of total employment (Colorado Department of Labor and Employment 2010).

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). 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 2011b). Due to the economic downturn, the 2010 oil and gas revenues and assessed valuation dropped drastically. Oil and gas assessed valuation amounted to \$2.0 billion, or about 60% of the total assessed value. In 2010, total tax revenues from all districts were approximately \$153 million. 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 NEPA process 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 Hispanic/Latino community is the only minority population of note in the vicinity of the project area. In 2010, approximately 28% of the residents of Garfield County identified themselves as Hispanic/Latino, compared to 17% in 2000. Statewide, the percentage of Hispanic/Latino residents grew from 17% to 21% during the same 10-year period. African-American, American Indian, Asian, and Pacific Islander residents accounted for a

combined 2.6% of the Garfield County population in 2010, compared to a statewide level of 8% (Garfield County 2010).

The predominant revenue source for Garfield County is property tax, which makes up approximately half of the County's total revenue. Growth in this revenue source is primarily driven by the oil and gas industry (Garfield County 2011a). Oil and gas related property tax revenue makes up more than two-thirds of the County's total property tax revenue, and more than two-thirds of this oil and gas related property tax is directly associated with production. Total revenues for Garfield County in 2009 amounted to more than \$135 million. Garfield County property tax is utilized as 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.

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 10 (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.

The NEPA process 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: 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:*

This alternative, which would deny approval of Federal oil and gas wells described for the Proposed Action, would have minor adverse impacts on employment and local revenues. This alternative would also cause only nominal social impacts. Further reductions in the scenic quality of the area would not occur, and dust levels and traffic would not increase as a result of this project.

## **Soils**

### Affected Environment

Soils within the project area have formed in several types of surficial materials (Soule and Stover 1985):

- Residual material produced by in-situ weathering of the underlying sedimentary bedrock, which is primarily shale.
- Colluvium and mass wasting deposits including landslides, debris flows, and slumps.
- Aeolian (wind) deposits of sand and silt.
- Alluvial deposits including alluvial fan gravels and floodplain alluvium in stream valleys.

Lack of moisture associated with the semi-arid climate has suppressed vegetation growth and slowed the chemical and biological processes commonly associated with soil development (BLM 1994). In addition, soil fertility is hampered by high salinity and susceptibility to wind and water erosion. Soils in the project area support low-density livestock grazing and wildlife habitat, but generally have a poor revegetation potential due to these limiting factors. However, soils in alluvial valleys and some gently sloping mesa summits are capable of supporting irrigated and dryland crops, principally hay and alfalfa.

The GV 18-23 is located at the toe of the Mt Callahan foothills and the ephemeral drainages of the Colorado River at the at elevations between 5,000 and 5,500 feet elevation. The proposed project is covered by the *Soil Survey of Rifle Area, Colorado* (NRCS 2010, USDA 1985). According to this survey, the project area lies entirely within the Torriorthents-Camborthids-Rock Outcrop Complex. This complex consists of exposed sandstone and shale bedrock, loose stones, stony basaltic alluvium and shallow to deep soils formed on foothills and mountainsides. This soil complex is generally used for grazing, wildlife habitat and recreation. The soil complex is unsuitable for crops and has moderate to severe erosion hazard.

Soils with a severe or very severe water erosion hazard tend to be found on moderately to steeply sloping lands. These soils also tend to be relatively impermeable, meaning that more precipitation tends to run off the surface rather than infiltrate into the soil. Other important soil characteristics that make a soil highly erodible by water include high contents of silt and very fine sand; expansive types of clay; a tendency to form surface crusts; the presence of impervious soil layers; and blocky, platy, or massive soil structure (Brady and Weil 2002).

### Environmental Consequences

The Proposed Action would involve surface disturbance for improved access road and expansion of one well pad. The Proposed Action would result in approximately 2 acres of additional short-term vegetation

loss and soil compaction and displacement. In general, the area that would be affected by the Proposed Action contains adequate vegetation buffers and moderate slopes that would reduce the potential for sediment transport to Divide Creeks and Colorado River. The project area includes a few places susceptible to erosion due to steep slopes. In areas susceptible to erosion or slope failure, proper erosion control and construction techniques and geotechnical analysis may be required in the site specific COAs. No soils that are subject to flooding or high water tables would be affected by the proposed project.

Additionally, construction activities would cause mixing of soil horizons, slight to moderate increases in local soil loss, loss of soil productivity, and sediment available for transport to surface waters. Noxious weed infestation resulting from disturbance would impact soil productivity. 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 streams.

Throughout the affected area, the potential would also exist for accidental spills or leaks of petroleum products and hazardous materials during construction, drilling activities and long term operations for the life of the wells. These events would cause soil contamination and may decrease the soil fertility and revegetation potential.

### **No Action Alternative**

The No Action Alternative constitutes denial of the Federal APDs described in the Proposed Action and any of the associated pad and road construction. Therefore, no project-related impacts to soils would occur.

### **Special Status Species**

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

##### **Affected Environment:**

According to the latest information available online from the USFWS, the following federally listed, threatened, plant species may occur within or be impacted by actions occurring in Garfield County: Parachute beardtongue (*Penstemon debilis*), DeBeque phacelia (*Phacelia submutica*), Colorado hookless cactus (*Sclerocactus glaucus*), and Ute ladies'-tresses orchid (*Spiranthes diluvialis*).

##### **Environmental Consequences**

###### ***Proposed Action***

Results of a plant survey conducted in 2010 indicate no habitat for federally listed, threatened, plant species in the project area. Therefore, the project would have “**No Effect**” on these species.

###### ***No Action Alternative***

Because of the lack of potential habitat for any Federally listed, proposed, or candidate threatened or endangered plant species in the project area, the No Action Alternative would have no adverse impacts to these species.

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

### Affected Environment

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, their status, and their distributions and habitat associations in the region are summarized below:

Canada Lynx (*Lynx canadensis*). 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 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 I-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 the Battlement Creek LAU and therefore is not considered further in this document.

Mexican Spotted Owl (*Strix occidentalis*). Federally listed as threatened. This large owl nests, roosts, and hunts in mature coniferous forests in canyons and foothills. The only extant populations in Colorado are in the Pikes Peak and Wet Mountain areas of south-central Colorado and the Mesa Verde area of southwestern Colorado. Because no known occurrences or suitable habitats are present in the project vicinity, this species is not considered further.

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*). 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. Riparian areas in the project area do not provide suitable habitat for this species. It also is not known to occur in the cottonwood corridor along the Colorado River a few miles north of the project area; occurrence there is unlikely due to the patchy nature of the stands and the general lack of a tall-shrub understory. Because no suitable habitats are present in the project vicinity, this species is not considered further.

Razorback Sucker (*Xyrauchen texanus*), Colorado Pikeminnow (*Ptychocheilus lucius*), Humpback Chub (*Gila cypha*), and Bonytail Chub (*G. elegans*). Federally listed as endangered. These four species of Federally listed big-river fishes occur within the Colorado River drainage basin near or downstream from the project area. 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. This portion of the Colorado River lies a few miles northeast of the project area. The nearest known habitat for the humpback chub and bonytail is within the Colorado River approximately 70 miles downstream from the project area. Occasionally, the bonytail is in Colorado west of Grand Junction, but its range does not extend east from that point. Only one population of humpback chub, at Black Rocks west of Grand Junction, is known to exist in Colorado.

Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*). 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 Cache Creek, located several drainages east of the project area. The greenback is the subspecies of cutthroat trout native to the Platte River drainage on the Eastern Slope of Colorado, while the Colorado River cutthroat trout (*O. c. pleuriticus*) is the subspecies native to Garfield County and throughout the Western Slope of Colorado. Although the occurrence of greenbacks in Cache Creek and potentially elsewhere in the CRVFO and WRNF areas is apparently the result of

human intervention (e.g., sanctioned or *ad hoc* transplantation of fish from the Eastern Slope), its status as threatened applies to Western Slope populations. However, because drainages within the project area do not support this species, it is not considered further.

### Environmental Consequences

#### *Proposed Action*

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 0.77 acre-feet of Colorado River water is consumed during activities related to each oil and gas well. This is equivalent to 0.04 to approximately 0.04 cubic feet per second (cfs) of water throughout the typical 10-day drilling period for an oil and gas well in the CRVFO area.

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. Construction activities would increase the potential for soil erosion and sedimentation. Although a minor temporary increase in sediment transport to the Colorado River may occur, it is unlikely that the increase would be detectable above current background levels. In any case, the Federally listed, proposed, or candidate fish species associated the Colorado River are adapted to naturally high sediment loads and would not be affected.

In contrast to inflow of sediments, the inflow of chemical pollutants could impact the endangered big-river fishes if concentrations are 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 into an ephemeral drainage that could flow to the Colorado River, the operator would be required to implement its Spill Prevention, Control, and

Countermeasures (SPCC) plan, including such cleanup and mitigation measures as required by BLM or the State. 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.

Based on the above, the BLM has determined that inflow of sediments and chemicals into the Colorado River would have “**No Effect**” on the endangered big river fishes. In the unlikely event of a spill with the potential to affect, or documented occurrence of an effect, the USFWS would initiate discussions with the involved parties to identify appropriate remedies.

#### *No Action Alternative*

Under the No Action Alternative, the Federal wells proposed and described in the Proposed Action would be denied. Thus, no disturbance would occur as a result of the project.

#### ***BLM Sensitive Plant Species***

##### Affected Environment

BLM sensitive plant species with habitat and/or occurrence records in Garfield County include DeBeque milkvetch (*Astragalus debequaeus*), Naturita milkvetch (*Astragalus naturitensis*), Piceance bladderpod (*Lesquerella parviflora*), Roan Cliffs blazing star (*Mentzelia rhizomata*), Harrington’s penstemon (*Penstemon harringtonii*), and Cathedral Bluffs meadow-rue (*Thalictrum heliophilum*).

##### Environmental Consequences

#### *Proposed Action*

Results of a 2010 plant inventory indicate no BLM sensitive plant species or their habitats in the vicinity of the project.

#### *No Action Alternative*

Since no BLM sensitive plant species occur in the project area, no impacts to these species are anticipated.

#### ***BLM Sensitive Animal Species***

##### Affected Environment

Table lists BLM sensitive vertebrate wildlife species that are known to occur in the region and, if present, could potentially be adversely affected by the Proposed Action. Species indicated in Table 11 as present or possible are discussed following the table.

| <b>Table 11. BLM Sensitive Wildlife Species Present or Potentially Present in the Project Area</b> |  |   |
|--|--|---|
| <i>Common Name</i>   | <i>Habitat</i>   | <i>Potential for Occurrence</i>               |
| Fringed myotis   | Breeds and roosts in caves, trees, mines, and buildings; hunts over pinyon-juniper, montane conifer, and semi-desert shrubland habitats. | Possible                                      |
| Townsend's big-eared bat   | Breeds and roosts in caves, trees, mines, and buildings; hunts over pinyon-juniper, montane conifer, and semi-desert shrubland habitats. | Possible                                      |
| Northern goshawk   | Occurs primarily in spruce/fir forests but also found in Douglas-fir, various pines, and aspens.   | Unlikely                                      |
| Peregrine Falcon   | Nests on high cliffs and hunts along rivers and lakes for waterfowl.   | Present on cliffs near Anvil Points           |
| Bald eagle   | Nests and roosts in mature cottonwood forests along rivers, large streams, and lakes.  | Present along Colorado River                  |
| Brewer's sparrow   | Nests in sagebrush shrublands and mountain parks, and more rarely in alpine willow stands.   | Possible                                      |
| Midget faded rattlesnake   | High, cold desert dominated by sagebrush and with an abundance of rock outcrops and exposed canyon walls.                                | Found in Kelly Gulch                          |
| Great Basin spadefoot  | Breeds in seasonal streams and pools in areas of pinyon-juniper, sagebrush, and salt-desert shrublands                                   | Unlikely                                      |
| Northern leopard frog  | Wet meadows and the shallows of marshes, ponds, and lakes and slow-flowing segments of perennial streams and irrigation ditches.         | Not Present                                   |
| Colorado River cutthroat trout   | Headwaters streams and ponds with cool, clear waters and no non-native cutthroat subspecies  | Not Present                                   |
| Flannelmouth sucker  | Generally restricted to rivers and major tributaries.  | Present in Colorado River                     |
| Bluehead sucker  | Found in smaller streams with a rock substrate and mid to fast flowing waters. Also reported to occur in Colorado River.                 | Present in Colorado River                     |
| Roundtail chub   | Roundtail Chub generally restricted to rivers and major tributaries.   | Present in Parachute Creek and Colorado River |

## Environmental Consequences

### *Proposed Action*

For the sensitive species listed in Table 11, the minor amount of direct or indirect loss of suitable habitat, the transient nature of their potential use of the area, and the brief period of construction-related activities in any given part of the project area combine to result in negligible potential for adverse impacts. The bases for this determination are summarized below. Note that another BLM sensitive species present in the CRVFO, the Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*), is not addressed here because it does not occur in streams potentially affected by the project, including the Colorado River (the species is limited to cold, clean streams that are isolated from areas where non-native cutthroats have been stocked for recreation).

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. Loss of habitat above which the bats could search for aerial prey would also be minimal, and disturbance due to construction activities would not occur at night when the bats are feeding.

Northern Goshawk. This species (*Accipiter gentilis*) 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.).

Peregrine Falcon. Peregrine falcons nest along the Roan Cliffs in the vicinity of Anvil Points and hunt for waterfowl along the Colorado River or other birds across open terrain. The cliffs north of the project area are not known to contain nests of this species, and the presence of golden eagles on the nearby cliffs and the availability of abundant nest sites near Anvil Points make use of the project area very unlikely, except for infrequent, transitory overflights while traveling between the Colorado River and Roan Cliffs.

Bald Eagle. Although bald eagles nest and roost along the Colorado River just southeast of the project area, the potential for use of the actual project area is moderate. Any such use would most likely be by an individual hunting across large expanses of open upland habitats during winter. The project area would represent a small portion of such potential winter hunting habitat, and the reclaimed grass-forb community would provide better habitat for prey than the current shrubland types.

Brewer's Sparrow. Although the Brewer's sparrow was confirmed in the project area (WWE 2011), the 60-day TL to prohibit removal of vegetation during the period May 15 to July 15 (see Appendix A) would avoid or minimize the potential for impacts to nesting Brewer's sparrows. Construction activities outside this period could cause individuals to avoid the disturbance while feeding. However, this impact would be limited in duration at any point along the corridor, and individuals are expected to feed across very large home ranges outside the nesting season, thus minimizing the severity of this potential indirect impact.

Midget Faded Rattlesnake. This small viper, *Crotalus viridis concolor*, is generally considered a small, pale-colored subspecies of the common and widespread western (prairie) rattlesnake, although some authorities consider it and another western subspecies, the Great Basin rattlesnake (*C.v. nuntius*) to be genetically distinct. Although movement patterns of midget faded rattlesnakes are not well known, they are believed to be limited to a few hundred meters from den sites. The limited distribution and small home range make this snake susceptible to impacts from human disturbance (USGS 2007). Threats include direct mortality from vehicles traveling on roads and pads, off-highway vehicle use throughout the landscape, capture by collectors, and livestock grazing. As access increases into previously undeveloped areas, the risk of encounters with humans will increase, resulting in some cases of mortality or collection. During the recent wildlife surveys, one midget-faded rattlesnake was observed in the bottom of Kelly Gulch late in the day (WestWater 2011).

Great Basin Spadefoot. In Colorado, this species (*Spea intermontana*) inhabits pinyon-juniper woodlands, sagebrush, and semi-desert shrublands. It ranges from the bottoms of rocky canyons to broad dry basins and stream floodplains (CDPW 2006). Great Basin spadefoots prefer sagebrush communities below 6,000 feet in elevation, although they have been found at elevations of 9,200 feet. Habitat types required for their survival include overwintering burrow sites, temporary breeding ponds and foraging areas, and safe passages between these areas. Potentially suitable habitat in the project area occurs along Kelly Gulch.

Flannelmouth Sucker, Bluehead Sucker, and Roundtail Chub. As with the ecologically similar Colorado River endangered fishes described above, the flannelmouth sucker (*Catostomus discobolus*) and roundtail chub (*Gila robusta*) are adapted to naturally high sediment loads and therefore would not be affected by increased sediment transport to the Colorado River. Furthermore, protective COAs for water quality would minimize this potential (Appendix A). However, these species are vulnerable to alterations in flow regimes in the Colorado River (including evaporative losses from dams and depletions from withdrawal of water for irrigation or municipal water supplies) that affect the presence of sandbars and seasonally flooded overbank areas needed for reproduction.

#### *No Action Alternative*

Under the No Action Alternative, the Federal wells proposed and described in the Proposed Action would be denied. Thus, no disturbance would occur as a result of the project.

### **Vegetation**

#### Affected Environment

Vegetation in the project area is characterized by open sagebrush-greasewood shrublands and bunch grass grasslands with scattered junipers. Vegetation consists of salt desert shrub including shadscale (*Atriplex confertifolia*) and fourwing saltbush (*Atriplex canescens*), Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), Indian ricegrass (*Achnatherum hymenoides*), Galleta grass (*Pleuraphis jamesii*), and Utah juniper (*Juniperus osteosperma*). Most of the vegetation described above surrounds the existing pad. Crested wheatgrass (*Agropyron cristatum*), a widely introduced non-native pasture grass, is common within and outside the reclaimed area of the pad.

#### Environmental Consequences

##### *Proposed Action*

Construction of the pad and access road would result in both direct and indirect effects on vegetation. Direct effects would include short and long-term loss of vegetation and long-term modification of community structure and composition. Indirect effects could include increased potential for noxious weed invasion, increased soil erosion and sedimentation, reduced wildlife habitat quantity or quality, and changes in fire regime.

The Proposed Action would result in the short-term loss of approximately less than 0.01 acre of vegetation on BLM land and 4.5 acres on private land, of which 1.2 acres would remain unreclaimed during the life of the wells. With implementation of standard COAs (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 vegetation would remain in an early seral stage for the life of the wells.

Although vegetation would regenerate over time, this process could take several decades, depending on the growth and persistence of seeded species and the intensity of grazing by livestock or wildlife. This would result in an increase in the proportion of herbaceous (i.e., non-woody) species in the areas of disturbance. The success or failure of revegetation would affect other resources including soils, surface water quality, wildlife, visual resources, and livestock grazing.

##### *No Action Alternative*

No new surface disturbance on private or public land would occur under the No Action Alternative, thus eliminating impacts to vegetation.

## **Visual Resources**

### **Affected Environment**

The Proposed Action would take place on private land along the toe of the southeast-facing slope of the Mount Callahan foothills approximately 1 mile southwest of Parachute, Colorado. Less than 0.01 acre will occur on land administered by the BLM. This area is classified as Visual Resource Management (VRM) Class III, as identified by the 1984 Glenwood Springs Resource Management Plan. The objectives for VRM Class III, as defined by the BLM's Manual H-8410-1 – Visual Resource Inventory (BLM 1986) is described below.

- The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

The Proposed Action that occurs on private land, federal lease terms regarding visual concerns are not applicable. Visual resource management objectives do not apply to non-BLM lands; visual values for those lands are only protected by landowner discretion.

The project area consists of finger-like ridges extending south and east from Mount Callahan. The area is characteristic of light industrial and oil and gas development. The Proposed Action will occur on a southeast-facing aspect of one of these ridges. Mount Callahan, directly northwest of the project area, is one the dominant topographic features to the project area and adjacent communities along the I-70 corridor including Parachute. Vegetation consists of open sagebrush-greasewood shrublands and bunch grass grasslands intermixed with scattered patches of Juniper.

The proposed GV 18-23 pad would occur entirely on private land with the exception of less than 0.01 acre of disturbance occurring on BLM land (Figure 8).

The visual resource analysis area includes the I-70 and Highway 6 and 24-travel corridor. This viewshed is important, as it is viewed by people who live, work and recreate in the area. The Proposed Action would be located in the viewer's foreground/middle ground, within 5 miles from I-70 and Highway 6 and 24. BLM guidance states that lands with high visual sensitivity are those within five miles of a primary travel corridor and of moderate to very high visual exposure, where details of vegetation and landform are readily discernible and changes in visual contrast can be easily noticed by the casual observer.

The visual impact analysis for this project is based on the view from 1 Key Observation Point (KOP) representing 2 linear viewer locations, I-70, and Highway 6 and 24.

KOP 1 (Figure 9) is located on Highway 6 and 24, representing the viewing angle and direction with the highest frequency of viewers. The viewer would look directly at the Proposed Action while traveling east or west along I-70 and Highway 6 and 24. The foreground consists of open sagebrush-greasewood shrublands and bunch grass grasslands with scattered juniper. The background is dominated by Mt. Callahan, the lower flanks of which are visible in Figure 9 .

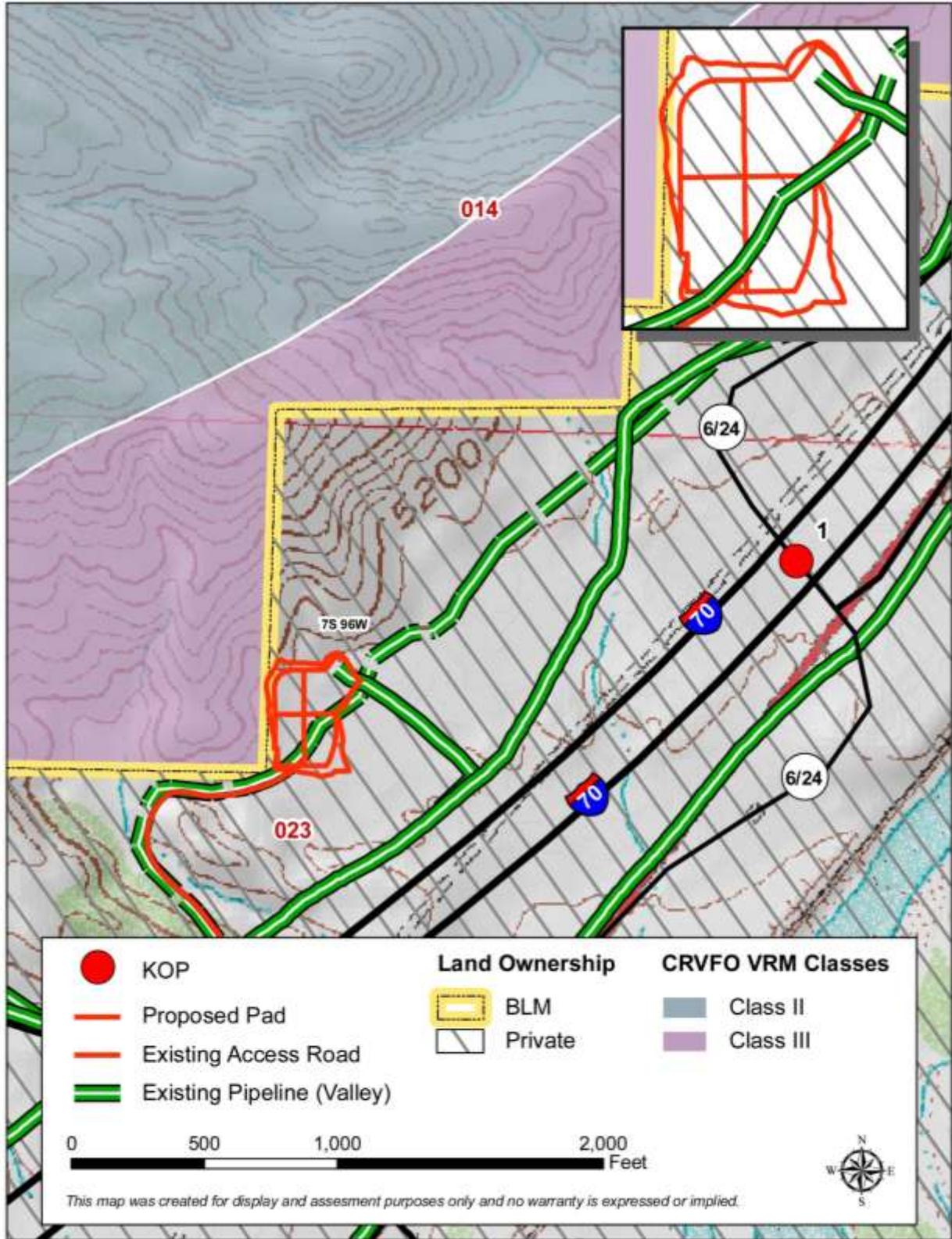
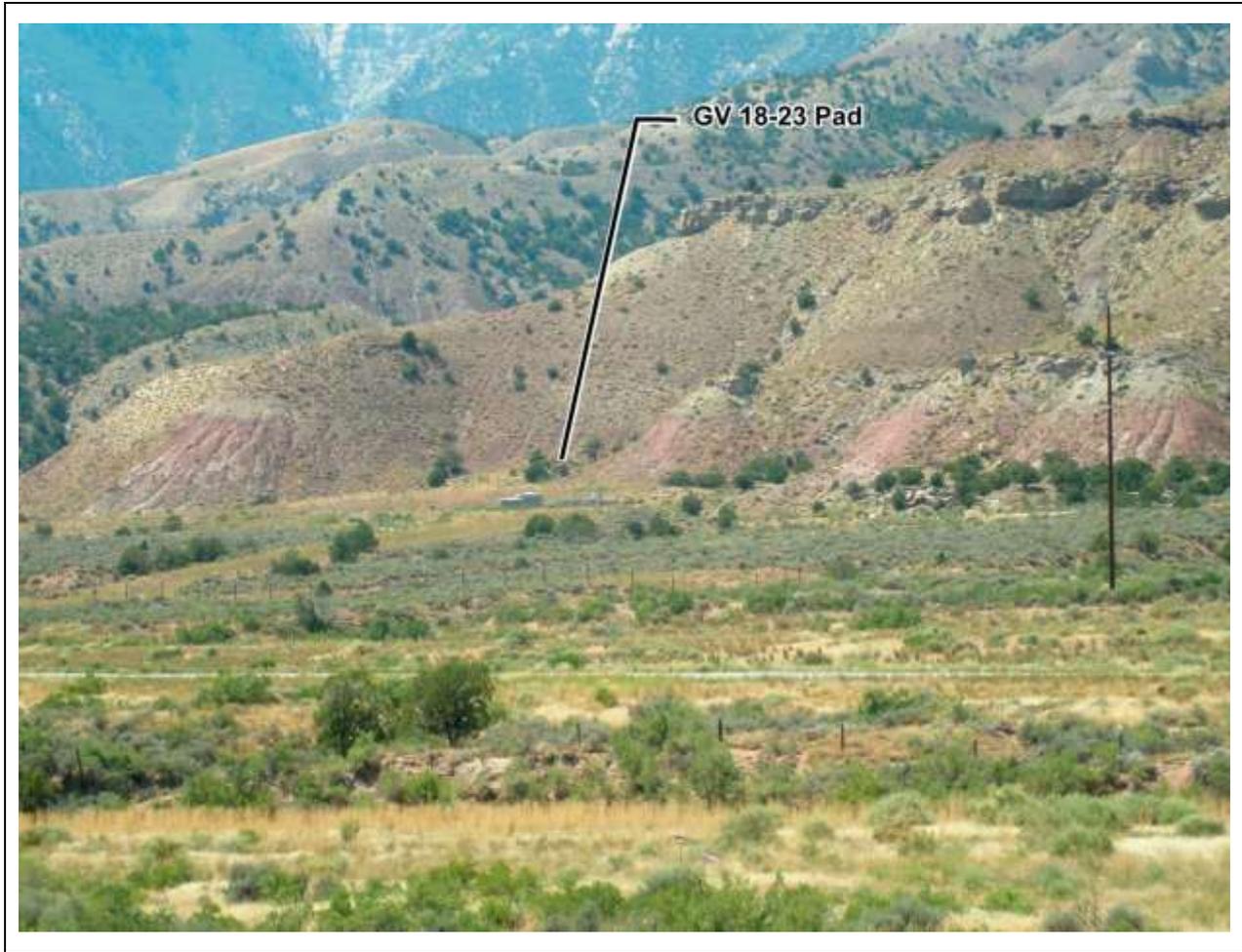


Figure 8. Proposed Action Relationship to Visual Resource Management (VRM) Classes.



**Figure 9. KOP 1**

Environmental Consequences

*Proposed Action*

The planning process involved two site visits to review the Proposed Action. The Proposed Action would create visual contrast within the immediate landscape by removing the existing vegetation, exposing bare ground, and creating a series of distinct lines and colors within the landscape. Such visual changes would be most evident during construction and completion activities. Once the wells are put into production and the pad is recontoured and vegetation is reestablished, the overall visual contrast and texture of the site would be expected to blend with the surroundings. Short-term visual impacts would include light pollution, dust, and increased traffic from construction, drilling and completion activities. Such impacts should be adequately mitigated by proper utilization of the standard COAs.

Less than .01 acre of the short-term surface disturbance related to the Proposed Action will be on BLM land. The total short-term disturbance would amount to approximately 4.5 acres (pad total surface disturbance and access road surface disturbance) with long-term disturbance after interim reclamation amounting to approximately 1 to 2 acres. The level of change to the characteristic landscape on BLM land would be low, would not attract attention, and would therefore meet VRM Class III.

### *No Action Alternative*

Under the No Action Alternative, none of the components of the Proposed Action would be approved. The existing visual environment would remain in its current condition, with no new or additional impacts to scenic quality or visual resources. However, the visual impacts associated with production activities and traffic related to the existing four GV 18-23 wells would continue for the producing life of the wells.

## **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 NEPA 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 (BLM 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 contamination are as follows:

- The Oil Pollution Act (Public Law 101-380, August 18, 1990) prohibits discharge of pollutants into waters of the US, 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 would include those associated with well production and transmission of natural gas, 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 during construction or operation of the facilities. None of the chemicals expected to be used meets 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 limited extent, during project operations. These would be removed to a landfill or water treatment facility as needed, and all would be removed prior to interim reclamation. Surface water or groundwater could be impacted under the Proposed Action. Pollutants potentially released as a result of accidents 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 potential hazardous or solid waste issues.

### *No Action Alternative*

Under this alternative, the components of the Proposed Action would not be approved or implemented. Therefore, no project-related increases in impacts from hazardous or solid wastes are expected.

## Water Quality, Surface and Ground

### *Surface Water*

#### Affected Environment

The proposed activities for GV18-23 would occur within the Colorado River below Rifle Creek 6<sup>th</sup> code hydrologic unit which empties directly into the Colorado River approximately ¼ mile to the south of the project. According to the *Stream Classifications and Water Quality Standards* (CDPHE, Water Quality Control Commission [WQCC] Regulation No. 37) (CDPHE 2007), unnamed ephemeral drainages that drain most of the project vicinity are within segment 4a, which includes tributaries to the Colorado River from its confluence with the Roaring Fork River to a point immediately below its confluence with Parachute Creek. Following is a brief description of segment 4a.

- Segment 4a – This segment has been classified aquatic life cold 2, recreation N, water supply, 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 N refers to waters that are not suitable or intended to become suitable for primary contact recreation. This segment is suitable or intended to become suitable for potable water supplies and agricultural purposes that include irrigation and livestock use.

| <i>Parameter</i>                        | <i>Colorado River below Rulison CO,<br/>USGS Site #09092570<br/>01/18/1978</i> | <i>Colorado River below Rulison CO,<br/>USGS Site #09092570<br/>4/8/1977</i> |
|---|--|--|
| Instantaneous discharge (cfs)           | 1,500  | 1,560  |
| Temperature, water (°C)                 | 2.5  | 11   |
| Field pH (standard units)               | 7.9  | 8.1  |
| Specific conductance (µS/cm/cm at 25°C) | 1,320  | 1,200  |
| Total Dissolved Solids (mg/L)           | 756  | 733  |
| Hardness as CaCO <sub>3</sub> (mg/L)    | 280  | 250  |
| Chloride (mg/L)                         | 230  | 230  |
| Selenium (µg/L)                         | 2  | 1  |
| Dissolved oxygen (mg/L)                 | 11.2   | 10   |

Note: NA = data not available  
Source: USGS 2007

No sediment measuring stations are present on the Colorado River or its tributaries near the pad location. The closest downstream station on the Colorado River is near DeBeque, Colorado. A summary of USGS data collected at this station indicates that the mean sediment load was 1,817 tons per day during the period of 1974 to 1976. The maximum and minimum for this location during the same period was 41,300 and 8 tons/day respectively (USGS 2007).

#### Environmental Consequences

##### *Proposed Action*

The Proposed Action would result in 2 acres of surface disturbance. Potential impacts to surface water associated with the Proposed Action occur from surface-disturbing activities, traffic, waste management, and the use, storage and transportation of fluids (i.e., chemicals, condensate, and produced water). Surface-disturbing activities associated with well and facility pads, roads, and pipelines cause loss of

vegetation cover, soil compaction and displacement, increased volume and velocity of runoff, and increased sedimentation and salinity in surface waters. Initially impacts can be minimized by stormwater management, stockpiling topsoil, controlling erosion, rehabilitation of disturbed surfaces quickly. Long term soil protection could be achieved by continued road and pad maintenance to reduce erosion, remediation of contaminated soils and minimizing the size of the long-term pad footprint through interim reclamation measures. As proposed, these measures would include limiting cut slope steepness, step-cutting, crowning road surfaces, installing culverts and drainage systems, and applying gravel to all upgraded BLM roads in the project area to a compacted thickness of 6 inches (Appendix A).

Oil and gas waste management practices have the potential to contaminate soils and surface water. Contamination of soils could cause long-term reduction in site productivity resulting in increased erosion and potential sediment and contaminant delivery to nearby waterways during runoff. Use, storage, and transportation of fluids such as produced water, hydraulic fracturing fluids, and condensate have the possibility of spills that could migrate to surface or groundwater. Additionally, tanks used to store produced water and condensate would be placed in secondary containment to prevent offsite release. 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 against the cutslope on the pad. A traditional reserve pit would not be constructed.

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 management areas must be decontaminated to COGCC standards prior to pit closure.

Implementation of the standard COAs for mitigating impacts to surface waters (Appendix A) would minimize risks of adverse impacts associated with construction and ongoing production activities.

#### *No Action Alternative*

The No Action alternative would constitute denial of the federal wells as proposed. Fee wells drilled under the authority of the COGCC would result in the same potential for impacts to surface waters as described above for the Proposed Action.

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

##### Affected Environment

Waters of the U.S. located in the project vicinity include the ephemeral drainages to the Colorado River. Section 404 of the Clean Water Act requires a Department of the Army permit from the U.S. Army Corps of Engineers (USACE) prior to discharging dredged or fill material into waters of the U.S. 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, while smaller discharges may be granted a nationwide permit (NWP).

##### Environmental Consequences

###### *Proposed Action*

No new crossings of waters of the U.S. are included in the Proposed Action, nor is pad expansion of access road upgrade proposed that could discharge fill into Waters of the U.S.

Based on the estimated impacts to waters of the U.S., any upgrades to the road and pipeline crossings of drainages within the GV18-23 would be authorized by the USACE. A COA listed in Appendix B required that the operator obtain a formal jurisdictional determination by USACE prior to any construction that could affect Waters of the U.S., and 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 0.25 miles to the South. However, standard and site-specific surface-use COAs listed in Appendix A would be implemented to protect the Colorado River potentially impacted by long-distance stormflow transport.

#### *No Action Alternative*

The No Action alternative would constitute denial of the federal wells as proposed. However, Fee wells drilled under the authority of the COGCC would result in the same potential for impacts to waters of the U.S. as described above for the Proposed Action.

### ***Groundwater***

#### Affected Environment

The Lower Piceance Basin contains both alluvial and bedrock aquifers (Colorado Geological Survey 2003). Unconsolidated alluvial aquifers are the most productive aquifers in the region (EPA 2004) and are defined as narrow, thin deposits of sand and gravel formed primarily along stream courses, in this case, along the Colorado River and its tributaries. Alluvial well depths are generally less than 200 feet and water levels typically range between 100 to 150 feet. Well yield is dependent upon the intended use of the well, well construction design, sediment type and saturated thickness. Domestic use wells are limited to 15 gallons per minute (gpm) administratively, while municipal wells are designed and constructed for maximum potential yield.

The principal bedrock aquifers of the Piceance Basin are the Uinta Formation and the Parachute Creek Member of the Green River Formation, are defined as the upper and lower Piceance Basin aquifer systems. The Uinta Formation consists of discontinuous layers of sandstone, siltstone, and marlstone and is less permeable than the hydrologically connected upper Parachute Creek Member (Robson and Saulnier 1981). The upper most Uinta Formation also contains a shallow, perched aquifer that is separate from the upper aquifer unit (Cole et al. 1995). The upper Piceance Basin aquifer is underlain by the Mahogany confining unit, and correlates with the Mahogany Zone, the principal oil shale unit of the Piceance Basin. The Mahogany Zone separates the upper aquifer from the lower. The lower aquifer consists of the fractured marlstone of the lower part of the Parachute Creek Member. The thickness of the upper and lower aquifer units average 700 and 900 feet, respectively (CGS 2003). Both the upper and lower aquifer systems are found within the surrounding cliffs of the project area, but no water wells are completed within either the upper or lower bedrock aquifers units as described above. Beneath these two aquifer systems is a confining unit which consists of the lower two members of the Green River Formation, and the Wasatch Formation. Although considered a confining unit, some fresh water wells are completed in the discontinuous water bearing sands of the Wasatch Formation, but these water bearing intervals are considered to be localized.

Below the Wasatch Formation is the Cretaceous aged Mesaverde aquifer. The depth to the top of this aquifer beneath the project area is more than 5,000 feet below ground surface (bgs), far too deep for economic development. The Mesaverde aquifer is of regional importance, but does not provide recharge into the fresh water system within the shallower groundwater system of the project area.

Water quality of the upper Piceance Basin aquifer unit is relatively good, ranging in Total Dissolved Solid (TDS) levels from 500 to 1,000 milligrams per liter (mg/L). In the lower unit, TDS concentrations increase from 1,000 to 10,000 mg/L along basin flow paths. Waters with TDS values in excess of 1,000 mg/L are generally unsuitable for potable supply. Water suitable for drinking has a Federal secondary standard set at 500 mg/L or less (EPA 2006). The quality of the water in the Mesaverde aquifer is highly variable, with concentrations of dissolved solids ranging from less than 1,000 milligrams per liter in many of the basin-margin areas to more than 10,000 milligrams per liter in the central part of the Piceance Basin (EPA 2004). In general, areas of the aquifer that are recharged by infiltration from precipitation or surface water sources contain relatively fresh water. However, water quality in the Piceance Basin is generally poor overall due to the presence of nahcolite deposits and salt beds found throughout the basin. Only very shallow waters such as those from the surficial Wasatch Formation are used for drinking water (Graham 2001, cited in EPA 2004).

One permitted domestic water well is located within a 0.5-mile radius of the proposed project area. The well is located approximately 2,500 feet southeast of the GV 18-23 pad; it is reported as having a depth of 10 feet, a static water level of 6 feet and a discharge rate of 23 gpm. Numerous water wells are located to the east and south in sections 24 and 26. These wells range in depth from 43 to 160 feet bgs (below ground surface, have a static water level between 5 and 85 feet bgs and an average discharge rate of 15 gpm.

### Environmental Consequences

#### *Proposed Action*

Potential impacts to groundwater resources from the proposed development would include contamination of the groundwater with produced water, drilling mud, and petroleum constituents. Hydraulic fracturing (fracing) would be incorporated to create additional pathways to facilitate gas production. Agents called “proppants” used to prop open the fractures are mixed with both fresh water and produced water. Typical proppants include sand, aluminum, glass, or plastic beads, with less than 1% of other compounds such as corrosion-, friction-, and scale-inhibitors (EnerMax Inc. 2007). Fracing techniques are used to create secondary porosity fractures, held open by proppants, allowing the otherwise trapped gas to migrate up the borehole for production. Hydrofracturing would be conducted at 5,000 feet or more below ground surface (bgs). Drilling scenarios are developed to prevent fluids and produced hydrocarbons from migrating upward into fresh water zones. Geologic and engineering reviews are conducted to ensure that the cementing and casing programs are adequate to protect all downhole resources. The use of construction practices, drilling practices, and BMPs required by the BLM (see Downhole COAs in Appendix A) is expected to result in no significant adverse impact to groundwater aquifers.

#### *No Action Alternative*

The Proposed Action involves Fee surface with directional 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. The No Action Alternative constitutes denial of the APD associated with the Proposed Action. Under the No Action Alternative, the Federal wells proposed and described in the Proposed Action would not be drilled.

## **Wildlife, Aquatic**

### Affected Environment

The Proposed Action would occur in an area of highly dissected terrain containing a number of ephemeral drainages. Due to the short stream lengths and small watersheds of ephemeral streams potentially affected by the Proposed Action, fish species are not expected to occur. Aquatic macroinvertebrates most likely to occur include water striders, water boatmen, predaceous diving beetles, and the aquatic larvae of caddisflies, true flies, biting midges, and mosquitoes. Amphibians present, if any, would probably be limited to spadefoots and true toads, which are adapted to seasonal flow regimes in arid environments.

### Environmental Consequences

#### *Proposed Action*

Implementation of the Proposed Action could result in increases in erosion and sedimentation into nearby drainages and eventually the Colorado River. Because the Proposed Action includes summer use of the project areas, it is likely that roads and pads would not be muddy for extended periods of time. Roads are generally drier and in better condition during the non-winter months and consequently are less prone to erosion. Vehicular use during muddy road conditions could contribute to increased erosion of sediments into nearby ephemeral washes and eventually the Colorado River. The potential increase of sedimentation into the Colorado River would likely be nominal given background sediment loads currently carried by the river. Sediment-intolerant aquatic wildlife could be negatively affected, as increased erosion potential would persist and impair water and habitat quality. Measures to minimize erosion and sedimentation of aquatic environments are included among the COAs (Appendix A).

#### *No Action Alternative*

Under the No Action Alternative, the Federal wells proposed and described in the Proposed Action would be denied. Thus, no disturbance would occur as a result of the project.

## **Wildlife, Terrestrial**

### Affected Environment

The project area would be located in sparse to medium density juniper woodlands with openings of sagebrush, saltbush, and greasewood. Understory vegetation consists of mostly native grasses and forbs with some cheatgrass. Given these vegetation types, the area provides cover, forage, breeding, and nesting habitat for a variety of big game and small game species as well as nongame mammals, birds, and reptiles.

#### *Mammals*

The project area is within overall ranges of mule deer (*Odocoileus hemionus*) and Rocky Mountain elk (*Cervus elaphus nelsonii*). Because of its low elevation and generally south-facing aspect, the project area is primarily winter range, deer and elk populations increase during the winter months when animals migrate to lower elevations from Roan Plateau area to the north. Winter densities of big game animals in a given area are dependent on the type of habitat present and the severity of the winter. Deeper snows and colder temperatures result in increase in the number of big game animals using the area. The project area falls within CPW-mapped mule deer and elk overall and winter range. It is within a mule deer winter concentration area, and the lower portion immediately north of I-70 is mule deer severe winter range.

Severe winter range is the portion of overall winter range used primarily during the most severe winters in terms of temperatures and, especially, snow cover. Consequently, severe winter range is typically at the lower margins of overall winter range and often comprised of plant species that are not necessarily ideal as forage but remain available when higher quality winter range is covered with deep snow.

Large carnivores potentially present in the project vicinity include the mountain lion (*Felis concolor*), which moves seasonally with its preferred prey, the mule deer, and the black bear (*Ursus americanus*). Black bears are uncommon in the lowlands north of I-70 due to the scarcity of sufficient forest cover and suitable foods (including acorns and berries). Two smaller 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 raccoon (*Procyon lotor*), ringtail (*Bassariscus astutus*), striped skunk (*Mephitis mephitis*), spotted skunk (*Spilogale gracilis*), long-tailed weasel (*Mustela frenata*), and, along Garfield Creek, the mink (*Mustela vison*).

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

#### *Birds*

The Wild Turkey (*Meleagris gallopavo*) is native to North America and the largest member of the upland fowl. Wild turkeys are omnivorous, foraging on the ground or climbing shrubs and small trees to feed. They prefer hard mast such as acorns and pine nuts but also relish berries, seeds, and large insects. Wild turkeys may move from cover into open areas such as woodland clearings and the margins of grasslands and pastures dusk and dawn. This site is located approximately 1.4 miles south of the area mapped by the CPW as wild turkey overall range. Neither the pad nor the access route goes through the mapped area and therefore the proposed action will not impact the species.

See the sections on Migratory Birds and Special Status Species for discussions of other birds in the area.

#### *Reptiles and Amphibians*

The project area is within elevational range of most reptile species known to occur in Garfield County. Species most likely to occur include the collared lizard (*Crotaphytus collaris*), short-horned lizard, (*Phrynosoma hernandesi*), western fence lizard (*Sceloporus undulatus*), tree lizard (*Urosaurus ornatus*), and gopher snake (bullsnake) (*Pituophis catenifer*) in pinyon-juniper woodlands, sagebrush shrublands, or grassy clearings. Other reptiles potentially present along riparian areas are the milk snake (*Lampropeltis triangulum*), western terrestrial garter snake (*Thamnophis elegans*), and smooth green snake (*Opheodrys vernalis*). Two snake species were found during recent wildlife surveys. These observations consisted of one bull snake and one striped whipsnake (WestWater 2011).

In addition to a BLM sensitive species (the Great Basin spadefoot, see section on Special Status Species, amphibians potentially present in the project vicinity include Woodhouse's toad (*Bufo woodhousii*) and the western chorus frog (*Pseudacris triseriata*). Within the CRVFO area, Woodhouse's toad occurs primarily along ephemeral washes that do not support fish and contain persistent pools for at least a few

weeks in 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 Consequence

#### *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 4.5 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. Additional, indirect habitat loss may occur if increased human activity (e.g., traffic, noise) associated with infrastructure causes intolerant species to be displaced or alter their habitat use patterns. The extent of indirect habitat loss varies by species, the type and duration of the disturbance, and the amount of screening provided by vegetation and topography. In general, disturbance-related impacts are temporary, with patterns of distribution and habitat use returning to pre-disturbance conditions rather quickly when the disturbance stops.

#### *No Action Alternative*

Under the No Action Alternative, the Federal wells proposed and described in the Proposed Action would be denied. Thus, no disturbance would occur as a result of the project.

### **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**

Williams Production RMT Company LLC: April Mestas, Dan Collette, Kris Meil, Kent Rider

**INTERDISCIPLINARY TEAM REVIEW**

Members of the CRVFO Interagency Energy Team who participated in the impact analysis of the Proposed Action, development of appropriate mitigation measures, and preparation of this EA are listed in Table 12, along with their areas of responsibility.

| <b>Table 12. BLM Interdisciplinary Team Authors and Reviewers</b> |   |  |
|---|---|--|
| <i>Name</i>   | <i>Title</i>                            | <i>Areas of Participation</i>  |
| Julie McGrew  | Natural Resource Specialist             | Project Lead, Access and Transportation, Range Management, Recreation, Socio-Economics, Visual Resources |
| Allen Crockett  | Supervisory Natural Resource Specialist | NEPA Review  |
| Beth Brenneman  | Ecologist                               | Invasive Non-native Species, Special-status Species (Plants), Vegetation                                 |
| Sylvia Ringer   | Wildlife Biologist                      | Migratory Birds, Special-status Species (Animals), Wildlife, Aquatic and Terrestrial                     |
| John Brogan   | Archaeologist                           | Cultural Resources, Native American Religious Concerns   |
| Todd Sieber   | Geologist                               | Groundwater, Geology and Minerals  |
| Bob Hartman   | Petroleum Engineer                      | Downhole COAs  |
| Shauna Kocman   | Hydrologist                             | Soil, Air, Surface Water, U.S. Waters, Noise, Prime Farmland, Wetlands                                   |

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## **APPENDIX A**

### **Surface-Use and Downhole Conditions of Approval**

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**STANDARD SURFACE-USE CONDITIONS OF APPROVAL  
DOI-BLM-CO-N040-2011-0103-EA**

The following standard surface use COAs are in addition to all stipulations attached to the respective Federal leases and to any site-specific COAs for individual well pads.

1. Administrative Notification. The operator shall notify the BLM representative at least 48 hours prior to initiation of construction.
2. Road Construction and Maintenance. 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.
3. 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.
4. 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 (Travis Morse).

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.

5. 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 (Travis Morse). Copies of any printed or emailed approved USACE permits or verification letters shall be forwarded to the BLM.

6. Wetlands and Riparian Zones. The operator shall restore temporarily disturbed wetlands or riparian areas. The operator shall consult with the BLM Colorado River Valley Field Office to determine appropriate mitigation, including verification of native plant species to be used in restoration.
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 for the pad. Reclamation, including seeding, of temporarily disturbed areas along roads, pipelines, and topsoil piles and berms, shall be completed within 30 days following completion of construction.

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 number 19) 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 Attachments 1 and 2 of the letter provided to operators dated May 1, 2008). 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 reseeds 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. Big Game Winter Range Timing Limitation. The big game winter range timing limitation does not apply to fee pads drilling directionally into a federal lease not underlying the fee surface location.
10. 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 in the BLM Field Office (970-876-9051).

11. 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 Timing Limitation (TL) shall be applied to prohibit the initiation of construction, drilling, and completion activities for a Federal well during the period **May 1 to July 1**.
12. Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all vegetation removal or surface-disturbing activities are prohibited from **May 1 to July 1** to reduce impacts to Birds of Conservation Concern (BCC). An exception to this COA will be granted in any year during which nesting surveys conducted after May 1 indicate that no BCC species are nesting or otherwise present within 10 meters of the area to be disturbed. 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.
13. 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. Under the MBTA, “take” means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The operator shall prevent use by migratory birds of any pit containing fluids associated with oil or gas operations, including but not limited to reserve pits, produced water pits, frac-water pits, cuttings trenches (if covered by water/fluid), and evaporation pits. Fluids in these pits may pose a risk to migratory birds (e.g., waterfowl, shorebirds, wading birds, songbirds, and raptors) as a result of ingestion, absorption through the skin, or interference with buoyancy and temperature regulation. Regardless of the method used, it shall be in place within 24 hours following the placement of fluids into a pit. Because of high toxicity to birds, oil slicks and oil sheens should immediately be skimmed off the surface of any pit that is not netted. The most effective way to eliminate risk to migratory birds is prompt drainage, closure, and reclamation of pits, which is strongly encouraged. All mortality or injury to species protected by the MBTA shall be reported immediately to the BLM project lead and to the USFWS representative in the BLM Field Office at 970-876-9051 (Creed Clayton) and visit <http://www.fws.gov/mountain-prairie/contaminants/oilpits.htm>.
14. Range Management. Range improvements (fences, gates, reservoirs, pipelines, etc.) shall be avoided during development of natural gas resources to the maximum extent possible. If range improvements are damaged during exploration and development, the operator will be responsible for repairing or replacing the damaged range improvements. If a new or improved access road bisects an existing livestock fence, steel frame gate(s) or a cattle guard with associated bypass gate shall be installed across the roadway to control grazing livestock.
15. Ips Beetle. To avoid mortality of pinyon pines due to infestations of the *Ips* beetle, any pinyon trees damaged during road, pad, or pipeline construction shall be chipped after being severed from the stump or grubbed from the ground, buried in the toe of fill slopes (if feasible), or cut and removed from the site within 24 hours to a location approved by the Colorado State Forest Service.

16. Paleontological 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.

17. 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).

18. Visual Resources. Production facilities shall be placed as indicated on the plats attached to the APD, unless an alternative placement is approved by the BLM and shall be placed to maximize reshaping of cut-and-fill slopes and interim reclamation of the pad.

To the extent practicable, existing vegetation shall be preserved when clearing and grading for pads, roads, and pipelines. The BLM may direct that cleared trees and rocks be salvaged and redistributed over reshaped cut-and-fill slopes or along linear features.

Above-ground facilities shall be painted **Shadow Gray** to minimize contrast with adjacent vegetation or rock outcrops.

19. 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.

20. Reserve Pit. A minimum of 2 feet of freeboard shall be maintained in the reserve pit. Freeboard is measured from the highest level of drilling fluids and cuttings in the reserve pit to the lowest surface elevation of ground at the reserve pit perimeter.

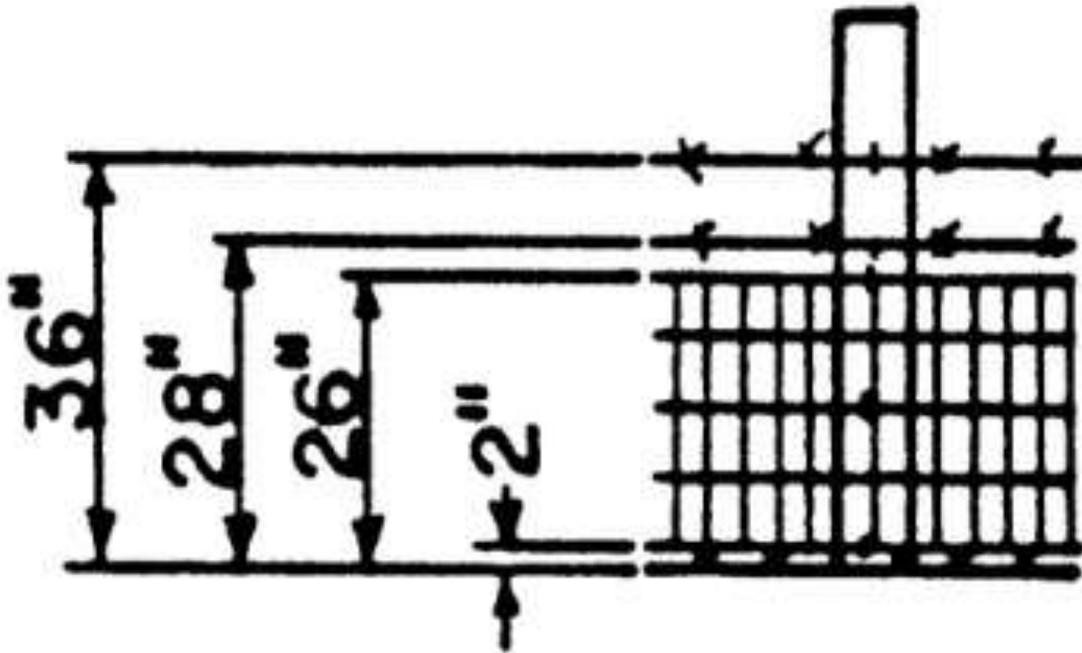
21. Soils. Cuts and fills shall be minimized when working on erosive soils and slopes in excess of 30%. Cut-and-fill slopes shall be stabilized through revegetation practices with an approved seed mix shortly following construction activities to minimize the potential for slope failures and excessive erosion. Fill slopes adjacent to drainages shall be protected with well-anchored silt fences, straw wattles, or other acceptable BMPs designed to minimize the potential for sediment transport. On slopes greater than 50%, BLM personnel may request a professional geotechnical analysis prior to construction.

#### **SITE-SPECIFIC COAS FOR THE GV 18-23 WELL PAD**

The following site-specific surface use COAs are in addition to the standard COAs listed above and all relevant stipulations attached to the respective Federal leases.

1. Pre-Construction Meeting. A pre-construction onsite meeting shall be held **prior to pad construction**. Attendees will include the appropriate operator representatives, construction contractors, and BLM specialists including the natural resource specialist, hydrologist, and ecologist.

2. Pre-Interim Reclamation Meeting. An onsite meeting shall also be held **prior to interim reclamation of the pad**. Attendees will include the appropriate operators' representatives, construction contractors, and BLM specialists including the natural resource specialist, hydrologist, and ecologist.
3. BLM Cadastral Survey Marker. The corner section marker shall be clearly marked and protected from disturbance during construction.
4. Fencing. A fence shall be installed to exclude sheep but allow big game movement. The fence shall be installed around the perimeter of the area of disturbance for the pad prior to construction. A fence shall also be installed around the pipeline corridor and pipeline valves. Fence specifications are as follows: *Two wires, upper two wires barbed; wire spacing from ground up is 2 inches, 24 (woven) inches, 2 inches, and 8 inches; maximum height is 36 inches.*



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

**Company/Operator: Williams Production RMT Co.**

**Surface Location:** Section 23, Township 7 South, Range 96 West, 6<sup>th</sup> P.M; NENW

| <u>Well Name</u> | <u>Well No.</u> | <u>Pad No.</u> | <u>Bottomhole Location</u> | <u>Lease/Unit</u> |
|------------------|-----------------|----------------|----------------------------|-------------------|
| SG               | 11-23           | GV 18-23       | NWNW, Sec. 23, T7S, R96W   | COC49513/COC53525 |
| SG               | 311-23          | GV 18-23       | NWNW, Sec. 23, T7S, R96W   | COC49513/COC53525 |
| GM               | 314-14          | GV 18-23       | SWSW, Sec. 14, T7S, R96W   | COC27874          |
| GM               | 414-14          | GV 18-23       | SWSW, Sec. 14, T7S, R96W   | COC27874          |
| GM               | 514-14          | GV 18-23       | SWSW, Sec. 14, T7S, R96W   | COC27874          |
| GM               | 524-14          | GV 18-23       | SESW, Sec. 14, T7S, R96W   | COC27874          |

1. Twenty-four hours *prior* to (a) spudding, (b) conducting BOPE tests, (c) cementing/running casing strings, and (d) within twenty-four 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 Alan White, 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. Please contact Bob Hartman at 970-244-3041 or a CRVFO petroleum engineer at 970-876-9049 (office) or 970-319-5837 (cell) for verbal approvals.
3. If a well control issue (e.g. kick, blowout, water flow, casing failure, or bradenhead pressure increase) arises during drilling or completions operations, contact Bob Hartman at 970-244-3041 or a CRVFO petroleum engineer at 970-876-9049 (office) or 970-319-5837 (cell) within **24 hours** from the time of the event. IADC/Driller's Logs and Pason Logs (mud logs) will 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 #2 for a **5M** system and recorded in the IADC/Driller's log. A casing head rated to 5,000 psi or greater shall be utilized.
5. Flexible choke lines shall meet or exceed the API SPEC 16C requirements. Flexible choke lines shall be effectively anchored, have flanged connections, and configured to the manufacturer's specifications. Manufacturer specifications shall be kept with the drilling rig at all times and immediately supplied to the authorized officer/inspector upon request. Specifications, at a minimum, shall include acceptable bend radius, heat range, anchoring, and the working pressure. All flexible choke lines shall be free of gouges, deformation, and as straight/short as possible.
6. Prior to drilling out the surface casing shoe, an electrical/mechanical mud monitoring equipment shall be function tested. As a minimum, this equipment shall include a trip tank or equivalent calibrated mud tank, pit volume totalizer, stroke counter, and flow sensor.

7. 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 gain/loss.
8. Prior to drilling out the surface casing shoe, a gas buster shall be functional and all flare lines effectively anchored in place. 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 source. Where noncombustible gas is likely or expected to be vented, the system shall be provided supplemental fuel for ignition and maintain a continuous flare.
9. 916-1505 feet of Surface Casing will be required on these wells to protect potential water source/aquifers and control loss circulation zones.
10. After the surface/intermediate casing is cemented, a Pressure Integrity Test/Mud Equivalency Test/FIT will be performed on the first well drilled in accordance with OOGO No. 2; Sec. III, B.1. i. in order to make sure the surface casing is set in a competent formation. This is not a Leak-off Test, but a formation competency test, insuring the formation at the shoe is tested to the minimum mud weight equivalent anticipated to control the formation pressure to the next casing shoe depth or TD. Submit the results from the test via email ([whowell@blm.gov](mailto:whowell@blm.gov)) on the first well drilled on the pad and record results in the IADC log.
11. 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 will 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,. Please evaluate the top of cement on the first cement job on the pad (Temperature Log).
12. 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 Petroleum Engineer or to Todd Sieber, 2300 River Frontage Road, Silt, CO 81652. Please contact Todd Sieber at 970-876-9063 or [asieber@blm.gov](mailto:asieber@blm.gov) for clarification.
13. Submit the (a) mud/drilling log (e.g. Pason disc), (b) driller's event log/operations summary report, (c) directional survey, and (d) Pressure Integrity Test results within 30 days of cementing the production casing per 43 CRF 3160-9.
14. During hydraulic frac operations, monitor the bradenhead/casing head pressures throughout the frac job. Any sharp rise in annular pressure (+/- 40 psi or greater) will terminate the frac operations in order to determine well/wellbore integrity. Notify BLM CRVFO engineer/inspector of annular pressure increase.
15. 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, the CRVFO petroleum engineer 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 Form 3160-4, Well Completion Report.

16. Submit a monthly report of operations or production per 43 CFR 3162.4-3 including any production from these wells in MCFPD, BOPD, BWPD with FTP/SITP until the completion report (Form 3160-4) is filed.
17. Per CFR 3162.4-1(c), not later than the fifth business day after any well begins production on which royalty is due anywhere on a lease site or allocated to a lease site, or resumes production in a case of a well which has been off production for more than 90 days, the operator shall notify the authorized officer by letter or sundry notice, Form 3160-5, or orally to be followed by a letter or sundry notice, of the date on which such production has begun or resumed.

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**FONSI**  
**DOI-BLM-CO-040-2010-0103 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 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) submitted by Williams Production RMT Company LLC.

MITIGATION MEASURES: Mitigation measures presented in Appendix A will be incorporated as COAs attached to the APD for the Williams GV 18-23 well for both surface and drilling operations.

NAME OF PREPARER: Julie McGrew, Natural Resource Specialist

SIGNATURE OF AUTHORIZED OFFICIAL:



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Allen B. Crockett, Ph.D., J.D.  
Acting Associate Field Manager

DATE: Oct. 14, 2011