

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

ENVIRONMENTAL ASSESSMENT

NUMBER: DOI-BLM-CO-N040-2010-0058-EA

CASEFILE NUMBER: Federal Leases COC62162.

PROJECT NAME: Proposal to Drill 6 Wells from the Existing DOE 2-W-29 Pad and Drill 15 Wells from the Existing DOE 3-W-29 Pad on Public Lands in the West Cottonwood Gulch Area East of Parachute, Colorado.

PAD LOCATIONS

DOE 2-W-29 Pad: Township 6 South (T6S), Range 95 West (R95W), Section 29, SE¼NE, Sixth Principal Meridian.

DOE 3-W-29 Pad: T6S, R95W, Section 29, SE¼SW¼, Sixth P.M.

Proposed Well Pads and Wells

DOE 2-W-29	PA 21-29	PA 322-29
	PA 22-29	PA 422-29
	PA 321-29	PA 522-29

DOE 3-W-29	PA 12-29	PA 313-29	PA 412-29	PA 423-29	PA 514-29
	PA 13-29	PA 314-29	PA 413-29	PA 512-29	PA 523-29
	PA 312-29	PA 323-29	PA 414-29	PA 513-29	PA 614-29

APPLICANT: Williams Production RMT Company. Contact: Howard Harris, 1515 Arapaho Street, Tower 3, Suite 1000, Denver, CO 80202.

PROPOSED ACTION

Williams Production RMT Company (“Williams”) proposes to drill and develop 21 Federal oil and gas wells from two existing well pads to be slightly expanded (DOE 2-W-29 and DOE 3-W-29 pads). Currently, the DOE 2-W-29 pad supports 5 existing wells drilled in 2004; the DOE 3-W-29 pad has four producing wells with 2001 being the most recent drilling visit. The pads are located on public lands, although public access is not available to the sites as they cross private lands along the I-70 frontage road. The Federal wells would be directionally drilled from the expanded pads into Federal lease COC62162. Lease terms applicable to the wells are presented in the Lease Stipulations section. The pads are situated on separate south-facing ridges west of Cottonwood Gulch and are served by two distinct access roads and pipeline gathering systems. Both pads lie within the juniper woodlands vegetation community with associated shrubs and grasses in the understory. The pads are currently in a state of acceptable interim reclamation.

DOE 2-W-29 Pad Plans

The existing DOE 2-W-29 pad is located approximately 6 miles northeast of Parachute, Colorado, off the lower Cottonwood Gulch road system (Figure 1). The access road and buried gas pipeline serving this pad are adequate to serve the additional wells. A new 4-inch diameter water line would be buried along the existing road and/or gas pipeline corridor from the DOE 2-W-29 pad southeast to the existing private Cottonwood Tank Facility where the produced water from the new wells would be stored in tanks. The wells would be simultaneously drilled and completed using conventional drilling techniques. Drill cuttings from the six wells would be deposited in a 5,300-cubic-yard cuttings trench excavated along the north side of the pad. The completion work would occur on the pad with frac water storage tanks staged on the nearby DOE 1-M-29 pad. Separators would remain on the pad and staged at the northeast pad corner near the road entrance. During the onsite visit, it was determined that the separators would be located in their present location and the northeast pad corner would be left undisturbed north of the separators.

The planned surface disturbance for the DOE 2-W-29 pad (2.5 acres) would essentially remain within the bounds of the original pad disturbance boundary. The expected surface disturbance for the buried water line to the existing Cottonwood Tank Facility (15 feet wide for 9,900 feet in length) would total 3.4 acres, of which 1.3 acres (along 3,800 linear feet) would be on BLM land. The total short-term surface disturbance attributable to the DOE 2-W-29 wells would be 5.9 acres, with 3.8 acres on BLM land. Long-term, after the pad and pipelines are reclaimed, the disturbance would amount to 1.5 acres of reclaimed pad footprint on BLM (Table 1).

Table 1: Disturbance Area (acres)				
<i>Project Component</i>	<i>Federal Surface Disturbance</i>		<i>Total Surface Disturbance</i>	
	<i>Short-term</i>	<i>Long-term*</i>	<i>Short-term</i>	<i>Long-term*</i>
DOE 2-W-29 Pad	2.5	1.5	2.5	1.5
DOE 2-W-29 Pipeline	1.3	--	3.4	--
DOE 2-W-29 Subtotals	3.8	1.5	5.9	1.5
DOE 3-W-29 Pad	3.0	1.5	3.0	1.5
DOE 3-W-29 Road	1.0	0.5	1.0	0.5
DOE 3-W-29 Pipeline	1.1	--	1.7	--
DOE 3-W-29 Tank Pad	--	--	0.3	0.3
DOE 3-W-29 Subtotals	5.1	2.0	6.0	2.3
Project Totals	8.9	3.5	11.9	3.7
<p>*Long-term disturbance figures are derived from the unreclaimed working area of the pad and the travel way area of the access road. Since the entire disturbed pipeline corridor is typically reclaimed, no long-term disturbance is attributable to pipelines.</p>				

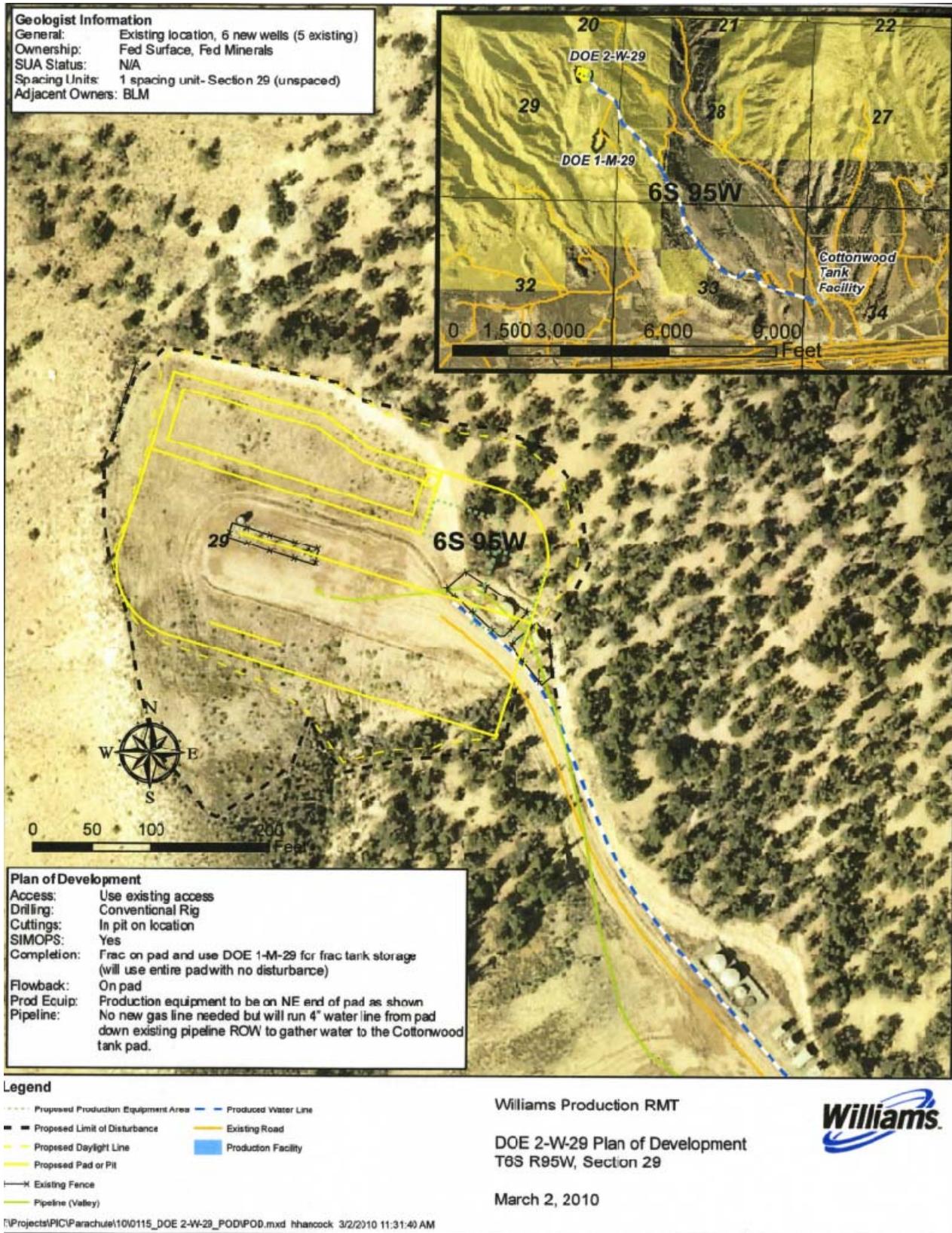


Figure 1. DOE 2-W-29 Project Location

DOE 3-W-29 Pad Plans

The DOE 3-W-29 pad is located about 4 miles northeast of Parachute at the end of a ridgetop road north of Williams's Jackrabbit Compressor Station. The pad, built by the U.S. Department of Energy (DOE), supports the original well (2-M-29), drilled in the 1990s, and three additional wells drilled in 2001 (Figures 2 and 3). After onsite discussions, the pad was built with a cutslope of 0.5:1 (horizontal:vertical) to minimize the amount of disturbance affecting the northern side of the pad. This cutslope has remained stable. Review of Figure 3 indicates relatively little increase in disturbance area, as the 0.5:1 daylight line remains within the original disturbance along all sides except the northern edge. The cuttings for the wells would be stored in a trench to be constructed at the western end of the pad (Figure 3). Topsoil and overburden from the trench excavation would be stacked off the western edge but within the existing limit of disturbance. Additional topsoil would be windrowed along the southern edge of the pad. With 15 wells being drilled, additional cuttings storage space would be available by stacking it on the PA34-29 pad. With the storage tanks being located down on the valley floor, only the wellheads and separators would remain on the pad during the wells' producing life. The planned pad disturbance would be 3.0 acres with the pad footprint being reclaimed down to 1.5 acres.

The pad access road would be realigned around the eastern and southern edges of the PA34-29 pad 0.25 mile southeast of the DOE 3-W-29 pad, as the existing 22% road grade up from the PA34-29 pad is excessive, unsafe, and difficult to maintain (Figure 4). The length of the road reconstruction would be approximately 900 feet with an average 50-foot disturbance width resulting in 1.03 acres of disturbance. The buried gas pipeline serving the four wells on the DOE 3-W-29 pad would be upgraded with a new 8-inch diameter steel pipeline to handle the expected gas production from the 15 wells. The new pipeline (4700 feet in length with a 15-foot wide disturbance corridor) would be buried alongside the existing access road although across the road from the original DOE 3-W-29 pipeline alignment. Of the 4,700 feet of new gas line, a total of 3,200 feet would be on BLM land. The buried gas pipeline presently serving the four producing wells on the pad would continue to convey natural gas.

A new 4-inch-diameter water line and two 2-inch diameter condensate lines would be buried in the same trench with the new gas pipeline from the DOE 3-W-29 pad southeast to a proposed tank facility on Exxon/Mobil property at the existing PA313-33 pad near the I-70 frontage road. These lines would be 5,000 feet in length and buried within the 15-foot wide pipeline corridor. The proposed tank site (60 feet by 200 feet) would be approximately 0.3 acre in size. The short-term disturbance for the ancillary facilities—road (1.03 acres), new pipelines (1.72 acres), and tank site (0.3 acre)—would be 3.05 acres (Table 1).

The 15 wells would be simultaneously drilled and completed using efficiency drilling techniques; drill cuttings would be deposited in a 3,800 cubic yard cuttings trench excavated along the west side of the pad. Additional cuttings storage space would be provided within the disturbed footprint of the existing PA34-29 pad nearby. The completion work would occur on the pad with water storage tanks staged on the PA34-29 pad. Separators would be staged at the northeast pad corner near the road entrance. During the onsite visit, it was determined that the existing vegetated fillslopes at the east side of the pad would remain undisturbed as the reclaimed vegetation from previous drilling visits is well established.

The total short-term surface disturbance for the DOE 3-W-29 pad and its ancillary facilities would include 6.05 acres. The long-term disturbance after pad and pipeline reclamation would be 2.3 acres based on the 900-foot road length with 25-foot travelway. Of these disturbance summaries, 5.1 acres of short-term disturbance and 2.0 acres of long-term disturbance would occur on public land.

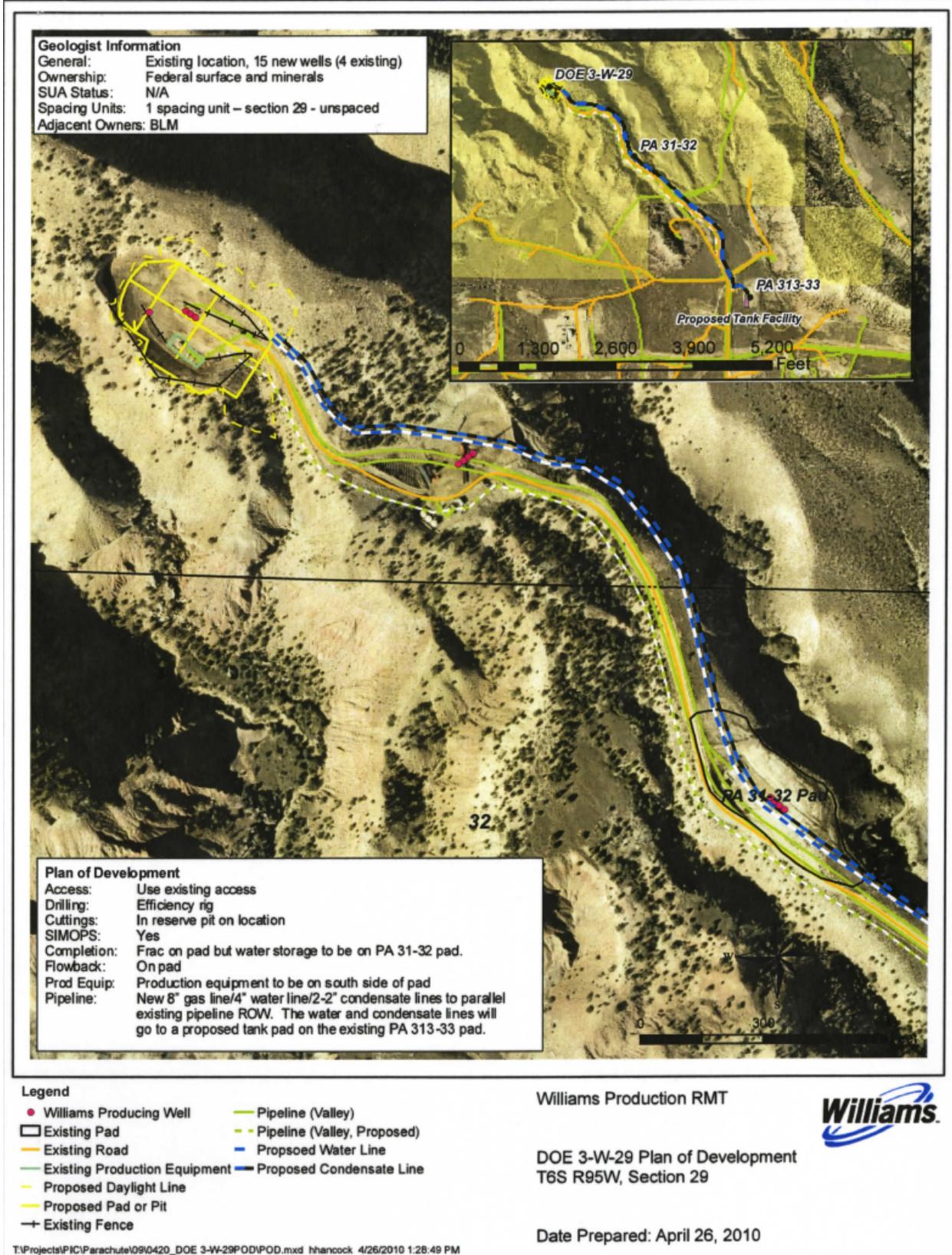


Figure 2. DOE 3-W-29 Project Location

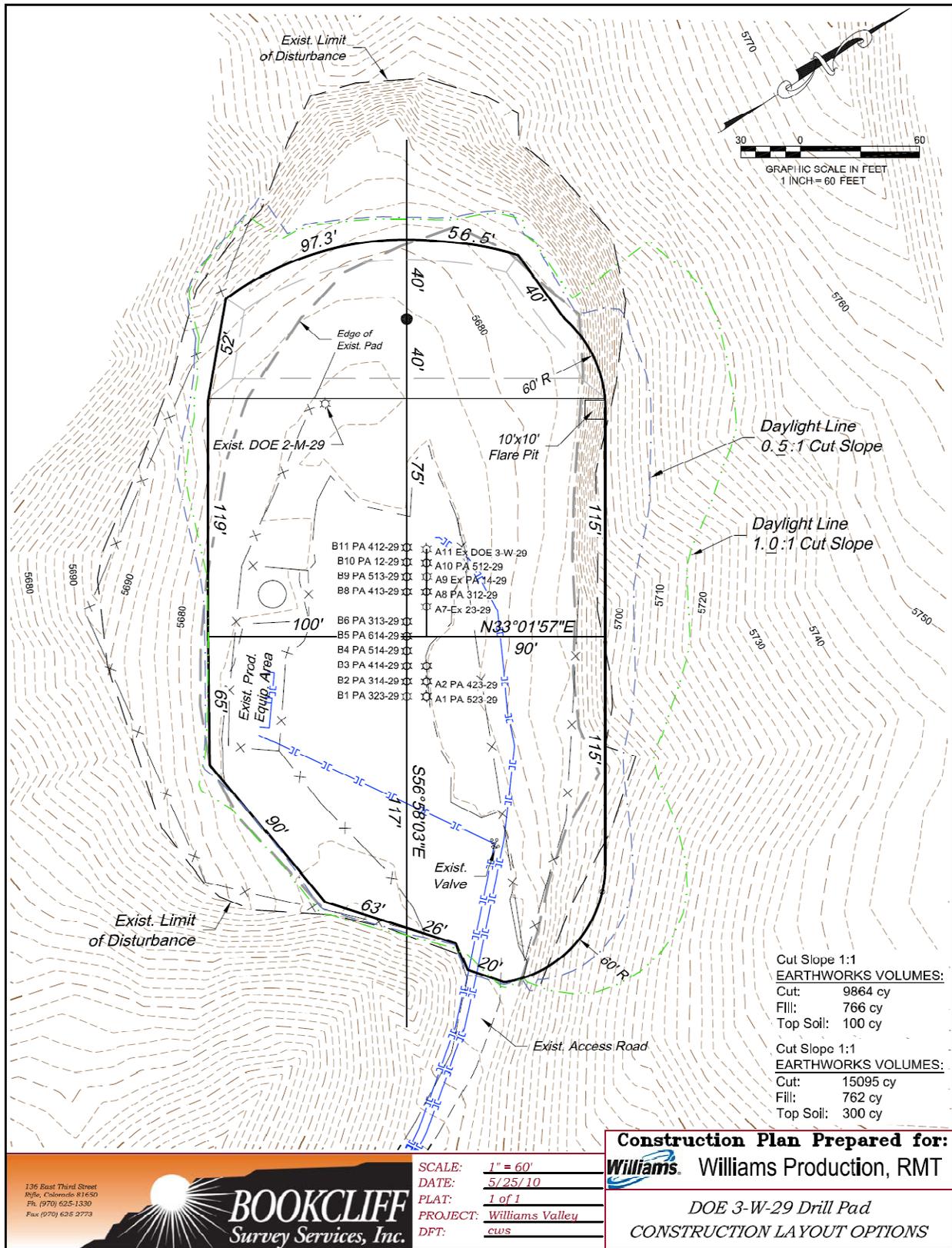


Figure 3. DOE 3-W-29 Pad Layout Options

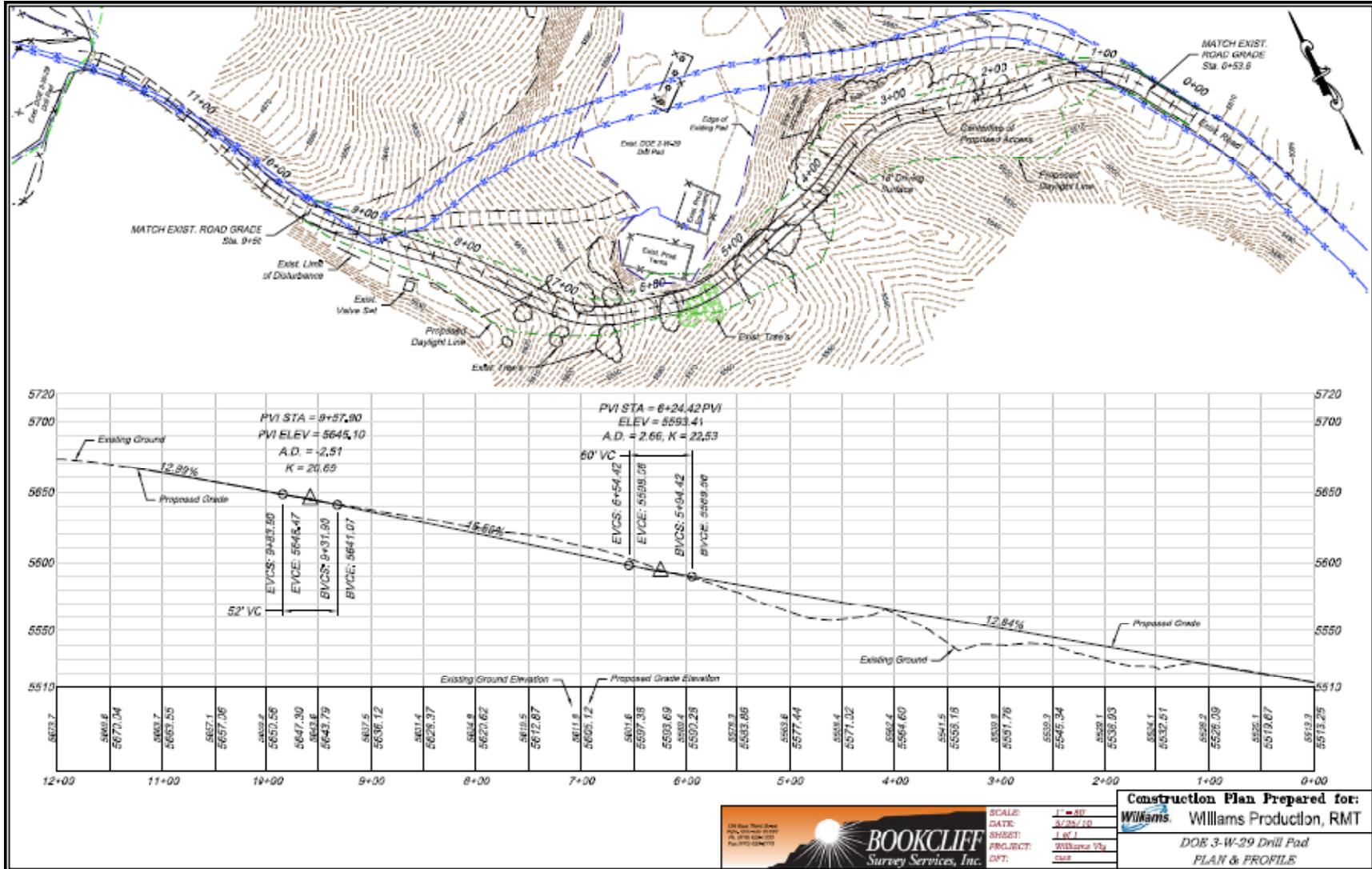


Figure 4. Proposed Road Realignment around the PA34-29 Pad

Surface Disturbance Summary

As shown in Table 1, the expected short-term disturbance of the two pads and their associated ancillary facilities would be 11.9 acres, with 8.9 acres occurring on public land. Long-term disturbance would be 1.5 acres on BLM land for the DOE 2-W-29 pad and 2.0 acres on BLM for the DOE 3-W-29 pad, in addition to new disturbance for access road realignment. The long-term disturbance estimates are based on interim reclamation of the pads and permanent reclamation of temporarily disturbed areas along the access road and pipelines.

The road, pipeline, and pad construction work would follow the guidelines established in the BLM Gold Book, *Surface Operating Standards for Oil and Gas Exploration and Development* (USDI and USDA 2006). A road maintenance program would be required during the production phase of the wells which includes, but is not limited to blading, ditching, culvert installation and cleanout, weed control, and gravel surfacing where excessive rutting or erosion may occur. Roads would be maintained in a safe and usable condition.

The Proposed Action would include drilling and completion operations, production of natural gas and associated liquid condensate, proper handling and disposal of produced water, and interim and final reclamation. The Proposed Action would be implemented consistent with Federal oil and gas lease, Federal regulations (43 CFR 3100), and the operational measures included in the Applications for Permit to Drill (APDs). Appendix A lists the specific Surface Use Conditions of Approval (COAs) that would be implemented as mitigation measures for this project. The operator would be responsible for continuous inspection and maintenance of the access road, pad and pipeline.

NO ACTION ALTERNATIVE

The No Action alternative constitutes denial of the 21 Federal APDs associated with the Proposed Action and any of the associated upgrades to the road and pipelines. The location of storage tanks on the valley floors and associated reduction in truck traffic related to the service of the ten producing wells would also be eliminated from consideration. The steep access road serving the DOE 3-W-29 pad would remain in its undesirable condition, creating access hassles for workover rigs and service trucks. Winching of larger vehicles to the site would continue.

No new surface disturbance would occur under the No Action alternative.

SUMMARY OF LEASE STIPULATIONS

The 21 Federal wells would be directionally drilled from the two BLM surface locations into the underlying Federal lease COC62162. The applicable Federal lease terms are presented in Table 2. Appendix A presents standard or site-specific COAs applicable to the Federal APDs.

LAND USE PLAN CONFORMANCE REVIEW

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

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

Table 2. Lease Stipulations Applicable to the Proposed Action		
<i>Lease Number</i>	<i>Description of Applicable Lands</i>	<i>Lease Stipulations</i>
<p>COC62162 (1999) <u>Proposed Pads</u> DOE 2-W-29 DOE 3-W-29</p>	<p>All lands within the Proposed Action</p>	<p>Controlled Surface Use: Visual Resource Management (VRM) Class II Areas – protection may include special design requirements, relocation of operations by more than 200 meters, and other measures to retain the overall landscape character.</p> <p>Controlled Surface Use: Erosive Soils and Slopes Greater than 30 % - to protect erosive soils and slopes greater than 30%, special design, construction and implementation measures will be required to limit the amount of surface disturbance, to reduce erosion potential, to maintain site stability and productivity, and to ensure successful reclamation.</p> <p>Timing Limitation: Big Game Winter Habitat (12/1 to 4/30). Exception may be granted under mild winter conditions for the last 60 days after consultation with CDOW.</p> <p>No Surface Occupancy: No surface use is allowed on steep slopes greater than 50% to maintain site stability and site productivity. This NSO does not apply to pipelines. Exception may be granted if lessee demonstrates that operations can be conducted without causing unacceptable impacts and that less restrictive measures will protect the public interest.</p> <p>No Surface Occupancy: To protect slopes over 30% with high visual sensitivity in the I-70 viewshed. Exceptions would be granted if protective measures can be designed to accomplish VRM Class II objectives, namely that the overall landscape character would be retained. Such measures would be designed to blend the disturbance in with the natural landscape.</p>

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

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

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. The environmental analysis must address whether impacts resulting from the Proposed Action or alternatives being analyzed would maintain, improve, or deteriorate land health conditions relative to these resources.

These analyses are conducted in relation to baseline conditions described in land health assessments (LHAs) completed by the BLM. The Proposed Action would be located in an area that was included in the Rifle West LHA (BLM 2005). These analyses are presented below.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section provides a description of the human and natural environmental resources that could be affected by the Proposed Action and No Action alternative. In addition, the section presents comparative analyses of the direct and indirect consequences on the affected environment stemming from the implementation of the various actions.

A variety of laws, regulations, and policy directives mandate the evaluation of the effects of a Proposed Action and alternative(s) on certain critical environmental elements. Not all of the critical elements that require inclusion in this EA are present, or if they are present, would be affected by the Proposed Action or No Action alternative (Table 3). Only mandatory critical elements that are present and affected are described in the following narrative. In addition to the mandatory critical elements are other resources and uses that would be impacted by the Proposed Action and alternative. These are presented under OTHER AFFECTED RESOURCES following the section below on CRITICAL ELEMENTS.

Table 3. Critical Elements of the Human Environment									
<i>Critical Element</i>	<i>Present</i>		<i>Affected</i>		<i>Critical Element</i>	<i>Present</i>		<i>Affected</i>	
	Yes	No	Yes	No		Yes	No	Yes	No
Air Quality	X		X		Prime or Unique Farmlands		X		X
Areas of Critical Environmental Concern		X		X	Special Status Species*	X		X	
Cultural Resources	X			X	Wastes, Hazardous or Solid	X		X	
Environmental Justice		X		X	Water Quality, Surface and Ground*	X		X	
Floodplains		X		X	Wetlands and Riparian Zones*		X		X
Invasive Non-native Species	X		X		Wild and Scenic Rivers		X		X
Migratory Birds	X		X		Wilderness and Wilderness Study Areas		X		X
Native American Religious Concerns		X		X					

* Public Land Health Standard

CRITICAL ELEMENTS

Air Quality

Affected Environment

Colorado Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) are health-based criteria for the maximum acceptable concentrations of air pollutants in areas of public use. Although specific air quality monitoring has not been conducted within the project area, regional air quality monitoring has been conducted in Rifle and elsewhere in Garfield County. Air pollutants measured in the region for which ambient air quality standards exist include carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter less than 10 microns (μ) in diameter (PM₁₀) and less than 2.5 μ in diameter (PM_{2.5}), and sulfur dioxide (SO₂).

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 the air quality classification of an area. Incremental increases in PSD Class I areas are strictly limited.

Air pollutants measured in the region for which ambient air quality standards exist include carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter less than 10 microns (μ) in diameter (PM₁₀) and less than 2.5 μ in diameter (PM_{2.5}), and sulfur dioxide (SO₂). Federal air quality regulations adopted and enforced by CDPHE limit incremental emissions increases to specific levels defined by the classification of air quality in an area. The Prevention of Significant Deterioration (PSD) Program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict.

The project area and surrounding areas are classified as PSD Class II. 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 SO₂ by CDPHE. Regional background pollutant concentrations and applicable standards or limits are listed in Table 4.

Environmental Consequences

Proposed Action

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. Therefore, 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.

Table 4. Air Pollutant Background Concentrations, Colorado and National Ambient Air Quality Standards, and Prevention of Significant Deterioration Increments.					
<i>Pollutant/Averaging Time</i>		<i>Measured Background</i>	<i>CAAQS and/or NAAQS</i>	<i>Incremental Increase Above Legal Baseline</i>	
Carbon Monoxide (CO) ¹	1-hour	1,160 µg/m ³	40,000 µg/m ³ (35 ppm)	n/a	n/a
	8-hour	1,160 µg/m ³	10,000 µg/m ³ (9 ppm)	n/a	n/a
Nitrogen Dioxide (NO ₂) ²	Annual Arithmetic Mean	10 µg/m ³	100 µg/m ³ (0.053 ppm)	2.5 µg/m ³	25 µg/m ³
Ozone ³	8-hour	0.076 ppm (highest)	0.075 ppm	n/a	n/a
Particulate Matter (PM ₁₀) ¹	24-hour	114 µg/m ³ (highest)	150 µg/m ³	8 µg/m ³	30 µg/m ³
Particulate Matter (PM _{2.5}) ⁴	24-hour	40 µg/m ³ (highest)	35 µg/m ³	n/a	n/a
	Annual	11.2 µg/m ³	15 µg/m ³	n/a	n/a
Sulfur Dioxide (SO ₂) ^{5,6}	3-hour	24 µg/m ³	1,300 µg/m ³ (0.5 ppm)	25 µg/m ³	512 µg/m ³
	24-hour	13 µg/m ³	365 µg/m ³ (0.14 ppm)	5 µg/m ³	91 µg/m ³
	Annual	5 µg/m ³	80 µg/m ³ (0.03 ppm)	2 µg/m ³	20 µg/m ³

¹ Background data collected in Rifle, 2008; highest levels recorded in April (Air Resource Specialists 2009).
² Background data collected by EnCana at site north of Parachute, 2007 (CDPHE 2008).
³ Background data collected in Rifle, 2008; highest levels recorded in July (Air Resource Specialists 2009).
⁴ Background data collected in Rifle, September – December 2008; highest levels recorded in December (Air Resource Specialists 2009).
⁵ Background data collected at Unocal site, 1983-1984 (CDPHE 2008).
⁶ Colorado 3-hour AAQS = 700 µg/m³.

Air quality would decrease during construction of the access road, pad, wells and pipelines. Pollutants generated during these activities would include combustion emissions and fugitive dust associated 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 for a period of four to six weeks. 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.

Volatile organic compound (VOC) emissions are dependent on the characteristics of the condensate, tank operations, and production. The air impacts associated with the condensate tanks are anticipated to be minor, but VOC emissions would be controlled under CDPHE Regulation 7. This includes capture and thermal destruction of VOCs from condensate tanks.

The Roan Plateau RMPA and EIS describe potential effects from oil and gas development (BLM 2006a:4-26 to 4-37). Analysis was completed with regard to greenhouse gas emissions, a near-field and far-field analysis for “criteria pollutants” (particulate matter [PM₁₀ and PM_{2.5}], carbon monoxide, sulfur dioxide, and nitrogen oxides) and hazardous air pollutants (benzene, ethylbenzene, formaldehyde, hydrogen sulfide, toluene, and xylenes). Sulfur and nitrogen deposition, acid neutralizing capacity, and a visibility screening analysis were also completed in the Roan Plateau RMPA and EIS. Because the visibility screening analysis showed potential impacts at one or more Class I areas, a refined visibility analysis was also completed. The refined visibility analysis indicated a “just noticeable” impact on visibility for one day each at two Class I areas (Black Canyon of the Gunnison National Park and the Mt. Zirkel Wilderness). For the other pollutants analyzed, the implementation of oil and gas development

under the Roan Plateau RMPA and EIS was calculated as having no or negligible long-term adverse impacts on air quality. The Proposed Action is within the scale of development anticipated in the Roan Plateau RMPA and EIA.

Activities described in the Proposed Action would result in localized short-term increases in pollutant emissions from vehicles and drilling equipment and fugitive dust emissions from construction and use of the well pad and access road. Concentrations would be below applicable ambient air quality standards as analyzed in the Roan Plateau RMPA and EIS. However, it is anticipated that construction, drilling, and production activities would produce high levels of fugitive dust in dry conditions without dust abatement. To mitigate dust generated by these activities, the operator would be required to implement dust abatement strategies as needed by watering the access road and construction areas and/or by applying a surfactant approved by the BLM (Appendix A). Additionally, the operator would be required to apply gravel to the access road to a compacted depth of 6 inches, further reducing fugitive dust emissions (Appendix A).

Since the current land use plan was approved BLM (1999), 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 assessment of GHG emissions and climate change remains in its formative phase. Therefore, it is not yet possible to know with certainty the net impact to climate from GHGs produced globally over the last century or from those produced today. 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 may contribute GHGs to the atmosphere, the contributions would not have a significant effect on a phenomenon occurring at a global scale believed by some to be due to more than a century of human activities.

No Action Alternative

Under the No Action alternative, the project components included in the Proposed Action would not be approved and constructed. Therefore, emissions of pollutants from vehicle and equipment engines or fugitive dust from disturbed surfaces that would accompany the Proposed Action would not occur.

Cultural Resources

Affected Environment

Cultural resources are fragile and nonrenewable remains of prehistoric and historic human activity, occupation, or endeavor as reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works

of art, architecture, and natural features that were of importance in human history. Cultural resources comprise the physical remains themselves, the areas where significant human events occurred even if evidence of the event no longer remains, and the environment surrounding the actual resource.

Section 106 of the National Historic Preservation Act (NHPA)(P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470) and its implementing regulations found at 36 CFR Part 800 require Federal agencies to take into account the effect of their actions on cultural resources for any endeavor that involves Federal monies, Federal permitting or certification, or Federal lands. Projects that extend on to private land from Federal land, or that involve Federal minerals, or that otherwise would not be feasible if all Federal involvement were eliminated, are required to consider the effects to historic properties over the entire area of potential effect of the project, regardless of surface ownership.

Twenty-three Class III (intensive pedestrian survey) cultural resource inventories have been conducted within a one mile radius of the current project area. Of these, six have been conducted in the last 4 years, including the most recent (GSFO# 1111-2) by Grand River Institute, for all areas of proposed disturbance.

In summary, the inventories conducted within and adjacent to the proposed DOE 2-W-29 and DOE 3-W-29 pads and access roads identified 20 localities containing cultural resources within a 1-mile radius of the project area. Of these 20 cultural resources, three are sites eligible or potentially eligible for NRHP listing as “historic properties,” a total of 11 are sites identified as not eligible for NRHP listing, and the five remaining cultural resources are isolated finds, which are by definition not eligible for NRHP listing. None of the “historic properties” is within the area of potential effects (APE) for the project or would be affected by project development.

Environmental Consequences

Proposed Action

The Proposed Action was designed to avoid new disturbance to all sites that are eligible for NRHP listing and would not cause removal or project-related direct disturbance to these cultural resources. However, the Proposed Action would result in increased human activity in the project area in the form of project workforce and increased road traffic, particularly during construction. The Proposed Action would therefore increase the risk of disturbance, vandalism, collection, or excavation at known or undiscovered cultural resources sites in the West Cottonwood Gulch area.

Mitigation measures would be implemented to minimize the potential for incidental impacts to cultural resources. A standard BLM education/discovery COA for cultural resource protection would be attached to the APDs (Appendix A).

Although project activity itself may not physically impact cultural resources, construction in proximity to a cultural resource may in fact adversely impact the significance of a cultural resource by changing the setting, location, association, and feeling particularly for culturally sensitive Native American sites and/or areas of concern. These changes may not be quantifiable at the level of individual sites, but the cumulative effects of these changes over time and over the entire West Cottonwood Gulch area will result in degradation of the condition and integrity of setting, location, association, and feeling for which the surrounding landscape is a part of the site’s significance.

No formal consultation was initiated with the Colorado State Historic Preservation Office (SHPO), as all historic properties identified during the inventories would be avoided by various methods, including rerouting and/or relocation of facilities. Based upon the Class III inventories and the avoidance of all historic properties, the BLM made a determination of “No Historic Properties Affected” for Williams’s

Proposed Actions within the West Cottonwood Gulch area. This determination was made in accordance with 36 CFR 800.4(d)(1) for Section 106 of the NHPA (16 U.S.C. 470f), the BLM/SHPO Programmatic Agreement (1997), and the Colorado Protocol (1998).

No Action Alternative

The No Action alternative constitutes denial of the 21 Federal Applications for Permit to Drill (APDs) associated with the Proposed Action and any of the associated upgrades to the road and pipelines. The location of storage tanks on the valley floors and associated reduction in truck traffic related to the service of the ten producing wells would also be eliminated from consideration. No new surface disturbance would occur under the No Action alternative.

Under this alternative, there would still be potential for impact to unknown Native American resources. Although no direct impacts to known cultural resources would occur, cultural resources in the general area would still remain vulnerable to damage from accidental or inadvertent disturbance, increased illegal activities and natural processes.

Invasive Non-native Species

Affected Environment

The project area is relatively free of noxious and invasive weeds with the exception of scattered cheatgrass (*Anisantha tectorum*) and redstem filaree (*Erodium cicutarium*).

Environmental Consequences

Proposed Action

Surface-disturbing activities provide a niche for the invasion and establishment of invasive non-native species, particularly when these species are already present in the surrounding area. Because invasive, non-native species are found in low density in the project area, the potential for invasion following construction activities is moderate. Mitigation measures designed to minimize the spread of these species would be attached to well APDs as conditions of approval (see Appendix A).

No Action Alternative

Under the No Action alternative, none of the proposed ground disturbance on BLM land would occur. Although the potential for weed invasion would be much less than under the Proposed Action, populations of invasive non-native species already present in the project area would spread if left untreated.

Migratory Birds

Affected Environment

Vegetation in the area consists of sparse to medium density juniper woodlands with openings of sagebrush, saltbush, and greasewood. Understory vegetation consists primarily of native grasses and forbs with some cheatgrass. These vegetation types provide cover, forage, and nesting habitat for a variety of migratory birds. Habitats of the project area are suitable for use by a variety of migratory birds, which are protected by the Migratory Bird Treaty Act (MBTA). The MBTA prohibits harassing, injuring,

or killing migratory birds, destroying active nests, or interfering with breeding. This includes activities that result in nest failure due to abandonment or reduced attentiveness by one or both adults.

Although essentially all migratory species—broadly defined to include most resident native species—are protected by the MBTA, particular focus for BLM oil and gas projects is placed on species identified by the U.S. Fish and Wildlife Service (USFWS 2008) as Birds of Conservation Concern (BCC). The current BCC list includes 10 species potentially present in or near the project area: the bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), yellow-billed cuckoo (*Coccyzus americanus*), Lewis's woodpecker (*Melanerpes lewis*), willow flycatcher (*Empidonax traillii*), gray vireo (*Vireo vicinior*), pinyon jay (*Gymnorhinus cyanocephalus*), juniper titmouse (*Baeolophus griseus*), and Brewer's sparrow (*Spizella breweri*). The following describes specific habitat types present in the project area and the potential for occurrence of BCC species.

Stands or scattered individuals of Utah juniper provide some habitat for three pinyon-juniper obligates 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 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 (*Poliophtila 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).

Sagebrush shrublands in the project area provide potential habitat for the Brewer's sparrow, which is a near-obligate in sagebrush shrublands. Other migratory birds that are associated with sagebrush shrublands but are not BCC species include the western meadowlark (*Sturnella neglecta*) and three species of neotropical migrants: western kingbird (*Tyrannus verticalis*), vesper sparrow (*Pooecetes gramineus*), and lark sparrow (*Chondestes grammacus*). Additionally, two active golden eagle nests were found in the cliff bands north of the proposed well pads. The golden eagles and any prairie falcons that may also nest along the cliffs are more likely to hunt across sagebrush areas than in the other habitat types in the project area, all of which contain taller, denser woody vegetation.

Riparian corridors in the project vicinity provide potential habitat for the willow flycatcher, an obligate in riparian shrublands dominated by tall willows or structurally similar species. This habitat occurs along the Colorado River, which is 0.5 mile south of the project area and separated by I-70 and the Union Pacific Railroad, but this habitat type does not occur along drainages within the project area. Other migrants commonly associated with riparian habitats along the Colorado River include the western wood-pewee (*Contopus sordidulus*), house wren (*Troglodytes aedon*), warbling vireo (*Vireo gilvus*), yellow warbler (*Dendroica petechia*), American and lesser goldfinches (*Spinus tristis*, *S. psaltria*), and song sparrow (*Melospiza melodia*)—all but the last species being neotropical migrants. Raptor surveys conducted in the area in 2008 resulted in no nests being found within 0.25 mile of any proposed development (WWE 2009).

Environmental Consequences

Proposed Action

The Proposed Action would result in a loss of nesting, breeding, roosting, perching, and foraging habitat for migratory birds on disturbed areas and reduce habitat effectiveness adjacent to areas where disturbance-related effects could be expected. Construction activities would be mostly limited to re-disturbance of previously disturbed areas at the existing pads and along existing pipelines, minimizing

impacts to migratory birds from habitat loss or fragmentation. However, it is possible that during construction, drilling, and completion activities, individual birds could be displaced to adjacent habitats due to noise and human presence. Effects of displacement could include increased risk of predation or failure to reproduce if adjacent habitat is at carrying capacity. Impacts to migratory bird species that nest in sagebrush, pinyon-juniper woodlands, and riparian woodland habitats can be minimized by conducting construction, drilling, and completion activities outside the nesting season.

No Action Alternative

Under the No Action alternative, all Federal APDs would be denied along with the expansion of the DOE 2-W-29 and DOE 3-W-29 pads, the DOE 3-W-29 road realignment and all associated pipeline upgrades, thus greatly lessening the impacts to migratory birds. Disturbance-related effects to birds would be reduced, as would the potential for a “take” under the MBTA.

Native American Religious Concerns

Affected Environment

The West Cottonwood Gulch project area is within a larger area identified by the Ute Tribes as part of their ancestral homeland. Cultural resource inventories (see Cultural Resources) were conducted to determine if there were any areas that might be culturally sensitive to Native Americans.

Environmental Consequences

Proposed Action

At present, no Native American concerns are known within the project area and none were identified during the inventories. The Ute Tribe of the Uintah and Ouray Bands, the primary Native American tribe in this area of the CRVFO, have indicated that they do not wish to be consulted for small projects or projects where no Native American areas of concern have been identified either through survey or past consultations. Therefore, formal consultation 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, increased access and personnel in the vicinity of the proposed project could indirectly impact unknown Native American resources ranging from illegal collection to vandalism.

The 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 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 21 Federal APDs associated with the Proposed Action and any of the associated upgrades to the road and pipelines. The location of storage tanks on the valley floors and associated reduction in truck traffic related to the service of the ten producing wells would also be eliminated from consideration. No new surface disturbance would occur under the No Action alternative.

Under this alternative, the potential would still exist for impacts to unknown Native American resources. Although no direct impacts to known cultural resources would occur, cultural resources in the general area would still remain vulnerable to damage from accidental or inadvertent disturbance, increased illegal activities and natural processes

Special-Status Species

Federally Listed, Proposed, or Candidate Plant Species

Affected Environment

According to the current species list available online from the U. S. Fish and Wildlife Service (USFWS) (<http://www.fws.gov/mountain-prairie/endspp/CountyLists/Colorado.pdf>), the following Federally listed, proposed, or candidate plant species may occur within or be impacted by actions occurring in Garfield County: DeBeque phacelia (*Phacelia submutica*), Parachute beardtongue (*Penstemon debilis*), Colorado hookless cactus (*Sclerocactus glaucus*), and Ute ladies'-tresses orchid (*Spiranthes diluvialis*).

Environmental Consequences

Proposed Action

The results of a plant survey conducted in May 2010 indicated no habitat for Federally listed, proposed, or candidate plant species in the project area. Therefore, the project would have “**No Effect**” on these species.

No Action Alternative

Because of the absence of potential habitat for any Federally listed, proposed, or candidate plant species in the project area, the No Action alternative would have no impacts on these species.

Federally Listed, Proposed, or Candidate Animal Species

Affected Environment

According to the current species list available online from the USFWS (<http://www.fws.gov/mountain-prairie/endspp/CountyLists/Colorado.pdf>), the following Federally listed, proposed, or candidate animal species may occur within or be impacted by actions occurring in Garfield County: razorback sucker (*Xyrauchen texanus*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), bonytail [chub] (*Gila elegans*), greenback cutthroat trout (*Oncorhynchus clarki stomias*), Mexican spotted owl (*Strix occidentalis*), western yellow-billed cuckoo (*Coccyzus americanus*), and Canada lynx (*Lynx canadensis*).

Endangered Colorado River Fishes. Four species of big-river fishes that are Federally listed as Endangered occur within the Colorado River drainage basin, which is approximately 4 miles south of the project area. These endangered species are the razorback sucker, Colorado pikeminnow, humpback chub, and bonytail. 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 includes the reach downstream from the inflow of Parachute Creek, of which Wheeler Gulch is a tributary. The nearest known habitat for the humpback chub and bonytail is within the Colorado River approximately 60 miles downstream from the project area. Only one population of humpback chub, at Black Rocks west of Grand Junction, is known to exist in Colorado.

Greenback Cutthroat Trout. The greenback cutthroat trout, Federally listed as Threatened, is a subspecies of cutthroat trout native to the Platte River drainage on the eastern slope of Colorado. Its documented presence in some Garfield County streams suggest that fish were either intentionally removed from east-slope waters or stocked in west-slope waters, or that the genetics of this species and the Colorado River cutthroat trout (subspecies native the western slope) are not clearly defined. The greenback cutthroat trout is not known or expected to occur within or near the project area.

Terrestrial Vertebrates. None of the Federally listed, proposed, or candidate terrestrial wildlife species that occur or are potentially present in Garfield County—the Mexican spotted owl, western yellow-billed cuckoo, and Canada lynx—is considered likely to occur in the project area or vicinity due to lack of habitat and/or negative results of prior surveys. Hence, these species are not considered further in this EA. The bald eagle and peregrine falcon were removed from the list of threatened or endangered species in August 2007 and August 1999, respectively, and are now classified by BLM as sensitive species. Although no longer protected by the Endangered Species Act, both species remain protected by the MBTA; the bald eagle is also protected by the Bald and Golden Eagle Protection Act.

Environmental Consequences

Proposed Action

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. Surface runoff of pollutants from the project area also has the potential to affect Colorado River fishes. Any leaks from trucks, drilling equipment, tanks, or ancillary facilities would be likely to reach the river during runoff events.

Additional potential impacts to the endangered Colorado River fishes would be associated with depletions in flows due to use of water from the Colorado River Basin in drilling, hydrostatic testing of pipelines, and dust abatement of unpaved access roads. Reductions in flows in the Colorado River and major tributaries have resulted from evaporative loss from reservoirs, withdrawals for irrigation, and other consumptive uses. These depletions have affected minimum flows, as well as peak “flushing” flows needed to maintain suitable substrates for spawning.

In May 2008, 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 BLM’s 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 razorback sucker, Colorado pikeminnow, humpback chub, or bonytail 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 to use for site-specific mitigation projects. These funds are used to contribute to the recovery of endangered fish through the restoration of habitat, propagation, and genetics management, instream flow identification and protection, program management, non-native fish management, research and monitoring, and public education.

No Action Alternative

Under the No Action alternative, all Federal APDs would be denied, as would expansion of the DOE 2-W-29 and DOE 3-W-29 pads, the DOE 3-W-29 road realignment, and all associated pipeline upgrades. Consequently, the potential for impacts to Federally listed, proposed, or candidate animal species would be greatly reduced.

BLM Sensitive Plant Species

Affected Environment

BLM sensitive plant species with habitat and/or occurrence records in the area 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 Bluff meadow-rue (*Thalictrum heliophilum*).

Environmental Consequences

Proposed Action

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

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

BLM sensitive animal species with habitat and/or occurrence records in the portion of the CRVFO that includes the project area and vicinity are listed in Table 5.

Environmental Consequences

Proposed Action

For the sensitive species listed in Table 5, 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 Cottonwood Gulch or other 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).

Table 5. Special-Status Wildlife Species Present or Potentially Present in the Project Area		
<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
Peregrine falcon	Nests on high cliffs and hunts along rivers and lakes for waterfowl.	Unlikely
Northern goshawk	Predominantly uses spruce/fir forests but will also use Douglas-fir, various pines, and aspens.	Possible winter visitor
Bald eagle	Nests and roosts in mature cottonwood forests along rivers, large streams, and lakes.	Present along Colorado River
Brewer's sparrow	Sagebrush shrublands, mountain parks; may be found in alpine willow stands.	Unlikely
Midget faded rattlesnake	High, cold desert dominated by sagebrush and with an abundance of rock outcrops and exposed canyon walls.	Possible
Great Basin spadefoot	Seasonal pools or slow-flowing ephemeral streams, primarily in desert and semi-desert grasslands, shrublands, and pinyon-juniper.	Unlikely
Northern leopard frog	Wet meadows and the shallows of marshes, ponds, glacial kettles, beaver ponds, lakes, reservoirs, streams, and irrigation ditches.	Unlikely
Flannelmouth sucker	Generally restricted to rivers and major tributaries.	Present in Colorado River
Roundtail chub	Generally restricted to rivers and major tributaries.	Present in Colorado River

Flannelmouth 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.

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 (CDOW 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. Where it occurs, the northern leopard frog is vulnerable to habitat loss or degradation from inflow of sediments that decrease water quality for reproduction and for survival of aquatic plants.

Northern Leopard Frog. The northern leopard frog (*Rana pipiens*) is not known to occur in the project area. This species requires permanent ponds, lake shores, or slow-flowing streams with good water quality and an abundance of aquatic plants. Where it occurs, the northern leopard frog is vulnerable to habitat loss or degradation from impacts that decrease water quality for reproduction and for survival of aquatic plants. The protective COAs for water quality in Appendix A would minimize this potential.

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 2009). Threats include direct mortality from vehicles traveling on roads and pads, off-highway vehicle use throughout the landscape, capture by collectors, and livestock grazing. Improved access by humans into previously undeveloped areas increases the risk of mortality or collection of amphibians.

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 south 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 2009), 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 impact.

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.

No Action Alternative

Under the No Action alternative, all Federal APDs would be denied along with the expansion of the DOE 2-W-29 and DOE 3-W-29 pads, the DOE 3-W-29 road realignment and all associated pipeline upgrades, thus greatly lessening the impacts to BLM Sensitive animal species.

Analysis on Public Land Health Standard 4 for Special Status Species

According to a recent land health assessment, habitat conditions within this area appear suitable for special-status animal species known or likely to occur (BLM 2005). However, large portions of the landscape are being fragmented due to extensive natural gas development. Continued habitat fragmentation is of concern as large blocks of contiguous intact habitat are required by many species. Sustained development and the proliferation of roads, well pads, pipelines, compressor stations, tank farms and other surface facilities will continue to reduce habitat patch size and affect both habitat quality and quantity. The potential to impact some species would increase as development continues. The Proposed Action in conjunction with similar activities throughout this watershed would increase fragmentation and could increase sediment loads. Although the contribution of the Proposed Action is in itself small, it may further trend the area away from meeting Standard 4 for special-status wildlife.

The No Action alternative would not result in a failure of the area to achieve Standard 4 because the proposed developments would not occur.

Wastes, Hazardous or Solid

Affected Environment

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

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

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

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

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

No Action Alternative

Under this alternative, no new Federal wells would be drilled, the two pads would not be expanded and no new surface disturbance would occur. The potential effects on soil or surface water from hazardous wastes would be limited to the ten producing wells on the two existing pads.

Water Quality, Surface and Ground (includes an analysis on Public Land Health Standard 5)

Surface Water

Affected Environment

The two pads comprising the project area lie within two separate 6th-code watershed units: Colorado River above Battlement Creek and Colorado River below Battlement Creek. The immediate DOE 2-W-29 pad area lies within the Colorado River above Battlement Creek unit while the majority of the planned pipeline upgrade would be buried within the Colorado River below Battlement Creek unit. The DOE 2-W-29 pad lies approximately 2 miles north of the Colorado River. The DOE 3-W-29 pad lies within the Colorado River below Battlement Creek 6th-code watershed unit and is located about 1¼ miles north of the Colorado River.

At this time, there are no water quality data for the ephemeral drainages near the proposed pad sites. These drainages are not currently on the State of Colorado's *Stream Classifications and Water Quality Standards* List (CDPHE, WQCC Regulation No. 37) (CDPHE 2007), the State of Colorado's *303(d) List of Water Quality Limited Segments Requiring TMDLS* (CDPHE, WQCC Regulation No. 93) (CDPHE 2006a), or the State of Colorado's *Monitoring and Evaluation List* (CDPHE, WQCC Regulation No. 94) (CDPHE 2006b).

The closest downstream sediment measuring station on the Colorado River is near DeBeque, Colorado. A summary of the 2 years of data collected at this station is presented in Table 6 (USGS 2007a).

**Table 6. Sediment Yields – USGS Station 9093700
(Colorado River near DeBeque, CO)**

<i>Maximum (tons/day)</i>	<i>Minimum (tons/day)</i>	<i>Mean (tons/day)</i>	<i>Median (tons/day)</i>	<i>Period of Record</i>
41,300	8.4	1,817.6	267	1974 – 1976
Source: USGS 2007a.				

Environmental Consequences

Proposed Action

Potential impacts to surface water associated with the Proposed Action include increased erosion and sedimentation of streams due to changes in channel morphology due to road and pipeline crossings, and contamination by drilling fluids, produced water, or condensate. Surface waters would be most susceptible to sedimentation during construction, drilling, and completion activities, which would collectively last approximately 30 to 45 days. After this period, reclamation activities would substantially reduce surface exposure, decreasing the risk to surface waters over the long term.

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

Tanks used to store produced water and condensate would be placed off-site on tank pads using secondary containment barriers to prevent offsite release. In the event of an accidental release, produced water and condensate would be confined for cleanup in a containment area and would not migrate to surrounding soils or surface waters. Pipelines associated with the transport of these liquids would be pressure tested to detect leakage prior to use. Cuttings pits must be decontaminated to COGCC standards prior to pit closure; the table of applicable standards is at http://cogcc.state.co.us/RR_docs_new/rules/900Series.pdf

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

No Action Alternative

Under the No Action alternative, the project components included in the Proposed Action would not be approved and constructed. Therefore, no impacts to surface water would result.

Waters of the U.S.

Affected Environment

Section 404 of the Clean Water Act requires a Department of the Army permit from the U.S. Army Corps of Engineers prior to discharging dredged or fill material into waters of the United States as defined by 33 CFR Part 328. A Department of the Army permit is required for both permanent and temporary discharges into waters of the United States.

Environmental Consequences

Proposed Action

No new crossings of Waters of the U.S. or streams that are potentially Waters of the U.S. are included in the Proposed Action, nor is any pad expansion proposed that could discharge fill into Waters of the U.S.

Improperly designed crossings of small ephemeral drainages, in particular undersized or poorly aligned culverts, could result in soil degradation that could include excessive erosion at culvert outlets, potentially supplying sediment to the Colorado River approximately 1-2 miles to the south. However, standard and site-specific surface-use COAs listed in Appendix A would be implemented to protect the Colorado River and any other waters of the U.S. that could be impacted by such long-distance stormflow transport.

No Action Alternative

Under the No Action alternative, the project components included in the Proposed Action would not be approved and constructed. Therefore, no impacts to Waters of the U.S. would result.

Groundwater

Affected Environment

The proposed activities are located within the Lower Piceance Basin aquifer system (CGS 2003), which contains both alluvial and bedrock aquifers. Unconsolidated alluvial aquifers are the most productive aquifers in the region (EPA 2004). Alluvial aquifers are narrow, thin deposits of sand and gravel formed primarily along stream courses, in this case, along the Colorado River and its tributaries. The principal bedrock aquifers of the basin are the Uinta Formation and the Parachute Creek Member of the Green River Formation.

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 uppermost 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 upper aquifer consists of both the Uinta Formation and the upper portion of the Parachute Creek Member of the Green River Formation. 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' respectively (CGS, 2003). Both of these aquifers and corresponding formations are found on the Roan Plateau north of the existing well pads.

These two aquifer systems are bounded on the north by the White River and on the south by the Colorado River, although the Wasatch basal confining unit is present throughout most of the Basin. Below the Wasatch Formation is the Cretaceous aged Mesaverde aquifer. This aquifer consists of sandstone with interbedded shale and coal of the Williams Fork Formation and the marine sands and shales of the Iles Formation. The depth to the top of this aquifer beneath the project area is more than 3,500 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.

Groundwater is recharged from snowmelt in upland areas that receive more precipitation than lower altitude areas. In the Piceance Basin, recharge flows from areas near the margins of the basin to discharge areas near principal stream valleys. The groundwater moves laterally and/or upward discharging directly into streams, springs, and seeps by upward movement through confining layers and into overlying aquifers or by withdrawal from wells (USGS 2007b). The natural discharge areas generally are found along the Colorado River and its tributaries (USGS 2007c).

Most of the groundwater recharge is provided by winter precipitation and stored as snowpack at the higher elevations within the basin. In the summer, little, if any rainfall infiltrates and percolates to the saturated zone (Glover et al. 1998). Most precipitation is lost to evapotranspiration, with estimates of loss as high as 98% (Taylor 1987, cited in CGS 2003).

Water quality of the upper 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 overall is generally poor because of nahcolite deposits and salt beds present within the basin.

Three registered fresh-water wells are located within a 1-mile radius of both pads. The only water well within the defined radius of the DOE 3-W-29 well pad is a domestic well located approximately 4,000 feet southeast. The 180-foot-deep well lists a static water level of 110 feet, with a very low yield of 2 gallons per minute (gpm). Relative to the DOE 2-W-29 pad, in addition to the water well just described, two other wells are clustered approximately 5,000 feet southeast, along the alluvial flood plain of the lower reaches of Cottonwood Gulch. Located approximately 200 feet apart, only one of these wells is defined by quantitative data. Showing a well depth of 280 feet, a static water level of 130 feet, and a yield of 15 gpm, this well has an undetermined current use. In general, few water wells are found within this area. The steeply incised “badlands” topography that dominates the area makes it difficult to support private ranching or farming ventures. The majority of water wells that have been completed are found along the alluvial terraces south of the Colorado River, and those farther east along Parachute Creek. A cross section of wells located in these areas confirms shallow well depths and water levels that are typical of water well parameters found within most wells completed in this part of the Piceance Basin.

Environmental Consequences

Proposed Action

Potential impacts to groundwater resources from the Proposed Action 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, which would otherwise be held captive within the tight gas sands of the Williams Fork. Proppants—used to prop open the fractures created during hydrofracturing operations—are mixed with both fresh and produced water. Proppants typically include sand, aluminum, glass or plastic beads, and minor amounts (<1%) of other compounds such as corrosion-, friction-, and scale-inhibitors (EnerMax Inc. 2007). Hydrofracturing would be conducted at 5,000 feet or more below ground surface (bgs), and is unlikely to cause impacts to groundwater resources near the surface. With the use of proper construction practices, drilling practices, and BMPs, no significant adverse impact to groundwater aquifers is anticipated to result from the project (see Appendix B regarding cementing and casing programs).

No Action Alternative

Under the No Action alternative, the development of 21 combined Federal wells from the two existing pads would not be approved. Associated expansion of the DOE 3-W-29 well pad would also be denied, as well as upgrades to existing facilities on both pads. No new surface disturbance would occur, therefore, no new impacts to groundwater resources would occur. The nine (9) existing wells completed between the two well pads would remain in production; the existing facilities would remain in their present condition.

Analysis on Public Land Health Standard 5 for Water Quality

The Proposed Action and the No Action alternative would be unlikely to prevent Standard 5 from being achieved. This is due to the lack of water bodies and riparian areas that would be affected by the project and by the lease stipulations, COAs, and requirements set for permitting by the COGCC and USACE.

OTHER AFFECTED RESOURCES

In addition to the critical elements, the resources presented in Table 7 were considered for impact analysis relative to the Proposed Action and No Action alternative. Resources that would be affected by the Proposed Action and No Action alternative are discussed following the table.

Table 7. Other Resources Considered in the Analysis			
<i>Resource</i>	<i>NA or Not Present</i>	<i>Present and Not Affected</i>	<i>Present and Affected</i>
Access and Transportation			X
Cadastral Survey	X		
Fire/Fuels Management	X		
Forest Management	X		
Geology and Minerals			X
Law Enforcement	X		
Paleontology			X
Noise			X
Range Management			X
Realty Authorizations	X		
Recreation			X
Socio-Economics			X
Soils			X
Vegetation			X
Visual Resources			X
Wildlife, Aquatic			X
Wildlife, Terrestrial			X

Access and Transportation

Affected Environment

Vehicle access to the two well pads would be accomplished by driving east of I-70 (Exit 75) at Parachute along the I-70 frontage road (U.S. Highway 6 and 24). Approximately 2.5 miles east of County Road 215 (CR215), the DOE 3-W-29 pad can be accessed along an existing road east and north of the Williams’s Jackrabbit Compressor Station. The DOE 3-W-29 pad rests at the end of the access road. Approximately 3¼ miles east of CR215, the DOE 2-W-29 pad can be accessed off the West Cottonwood Gulch Road system. The DOE 2-W-29 pads sets at the end of this road. No public vehicle access exists to either pad since private land must be crossed along the frontage road that serves the pad access roads (see Figures 1 and 2).

The existing access roads would provide access to the pads in their present condition and alignment with the exception of a 900-foot section to be reconstructed around the PA34-29 pad about 0.25 mile east of the DOE 3-W-29 pad. The existing 22% grade on this road is too steep for safe operations or maintenance.

Environmental Consequences

Proposed Action

The Proposed Action would result in a substantial increase in truck traffic. The largest increase would be during rig-up, drilling, and completion activities. Data indicate that approximately 1,160 truck trips over a 30-day period would be required to support the drilling and completion of each well (Table 5).

<i>Vehicle Class</i>	<i>Number of trips per well</i>	<i>Percentage of total</i>
16-wheel tractor trailers	88	7.6%
10-wheel trucks	216	18.6%
6-wheel trucks	452	39.0%
Pickup trucks	404	34.8%
Total	1,160	100.0%

Source: BLM 2006. Note: Trips by different vehicle types are not necessarily distributed evenly during the drilling process. Drilling and completion period is approximately 30 days per well.

Once the wells are producing, traffic would decrease to occasional visits for monitoring or maintenance activities. Each well may have to be recompleted once per year, requiring three to five truck trips per day for approximately seven days. Since the fluids generated during the gas production life of the wells would be transported via buried lines to the tank facilities near the I-70 frontage road, the water and oil truck traffic related to the fluids for these well pads would be drastically reduced.

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

No Action Alternative

This alternative would not have an impact on access or transportation, because the development activities would not occur.

Geology and Minerals

Affected Environment

The project area is located within the Piceance Basin, a broad, elongated structural basin located at the eastern edge of the Colorado Plateau. The highly asymmetrical basin is more than 100 miles long with an average width of 60 miles. Dissected by the Colorado River, the basin is divided into northern and southern sections. The northern part of the basin is bounded by the Colorado River on the southern end, and the White River on the northern end. The Grand Hogback Monocline delineates the eastern edge of the basin, where Mesaverde sediments outcrop in nearly vertical complete section. The Mesaverde

Group, the target zone of the proposed drilling program, is made up of the Williams Fork and Iles Formations. Sediments of the Mesaverde Group are a complex of transgressive and regressive sedimentary sequences of nearshore and offshore sediments. The orogenic or mountain building processes that also took place during the late Cretaceous produced uplift and subsidence structures in central and eastern Utah, western Colorado, and most of Wyoming (USGS 2009). As the highland areas were exposed to erosion, and the basin deepened, greater amount of sediment was available for deposition along the ancient shoreline. The subsequent facies changes that occurred as a result of these two processes are believed to be the trapping mechanism that defines the extensive gas accumulation of the Williams Fork Formation.

Surface deposits within the study area are mapped as the Tertiary Wasatch Formation (Two) underlying both the DOE 2-W-29 and the DOE 3-W-29 well pads. Farther north of the proposed well pads, Tertiary sediments of the Green River Formation are exposed along the cliffs of the Roan Plateau. Table 8 lists these formations along with other localized mapped units that are most prevalent within the study area and their characteristics.

Table 8. Geologic Formations within the Study Area				
<i>Map Symbol</i>	<i>Formation Name</i>	<i>Age</i>	<i>Characteristics</i>	<i>Location</i>
Qa	Unconsolidated Deposits	Holocene	Alluvium, gravel, sand, and silt and alluvial fans	Stream valleys
Qp	Pediment deposits	Holocene	Sand and gravel veneer formed during several cycles of erosion	Mesa tops
Tu	Uinta Formation	Eocene	Siltstone, sandstone, and marlstone	Top of Roan Plateau
Tgp	Parachute Creek Member of Green River Fm	Eocene	Gray and yellow-brown marlstone and tuff and Mahogany oil shale bed	Roan cliffs
M	Mahogany oil shale bed	Eocene	Dark gray and blue gray ledge forming oil shale	Roan cliffs
Tga	Anvil Points Member of Green River Fm	Eocene	Gray and brown sandstone, siltstone, and limestone and gray and green shale	Roan cliffs
Two	Wasatch Formation	Eocene, Paleocene	Red, gray and brown sandstone and siltstone and red, green and gray shale	Base of Roan cliffs and predominant surface exposures north of the Colorado River

Source: Tweto et al. 1978, Ellis and Freeman 1984, Shroba and Scott 1997

The proposed development area is located within the existing Parachute gas field, one of four fields clustered in a 35-mile by 15-mile “fairway” (a zone of increased favorability for hydrocarbon production) located between Silt and Grand Valley (Hemborg 2000). Production is derived from three reservoir intervals, which include the Wasatch Formation, the Williams Fork Formation, and Iles Formation. Since the late 1950s, substantial reserves have been known to be trapped within the tight sands of these reservoirs. Only within the last decade, and particularly within the last few years, has the integrated application of new technologies turned the tight gas sands into a profitable play (Kuuskraa 1997). 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). 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.

The proposed drilling program would target the sandstone sequences of the Upper Williams Fork Formation, which provide the majority of the production volumes (Lorenz 1989). The Williams Fork in this area is estimated to be between 3,000 and 4,000 feet thick. 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 tight gas is both stratigraphic and diagenetic. Migration of this gas is inhibited by the low permeability and discontinuous nature of the reservoirs (Cumella 2009).

Environmental Consequences

Proposed Action

Implementation of the proposed development program would result in natural gas and associated water being produced from the tight gas sands of the Mesaverde Group. 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 2006). If the wells become productive, initial production rates would be expected to be highest during the first few years of production, then steadily decline during the remainder of the economic lives of the wells. Most of the wells currently in production are estimated to have a life span of 30 to 35 years.

Specific casing depths will vary depending on well location and drilling conditions. Surface casing is utilized to protect and isolate usable water and potential production zones, and will be set at depths well below the depth to known aquifers within the area. If a water-bearing, gas-producing, lost-circulation or pressurized zone is encountered below the surface casing, cement volumes would be adjusted to protect and further isolate those zones. This configuration is designed to prevent accidental contamination or leakage of hydrocarbons or drilling fluids from reaching usable water zones within the wellbore.

No Action Alternative

Under the No Action alternative, the 21 combined Federal wells to be drilled from the existing DOE 2-W-29 and the DOE 3-W-29 well pads would not be approved. No new impacts to the geology and mineral resources would occur on Federal mineral estate. Associated upgrades to the existing facilities on those pads would also be denied, leaving the existing facilities in their present configuration.

Noise

Affected Environment

The Proposed Action would occur within a rural setting characterized by recent natural gas development activities. Noise levels in the area are presently created by traffic serving existing wells and ongoing drilling and completion, and well production activities. The proposed pads would not be located within one mile of a residence.

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 locations. Drilling activities are subject to noise abatement procedures as defined in the Colorado Oil and Gas Conservation Commission Rules and Regulations (Aesthetic and Noise Control Regulations), generally a limit of 80 decibels dBA during the day and 75 dBA during the night, measured at a distance of 350 feet. 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.

Short-term (7- to 14-day) increases in noise levels would characterize road and well pad construction. Based on the Inverse Square Law of Noise Propagation (Harris 1991) and typical construction site noise levels of 60 to 69 dBA at 500 feet (Table 9), construction noise would range from approximately 54 to 63 dBA at 1,000 feet, approximate an active commercial area (EPA 1974).

Table 9. Noise Levels at Typical Construction Sites and along Access Roads			
Equipment	Noise Level (dBA)		
	50 feet	500 feet	1,000 feet
Air Compressor, Concrete Pump	82	62	56
Backhoe	85	65	59
Bulldozer	89	69	63
Crane	88	68	62
Front End Loader	83	63	57
Heavy Truck	88	68	62
Motor Grader	85	65	59
Road Scraper	87	67	61
Tractor, Vibrator/Roller	80	60	54
Sources: BLM (1999a), La Plata County (2002)			

Noise impacts from drilling and completion activities would last approximately 45 to 60 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 dBA at 500 feet, actions associated with drilling and completion would generate approximately 62 dBA 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. As stated above, the nearest residence is 0.5 mile away.

Traffic noise levels 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 9, 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. These levels would be less than during the construction phase but greater than background noise levels. During maintenance and workovers, noise levels would increase above those associated with routine well production. Traffic noise level would impact 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, the project components included in the Proposed Action would not be approved and constructed. Therefore, no noise impacts would accompany this alternative.

Paleontology

Affected Environment

Although both the DOE 2-W-29 and the DOE 3-W-29 well pads are underlain by the Wasatch Formation, the latter is found within an area that has yielded more fossil discoveries. Within a 0.5-mile radius of the DOE 2-W-29 well pad, are 12 identified fossil discovery sites. The closest of these lie approximately 1,000 feet southwest of the pad location. Additional sites are found to the east and southeast. The abundance of discovery sites within this particular area is most likely the result of the lack of ground cover surrounding the pad. The well pad is perched on a ridge top isolated by ephemeral drainages on both the east and west sides. The surrounding soil cover is very soft and friable, and practically devoid of vegetation. Because of a lack of vegetation to absorb runoff, heavy summer storm events within the surrounding highlands, have the potential to carry large sediment loads downstream as surface runoff discharges into the drainage system. Most of the identified discovery sites surrounding the DOE 3-W-29 well pad are located adjacent to these ephemeral drainages. The DOE 2-W-29 well pad, although perched higher on the ridge than the DOE 3-W-29 pad, is located within established ground cover in the form of juniper shrublands. In contrast, three fossil discovery sites are identified within a 0.5 mile radius of the DOE 2-W-29 pad site. The three discovery sites near this pad site are also located within or adjacent to ephemeral drainages.

The Wasatch Formation is considered a Class 4/5 PFYC (Potential Fossil Yield Classification) unit, defined as having a high/very high potential for fossil occurrence. Fossils are known to occur or have been documented in Condition 4 units, but may vary in occurrence and predictability. Class 5 units are considered highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils. It is estimated that Class 4/5 units are at risk of human-caused adverse impacts or natural degradation.

The upper Shire Member of the Wasatch Formation has yielded significant Eocene mammals. The middle Molina Member is considered unfossiliferous by Donnell (1969), but Murphy and Daitch (2007) have stated that all members of the Wasatch Formation contain vertebrate fossils in varying abundances. The basal Atwell Gulch Member has yielded collections of Paleocene vertebrates and leaves from the Paleocene-Eocene boundary placed near the top of the member contact (Donnell 1969).

Fossils historically identified in the Wasatch are archaic mammals—including marsupials, representatives of two extinct orders of early mammals (pantodonts and creodonts), artiodactyls (deer-like, even-toed ungulates), ancestral horses and other perissodactyls (odd-toed ungulates), carnivores, and primates—as well as birds, lizards, turtles, crocodilians, gars and other fishes, freshwater clams, gastropods (snails), and other invertebrates (BLM 1999a).

Environmental Consequences

Proposed Action

Although numerous fossil locality sites are found near both well pads, the planned surface disturbance for the DOE 2-W-29 well pad would remain within the original pad disturbance boundary, therefore a paleontological clearance survey is not required. Although the surface disturbance for the DOE 3-W-29 well pad would be only slightly expanded, the access road realignment and new pipelines that will be collocated within the road corridor will create additional surface disturbance within an area that is identified as highly fossiliferous. Due to the numerous fossil resource sites identified within close proximity of the proposed disturbance area, closer review should be taken once construction commences on the DOE 3-W-29 well pad. Construction monitoring would be required as identified in Appendix A. The standard paleontological condition of approval would also be attached to all APDs.

No Action Alternative

Under the No Action alternative, development of 21 Federal wells from the existing DOE 2-W-29 and DOE 3-W-29 well pads would not be approved. Associated upgrades to the existing facilities on those pads would also be denied, leaving the existing facilities in their present configuration. No new impacts to paleontological resources would occur on Federal mineral estate.

Range Management

Affected Environment

The proposed pad expansions and installation of ancillary facilities would occur within the Cottonwood Gulch Allotment. Table 10 summarizes the permitted grazing use on the allotment. Williams has leased the grazing rights on the Exxon/Mobil ranch lands on the valley floor to rest the vegetation from livestock use for the 2010 grazing season.

Table 10. Range Management Allotments					
Allotment	Authorization Number	Number (Cattle)	Period of Use	Percent Public Land	Animal Unit Months (AUMs)
08924 Cottonwood Gulch	0503926	180	5/11 – 6/5	86	132

Environmental Consequences

Proposed Action

Reconstruction of the proposed pads and planned upgrades for the roads and pipelines would result in a total of 11.9 acres of surface disturbance and a loss of less than one AUM of available livestock forage. Rehabilitation of the disturbed area would replace some of the livestock forage initially lost. It usually takes about 3 to 5 years for grasses and forbs to recover lost productivity following site rehabilitation in this area. Production of grasses and forbs on successfully rehabilitated sites is often greater than on those sites prior to disturbance, which would help mitigate some of the initial loss of forage.

The Proposed Action would result in a long-term loss of forage in disturbed areas that are needed for maintenance of gas production over the life of the wells. An increase in human activity related to development and maintenance of the Proposed Action would cause cattle to move away from where the activity is taking place. The long-term negative impacts that development of the proposed wells would have on grazing livestock would be expected to be minor.

Any range projects that are damaged or destroyed during development or maintenance will be repaired or replaced as soon as possible by the operator (Appendix A).

No Action Alternative

There would be no impacts to range resources because the developments described in the Proposed Action would not occur.

Socio-Economics

Affected Environment

The project area is located within Garfield County, Colorado. The population of Garfield County has grown by approximately 2.7% per year from 2000 to 2005, resulting in an increase from 44,000 to 51,000 residents (DOLA 2007). Population growth in Garfield County is expected to more than double over the next 20 years from over 50,000 in 2005 to 116,000 in 2025 (DOLA 2007).

In the year 2000, industry groups in Garfield County with the highest percentage of total employment were construction (20.4%), tourism (10.7%), retail trade (13.7%), and education and health (15.4%). An estimated 13.3% of the population was retired in the year 2000 and did not earn wages. Employment in agriculture, forestry, hunting, and mining accounted for 2.4% of total employment.

Personal income in Garfield County has also risen, growing 120% from \$513 million in 1990 to \$1.1 billion in 2000. Annual per capita income has grown by 50% during the same period, from about \$17,000 to \$26,000 (BLM 2006), and the average earnings per job in 2005 was approximately \$37,500 (Garfield County 2007). The communities of Parachute, Silt, and Rifle are considered the most affordable for housing; the communities of Battlement Mesa, New Castle, and Glenwood Springs the least affordable where the cost to rent or own similar housing may be 50% or more (BLM 2006).

Activities on public land in the vicinity of the project area are primarily ranching/farming, hunting, OHV travel, and the development of oil and gas resources. Hunters contribute to the economy because many require lodging, restaurants, sporting goods, guides and outfitting services, food, fuel, and other associated supplies. Big game hunting, in particular, is viewed as critical to Garfield County, and especially the local community economies that depend on BLM and Forest Service public lands where most hunting occurs (BLM 2006). Expenditures by hunters in the Roan Plateau Planning Area have been estimated to be as much as \$1 million annually, with perhaps an additional \$1 million annually of indirect and local expenditures (CDOW 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). Gas production in Garfield County has increased tremendously during the past eight years from 70 billion cubic feet (BCF) in 2000 to more than 376 BCF in 2008 (COGCC 2009). In addition, Garfield County is experiencing the fastest oil and gas development in Colorado with 3,000 drilling permits currently approved (COGCC 2009). 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 4000 persons were directly employed by gas development companies and their subcontractors in Garfield County (Garfield County 2007).

The Federal government makes “Payments in Lieu of Taxes” (PILT) to County governments to help offset property tax revenue lost of nontaxable Federal lands within County boundaries (BLM 2006). Payments are based on Federal acreage in the County for all land management agencies, including BLM, U.S. Forest Service, U.S. Fish and Wildlife Service, and National Park Service. The amount may also be adjusted based on population and as appropriated by Congress. By formula, payments are decreased as other Federal funds, such as mineral royalty payments, increase. PILT received by Garfield County in the last four years has been as follows: \$1,170,205 in 2004; \$808,348 in 2005; \$1,065,158 in 2006; and \$1,078,087 in 2007 (USDI 2008).

In addition to PILT payments, BLM shares revenue generated by commercial activities on public lands with State and County governments (BLM 2006). Federal mineral royalties are levied 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 land. Half the royalty receipts are distributed to Colorado, and the amount distributed to Garfield County in 2002 attributable to oil and gas production was \$14.1 million. In 2001, the amount was \$5.5 million (BLM 2006). These funds are then allocated to fund County services, schools, and local communities.

Property tax revenue from oil and gas development has also become the largest source of public revenue in Garfield County (BLM 2006). In the year 2007, oil and gas assessed valuation in Garfield County amounted to approximately \$1.9 billion, or about 65% of total assessed value. Total tax revenues from property taxes and special district levies were \$130 million. Tax dollar distributions in 2007 were Schools 37%, County 30%, Special Districts 13%, Fire Districts 10%, Colleges 8%, and Towns 2%.

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 2000, 16.7% of the residents of Garfield County identified themselves as Hispanic or Latino, and this is consistent across the State (17.1%). African Americans, American Indians, and Pacific Islanders account for less than 1% of the Garfield County population, which is below the State levels.

Environmental Consequences

Proposed Action

The Proposed Action would positively impact the local economies of Garfield County through the creation or retention of job opportunities in the oil and gas industry and in supporting trades and services. In addition, local governments in Garfield County would experience an increase in tax and royalty revenues. Some minor economic loss to private landowners or guides may result from the potential displacement of big game and resulting reduction in big game hunting within the project area.

The Proposed Action could result in minor negative social impacts, including a negligible decrease in the recreational character of the area, reduced scenic quality, increased dust levels, and increased traffic. Impacts would be greatest during construction, drilling, and completion activities.

No Action Alternative

The No Action alternative would result in no additional impacts to socio-economics of the general area.

Soils (includes an analysis of Public Land Health Standard 1)

Affected Environment

According to the *Soil Survey of Rifle Area, Colorado* (USDA 1985), the proposed DOE 2-W-29 pad and pipeline upgrades would be located on the Rock Outcrop-Torriorthents soil complex. This broadly defined unit consists of exposed bedrock, very stony areas, soils that are shallow to moderately deep over bedrock, and small pockets of deep soils. The complex is on the rock escarpment and colluvial slopes along the edge of the Roan Plateau. The outcrops and soils are very steep to extremely steep, with slopes of 50% to 80%. Surface runoff is rapid and the erosion hazard is moderate. Primary uses for these soils are grazing and wildlife habitat. The south-facing lower areas are an important wintering area for deer.

The DOE 3-W-29 pad expansion, a portion of the pipeline upgrades, and the road work around the nearby PA34-29 pad would be located on Badlands. This broadly defined soil is characterized by steep foothills and mountainsides of nearly barren lands dissected by intermittent drainage channels with outcrops of shale or sandstone. The water erosion hazard is very severe and erosion is active. These soils have sparse plant cover which provides little protection and cover for livestock and wildlife.

The majority of the DOE 3-W-29 pipeline installations and the new PA313-33 tank pad would be located on the Nihill Channery loam unit. This deep, well drained, moderately sloping to hilly soil is found on the sides of valleys and alluvial fans at elevations from 5,000 to 6,500 feet and on slopes of 6% to 25% . This soil formed in alluvium derived from Green River shale and sandstone. Surface runoff is slow and erosion hazard is severe. Primary uses for this soil include grazing and wildlife habitat.

Environmental Consequences

Proposed Action

The Proposed Action would result in approximately 11.9 acres (8.9 acres on BLM) of short-term vegetation loss and soil disturbance, with a long-term loss of approximately 3.7 acres (3.5 acres on BLM). In general, the area contains adequate vegetation buffers that would minimize the potential for sediment transport. However, construction activities would cause slight to moderate increases in local soil loss, loss of soil productivity, and sediment available for transport to surface waters. Potential for such soil loss and transport would increase as a function of slope, feature (pad, road, or pipeline route) to be constructed, and proximity to drainages.

The area to be disturbed would be comprised of soils with moderate to severe risks of erosion or slope instability. However, the proposed work generally would occur on sites that have been previously disturbed and have proven to remain stable over the years. Although the project area is located 1 to 2 miles from the Colorado River, particular care should be taken at these locations during construction and reclamation to ensure that proper BMPs, including the COAs listed in Appendix A, are utilized to prevent erosion and slope instability due to construction activities.

No Action Alternative

Under this alternative, all components of the Proposed Action would be denied, avoiding additional impacts to soils.

Analysis on Public Land Health Standard 1 for Upland Soils

The Proposed Action with associated mitigation and the No Action alternative would be unlikely to prevent Standard 1 from being achieved.

Vegetation (includes an analysis on Public Land Health Standard 3)

Affected Environment

Vegetation on the slopes surrounding the existing pads includes Utah juniper (*Juniperus osteosperma*) woodlands with a Wyoming sagebrush (*Artemisia tridentata ssp. wyomingensis*) understory. Other native shrubs growing in the area include four-wing saltbush (*Atriplex canescens*), shadscale (*A. confertifolia*), and rubber rabbitbrush (*Chrysothamnus nauseosus*). A variety of native grasses and forbs are also present in this community including Sandberg's bluegrass (*Poa secunda*), galleta grass (*Pleuraphis jamesii*), bottlebrush squirreltail (*Elymus elymoides*), Indian ricegrass (*Achnatherum hymenoides*), and yellow milkvetch (*Astragalus flavus*).

Environmental Consequences

Proposed Action

Direct effects to vegetation under the Proposed Action would include short- and long-term losses of vegetation and long-term modification of community structure and composition. The total short-term surface disturbance resulting from proposed development activities on BLM land would be 8.9 acres, of which 3.5 acres of disturbance would remain for the life of the project.

Impacts in areas of interim reclamation are considered short term because reclamation would be initiated within 2 years. However, a substantially longer period, typically more than 5 years, would be required for the establishment of a self-sustaining native plant community that meets reclamation standards for cover and species composition. For habitats dominated by woodlands, many decades would be required for restoration to suitable conditions, depending on site-specific factors such as soil type, soil moisture, topography (slope, aspect, and elevation), and exposure to grazing by wild or domestic herbivores.

Indirect effects to vegetation that may result from implementation of the Proposed Action are as follows. Surface disturbance would increase the potential for noxious weed invasion and spread. Soil erosion and sedimentation may increase at locations of pads and access roads, but soil conditions would improve in the long-term in the treated areas. Changes to habitat quantity and quality would occur throughout the project area. The Proposed Action would result in an increase in the relative proportion of herbaceous, non-woody species in the areas of disturbance. Negative impacts would be minimized by implementing mitigation measures as presented in Appendix A.

No Action Alternative

Analysis on Public Land Health Standard 3 for Plant and Animal Communities (partial, see also **Wildlife, Aquatic and Wildlife, Terrestrial**)

The Rifle West Land Health Assessment determined that this portion of the landscape was not meeting Standard 3 (BLM 2005). Problems noted were the widespread invasion of cheatgrass with a corresponding loss of other functional groups such as perennial native grasses and forbs. Also, sagebrush communities were dominated by old, decadent sagebrush with poor recruitment. The surface disturbance associated with the Proposed Action has the potential to encourage expansion and dominance of the site

by cheatgrass and other weeds. Provisions to revegetate the disturbed areas with native vegetation and to control noxious weeds are presented in Appendix A. If the area is successfully revegetated and weeds are controlled, the Proposed Action would not have a negative impact on existing vegetation communities. The composition, density, and frequency of native plant species could be maintained at present levels.

The No Action alternative would not affect the ability of the area to meet the public land health standard for plant and animal communities because no new development would occur on BLM land.

Visual Resources

Affected Environment

Both well pad expansions, associated pipeline construction, and the minor access road reconstruction around the existing PA34-29 pad would be located on BLM-managed Federal land within an area classified as Visual Resource Management (VRM) Class II below the rim of the Roan Plateau (BLM 2006). The total expected short-term disturbance related to the Proposed Action would amount to 11.9 acres, of which 8.9 acres would occur on public land. The following statement describes the VRM objectives for Class II areas below the rim of the Roan Plateau (BLM 2006: C-19).

- VRM Class II – Preserve the existing character of the landscape to meet VRM Class II objectives in all areas designated at this class.

Current landscape character is best described as rural south-facing plateaus and canyons that slope toward the Colorado River valley. Numerous existing well pads, access roads, and associated pipelines are present in proximity to the proposed project. The dominant vegetation type throughout the proposed project is juniper woodlands with an understory of grasses and forbs.

Environmental Consequences

Proposed Action

The construction of the proposed project would create contrast within the immediate landscape by removing the existing vegetation, exposing bare ground, and creating a distinct line within the landscape. However, the planned construction areas on public lands would not be obviously viewable from I-70 or the Colorado River valley floor. The pads and portions of the existing roads and pipelines are more apparent from the mesas and from CR301 and CR309 in the Rulison-Morrisania Mesa area. However, the planned work would merely be a slight expansion of the existing disturbances that are background viewable from the south side of the Colorado River.

- VRM Class II – The entire project components would be located within VRM Class II but are screened by existing topography and vegetation. Furthermore, many of the planned improvements are occurring on ridgetops or small plateaus that are not directly viewable from the lower vantages along I-70 or the Colorado River valley. The Proposed Action would meet VRM Class II objectives.

No Action Alternative

Impacts to the VRM Class II viewshed are not expected to increase since there would be no new surface disturbances related to the No Action alternative.

Wildlife, Aquatic (includes an analysis on Public Land Health Standard 3)

Affected Environment

Along the upper reaches of the stream, Cottonwood Gulch is mainly a perennial stream; however, along the lower reaches the stream becomes ephemeral due mostly to the geology of the streambed. Based on limited data from the CDOW, the perennial portions of the stream have been known to support small populations of speckled dace (*Rhinichthys osculus*), a small minnow native to the western United States.

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 Cottonwood Creek and ephemeral drainages and eventually the Colorado River. Because the Proposed Action expects 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 in the COAs (Appendix A).

No Action Alternative

Under the No Action alternative, all Federal APDs would be denied. Consequently, the expansion of the DOE 2-W-29 and DOE 3-W-29 pads, the DOE3-W-29 road realignment, and associated pipeline upgrades would not occur, greatly lessening the potential for impacts to BLM aquatic wildlife species.

Analysis on Public Land Health Standard 3 for Plant and Animal Communities (partial, see also **Vegetation and Wildlife, Terrestrial and Aquatic**)

The Proposed Action and No Action alternative would result in negligible impacts to aquatic wildlife and would have little bearing on the ability to maintain or meet Standard 3 for plant and animal communities.

Wildlife, Terrestrial (includes an analysis on Public Land Health Standard 3)

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 contains winter range and severe winter range for mule deer (*Odocoileus hemionus*) and a smaller amount of winter range for Rocky Mountain elk (*Cervus elaphus nelsoni*) as mapped by the CDOW (2006). The mule deer is a recreationally important species that are common throughout suitable habitats in the region. Although most of the area is mapped as mule deer winter range, the project area also receives use by deer during the summer. Rocky Mountain elk are also recreationally important, but the project area contains relatively little suitable habitat for this species. Most winter use by elk north of I-70 in the project vicinity is along Parachute Creek and tributary canyons or along Piceance Creek, which the elk access by moving northward from summer range on the Roan Plateau.

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.

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

Birds

The highest quality raptor nesting habitat in the project vicinity is in the riparian area along Cottonwood Gulch as well as along the foot of the Roan Cliffs, outside the survey boundary. Raptors potentially nesting in the cottonwoods along Cottonwood Gulch or in large pinyon or juniper trees on nearby slopes include two small hawks, Cooper's hawk (*Accipiter cooperii*) and sharp-shinned hawk (*A. striatus*), which build stick nests in the tree canopies. Another raptor potentially nesting along Smith Gulch is the American kestrel (*Falco sparverius*), a small falcon that commonly nests in abandoned woodpecker holes or other tree cavities. Two larger raptors that are common throughout the region—the red-tailed hawk and great horned owl—also nest in trees as well as rock ledges. The sandstone bluffs are suitable for redtails and great horned owls, as well as American kestrels and a large non-raptor, the common raven (*Corvus corax*). Although these species are potentially present, no nests or individuals were observed during site surveys.

Passerine (perching) birds commonly found in the area in addition to the common raven and the species addressed previously under Migratory Birds and Special-Status Species include residents or short-distance migrants such as the western scrub-jay (*Aphelocoma californica*), black-billed magpie (*Pica hudsonia*), American robin (*Turdus migratorius*), Townsend's solitaire (*Myadestes townsendi*), blue-gray gnatcatcher (*Poliophtila caerulea*), mountain chickadee (*Poecile gambeli*), and house finch (*Carpodacus mexicanus*). A non-native gallinaceous species widely introduced as a gamebird, the chukar (*Alectoris chukar*), is present in relatively low numbers on the nearby slopes below the Roan Cliffs.

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 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 (*Liochlorophis vernalis*).

The area is also within the known range of the Great Basin spadefoot [toad] (*Spea intermontana*), Woodhouse's toad (*Bufo woodhousii*), and western chorus frog (*Pseudacris triseriata*). Within the CRVFO and vicinity, the spadefoot toad and the true toad occur primarily along ephemeral washes that do not support fish and contain pools of water for a period of at least a few weeks every spring. The chorus frog occurs primarily in cattail and bulrush wetlands and along the vegetated margins of seasonal or perennial ponds and slow-flowing streams.

Environmental Consequences

Proposed Action

Direct impacts to terrestrial wildlife from the Proposed Action may include habitat loss or modification as well as interference with critical behaviors (feeding, breeding) due to the operation of equipment and increased human presence. These could result from construction related to pad expansion and changes to the existing access road and pipeline corridors; increased noise during drilling and completion activities; and increased vehicular traffic. Some potential also exists for increased wildlife mortality due to collisions with project-related traffic. 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. Attached to Federal lease COC62162 is a Timing Limitation for big game winter habitat that restricts construction, drilling, and completion activities from December 1 to April 30 which will minimize impacts to big game during those critical winter months (Appendix A).

Additional, indirect habitat loss may occur if increased human activity (e.g., traffic, noise) causes intolerant species to be displaced to less suitable habitats, where survival or reproductive success are reduced. The extent of indirect habitat loss varies by species, type and duration of disturbance, and amount of screening provided by vegetation and topography. Mortality of eggs or young of birds may result due to nest abandonment or reduced attentiveness by one or both adults. 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, all Federal APDs would be denied along with the expansion of the DOE 2-W-29 and DOE 3-W-29 pads and associated ancillary facilities, thus greatly lessening the impacts to terrestrial wildlife species.

SUMMARY OF CUMULATIVE IMPACTS

Until relatively recently, modifications of the region have been characteristic of agricultural and ranching lands, with localized industrial impacts associated with the railroad and I-70 corridors. More recently, these changes are cumulative to the growth of residential and commercial uses, utility corridors, oil and gas developments, and other rural industrial uses. These increasing activity levels have accelerated the accumulation of impacts in the area. Cumulative impacts have included: (1) direct habitat losses; (2) habitat fragmentation and losses in habitat effectiveness; (3) elevated potential for runoff, erosion, and

sedimentation; (4) expansion of noxious weeds and other invasive species; and (5) increased noise and traffic and reductions in the scenic quality of the area (BLM 1999a: 4-1 to 4-68).

Although none of the cumulative impacts described in the 1999 FSEIS was characterized as significant, and while new technologies and regulatory requirements have reduced the impacts of some land uses, it is nonetheless clear that past, present, and reasonably foreseeable future actions has had and would continue to have adverse affects on various elements of the human environment. The anticipated impact levels for existing and future actions range from negligible to locally major, and primarily negative, for specific resources. The primary reasons for this assessment are twofold: (1) the rate of development, particularly oil and gas development, has until recently been increasing in the area, resulting in an accelerated accumulation of individually nominal effects; and (2) residential and commercial expansion, as well as most of the oil and gas development, has occurred private holdings lands where mitigation measures designed to protect and conserve resources are not in effect.

It is clear that the Proposed Action would contribute to the collective adverse impact for some resources. Although the contribution would be very 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

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INTERDISCIPLINARY REVIEW

BLM participants in preparation of this EA are listed in Table 11.

Table 11. BLM Interdisciplinary Team Authors and Reviewers		
<i>Name</i>	<i>Title</i>	<i>Areas of Participation</i>
Jim Byers	Natural Resource Specialist	EA Project Lead, Access and Transportation, Air Quality, Noise, Range Management, Socio-Economics, Soil, Surface Water, Visual Resources, Waters of the U.S.
Allen Crockett	Supervisory Nat. Res. Spec./Phys. Sci.	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
Karen Conrath	Geologist	Geology and Minerals, Groundwater, Paleontology
Dane Geyer	Petroleum Engineer	Downhole COAs

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The Environmental Assessment (EA) analyzing the environmental effects of the Proposed Action has been reviewed. The 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, which entails construction and associated maintenance activities for the existing DOE 2-W-29 and DOE 3-W-29 well pads, access roads, and ancillary facilities, including natural gas, water and condensate pipeline as shown on the plats, as well as drilling, completion, and production operations for six new Federal wells on the DOE 2-W-29 pad and 15 new Federal wells on the DOE 3-W-29 pad.

This decision does not authorize initiation of any surface disturbance on BLM-administered land or drilling and related activities of any Federal oil and gas wells. Such authorization will occur only upon approval by BLM of Applications for Permits to Drill (APDs) for the new Federal wells, as submitted by Williams Production RMT Company.

This decision will provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on valid oil and gas leases.

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. Environmental impacts would be mitigated by measures incorporated into the Proposed Action or applied and enforced by BLM as Conditions of Approval (COAs).
3. Furthermore, realignment of the existing to access road and pipeline to circumvent the A34-29 well pad, as described in the EA, would greatly improve safety associated with ongoing use of this existing infrastructure.

MITIGATION MEASURES: Mitigation measures to be applied as COAs are presented in Appendices A and B.

NAME OF PREPARER: Jim Byers

SIGNATURE OF AUTHORIZED OFFICIAL:



Acting Associate Field Manager

DATE SIGNED: August 26, 2010

APPENDIX A

Surface-Use and Downhole Conditions of Approval

DOE 2-W-29 pad

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**SURFACE-USE CONDITIONS OF APPROVAL
DOE 2-W-29 WELL PAD
DOI-BLM-CO-N040-2010-0058-EA**

1. Administrative Notification. The operator shall notify the BLM representative at least 48 hours prior to initiation of construction. If requested by the BLM project NRS, the operator and its contractors and subcontractors shall attend a pre-construction meeting prior to initiation of ground-disturbing activities.
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 Office, at 970-243-1199, ext. 16.

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 Office, at 970-243-1199, ext. 16. 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 #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.

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

Requests for use of soil amendments, including basic product information, shall be submitted to the BLM for approval.

- 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% age 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 reseedings 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. To minimize impacts to wintering big game, no construction, drilling or completion activities shall occur during a Timing Limitation (TL) period from **December 1 to April 30 annually**
 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 mile 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. Raptor nest surveys for Cottonwood Gulch in 2008 did not result in location of raptor nest structures within 0.25 mile of a well pad or 0.125 mile of an access road, pipeline, or other surface facility associated with this project. Therefore, a Raptor Nesting Timing Limitation COA is not attached to this EA. To ensure compliance with the Migratory Bird Treaty Act, the operator should schedule construction or drilling activities to begin outside the raptor nesting season (February 1 to August 15) if practicable. If initiation of construction, drilling, or completion activities during these dates cannot be avoided, the operator is responsible for complying with the Migratory Bird Treaty Act, which prohibits the “take” of birds or active nests (those containing eggs or young), including nest failure caused by noise and human activity.

12. Migratory Birds. It shall be the responsibility of the operator to comply with the Migratory Bird Treaty Act (MBTA) with respect to “take” of migratory bird species. 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 and visit <http://www.fws.gov/mountain-prairie/contaminants/oilpits.htm>.
13. Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all surface-disturbing activities are prohibited from **May 15 to July 15** to reduce impacts to Birds of Conservation Concern (BCC). An exception to this COA will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities 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 15 and continue into the 60-day period at the same location.
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 cattleguard 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

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. Where practicable, 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.

DOWNHOLE CONDITIONS OF APPROVAL
Applications for Permit to Drill
DOE 2-W-29 Well Pad

Company/Operator: Williams Production RMT Company

Surface Location: SENE, Section 29, Township 6 South, Range 95 West, 6th P.M.

<u>Well Name</u>	<u>Well No.</u>	<u>Bottomhole Location</u>	<u>Lease</u>
PA	522-29	SENW Sec. 29, T. 6S, R. 95W.	COC62162
PA	422-29	SENW Sec. 29, T. 6S, R. 95W.	COC62162
PA	322-29	SENW Sec. 29, T. 6S, R. 95W.	COC62162
PA	321-29	NENW Sec. 29, T. 6S, R. 95W.	COC62162
PA	22-29	SENW Sec. 29, T. 6S, R. 95W.	COC62162
PA	21-29	NENW Sec. 29, T. 6S, R. 95W.	COC62162

1. Twenty-four hours prior to (a) spudding, (b) conducting BOPE tests, (c) 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: Steve Ficklin at 970-876-9036, David Giboo at 970-876-9038, and Todd Sieber at 970-876-9044.
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, changes or variances to the BOPE, deviating from conditions of approval, and conducting other operations not specified within the APD. Contact Dane Geyer at 970-876-9048 (office) or 970-589-6887 (cell) for verbal approvals. A secondary contact is William Howell at 970-876-9049 (office) or 970-319-5837 (cell).
3. If a well control issue arises (e.g. kick, blowout, or water flow), casing failure occurs, or an increase in bradenhead pressure occurs during fracturing operations, Dane Geyer shall be notified within 24 hours from the time of the event.
4. The BOPE shall be tested and conform to Onshore Order #2 for a 3M system.
5. A casinghead rated to 3,000 psi or greater shall be utilized.
6. An electrical/mechanical mud monitoring equipment shall be functional prior to drilling out the next shoe. As a minimum, this shall include a pit volume totalizer, stroke counter, and flow sensor.
7. Gas detecting equipment shall be installed in the mud return system, prior to drilling out the next shoe, and hydrocarbon gas shall be monitored for pore pressure changes.
8. A gas buster shall be functional and all flare lines effectively anchored in place, prior to drilling out the next shoe. The discharge of the flare lines shall be a minimum of 100 feet from the wellhead and targeted at bends. The panic line shall be a separate line (not open inside the buffer tank) and effectively anchored. All lines shall be downwind of the prevailing wind direction and directed into a flare pit, which cannot be the reserve pit. The flare system shall use an automatic ignition. Where

noncombustible gas is likely or expected to be vented, the system shall be provided supplemental fuel for ignition and maintain a continuous flare.

9. Prior to commencing fracturing operations, the production casing shall be tested to the maximum anticipated surface fracture pressure and held for 15 minutes. If leak-off is found, Dane Geyer shall be notified within 24 hours of the failed test, but prior to proceeding with fracturing operations. The test shall be charted and set to a time increment as to take up no less than a quarter of the chart per test. The chart shall be submitted with the well completion report.
10. On the first well drilled on this pad, a triple combo shall be run from TD to the surface casing shoe. This log shall be in accordance with 43 CFR 3162.4(b), which states that the operator shall submit a complete set of electrical/mechanical logs in .LAS format with standard Form 3160-4, Well Completion or Recompletion Report and LOG. Contact Todd Sieber at 970-876-9044 or anthony_sieber@blm.gov for clarification.
11. As a minimum, cement shall be brought to 200 feet above the Mesaverde. Prior to commencing fracturing operations, a CBL shall be run (from TD to 200 feet above the TOC) and an electronic copy submitted to the CRVFO. If the TOC is lower than required or the cement sheath of poor quality, then, within 48 hours from running the CBL and prior to commencing fracturing operations, a CRVFO petroleum engineer shall be notified for further instruction.
12. Submit the (a) mud/drilling log (e.g. Pason disc), (b) driller's event log/operations summary report, (c) production test volumes, (d) directional survey, and (e) Formation Integrity Test results with the well completion report. Contact Dane Geyer at 970-876-9048 for clarification.

Wells: PA21-29, PA22-29, PA321-29, PA322-29, PA422-29 & PA522-29

Well Pad: DOE 2-W-29

Operator: Williams Production RMT Company

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APPENDIX B

Surface-Use and Downhole Conditions of Approval

DOE 3-W-29 pad

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**SURFACE-USE CONDITIONS OF APPROVAL
DOE 3-W-29 WELL PAD
DOI-BLM-CO-N040-2010-0058-EA**

1. Administrative Notification. The operator shall notify the BLM representative at least 48 hours prior to initiation of construction. If requested by the BLM project NRS, the operator and its contractors and subcontractors shall attend a pre-construction meeting prior to initiation of ground-disturbing activities.
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 Office, at 970-243-1199, ext. 16.

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 Colorado Office, at 970-243-1199, ext. 16. 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 #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.

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

Requests for use of soil amendments, including basic product information, shall be submitted to the BLM for approval.

- 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% age 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 reseedings 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. To minimize impacts to wintering big game, no construction, drilling or completion activities shall occur during a Timing Limitation (TL) period from **December 1 to April 30 annually**
 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 mile 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. Raptor nest surveys for Cottonwood Gulch completed in 2008 did not result in location of raptor nest structures within 0.25 mile of a well pad or 0.125 mile of an access road, pipeline, or other surface facility associated with this project. Therefore, a Raptor Nesting Timing Limitation COA is not attached to this EA. To ensure compliance with the Migratory Bird Treaty Act, the operator should schedule construction or drilling activities to begin outside the raptor nesting season (February 1 to August 15) if practicable. If initiation of construction, drilling, or completion activities during these dates cannot be avoided, the operator is responsible for complying with the Migratory Bird Treaty Act, which prohibits the “take” of birds or active nests (those containing eggs or young), including nest failure caused by noise and human activity.

12. Migratory Birds. It shall be the responsibility of the operator to comply with the Migratory Bird Treaty Act (MBTA) with respect to “take” of migratory bird species. 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 and visit <http://www.fws.gov/mountain-prairie/contaminants/oilpits.htm>.
13. Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all surface-disturbing activities are prohibited from **May 15 to July 15** to reduce impacts to Birds of Conservation Concern (BCC). An exception to this COA will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities 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 15 and continue into the 60-day period at the same location.
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 cattleguard with associated bypass gate shall be installed across the roadway to control grazing livestock.
15. Paleontological Resource Monitoring. Surface disturbance in areas considered to be Class 4/5 for paleontological resources shall have a field survey in exposed bedrock areas. Monitoring and spot checking shall be performed by a qualified paleontologist or their BLM-approved representative during any pad, road or pipeline construction related to the DOE 3-W-29 pad including the planned road realignment work near the PA34-29 pad. Local conditions, such as vegetated areas or isolated bedrock exposure may affect the need and intensity of field surveys. For areas determined to have high potential, it may be appropriate to examine the area when bedrock is initially exposed, occasionally during active excavation, and when maximum exposure is reached and before backfilling has begun.
16. Paleontological Resources Education/Discovery. 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

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. Where practicable, 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.
22. Facility Location. The production area shown on the Production Equipment Detail in the APD plats shall be sized to only allow space for separator units since the water and oil shall be piped down to the PA313-33 tank pad.

DOWNHOLE CONDITIONS OF APPROVAL
Applications for Permit to Drill
DOE 3-W-29 Well Pad

Company/Operator: Williams Production RMT Company

Surface Location: SESW, Section 29, Township 6 South, Range 95 West, 6th P.M.

<u>Well Name</u>	<u>Well No.</u>	<u>Bottomhole Location</u>	<u>Lease</u>
PA	514-29	SWSW Sec. 29, T. 6S, R. 95W.	COC62161
PA	323-29	NESW Sec. 29, T. 6S, R. 95W.	COC62161
PA	314-29	SWSW Sec. 29, T. 6S, R. 95W.	COC62161
PA	412-29	SWNW Sec. 29, T. 6S, R. 95W.	COC62161
PA	313-29	NWSW Sec. 29, T. 6S, R. 95W.	COC62161
PA	312-29	SWNW Sec. 29, T. 6S, R. 95W.	COC62161
PA	13-29	NWSW Sec. 29, T. 6S, R. 95W.	COC62161
PA	12-29	SWNW Sec. 29, T. 6S, R. 95W.	COC62161
PA	614-29	SESW Sec. 29, T. 6S, R. 95W.	COC62161
PA	523-29	NESW Sec. 29, T. 6S, R. 95W.	COC62161
PA	513-29	SWNW Sec. 29, T. 6S, R. 95W.	COC62161
PA	512-29	SWNW Sec. 29, T. 6S, R. 95W.	COC62161
PA	423-29	NESW Sec. 29, T. 6S, R. 95W.	COC62161
PA	414-29	SWSW Sec. 29, T. 6S, R. 95W.	COC62161
PA	413-29	NWSW Sec. 29, T. 6S, R. 95W.	COC62161

1. Twenty-four hours prior to (a) spudding, (b) conducting BOPE tests, (c) 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: Steve Ficklin at 970-876-9036, David Giboo at 970-876-9038, and Todd Sieber at 970-876-9044.
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, changes or variances to the BOPE, deviating from conditions of approval, and conducting other operations not specified within the APD. Contact Dane Geyer at 970-876-9048 (office) or 970-589-6887 (cell) for verbal approvals. A secondary contact is William Howell at 970-876-9049 (office) or 970-319-5837 (cell).
3. If a well control issue arises (e.g. kick, blowout, or water flow), casing failure occurs, or an increase in bradenhead pressure occurs during fracturing operations, Dane Geyer shall be notified within 24 hours from the time of the event.
4. **Surface and Production String Centralization Program for the PA 312-29 well only:**

Surface string: two turbolizer per joint through the build section, a turbolizer on each of the bottom three joints, and one turbolizer per two joints for the remaining section(s) to be cemented.

Production string: two turbolizers per joint through drop section to the top of the Mesaverde, and one turbolizer per three joints for the remaining section(s) to be cemented.

API approved bow spring turbolizers shall be utilized. Turbolizers shall not ride free on the casing joints, rather, to prevent them from being pushed in the hole, turbolizers shall be installed over an API stop collar or casing collar, utilize integrated stop collars, or combination of the previously mentioned.

5. The BOPE shall be tested and conform to Onshore Order #2 for a 3M system.
6. A casinghead rated to 3,000 psi or greater shall be utilized.
7. An electrical/mechanical mud monitoring equipment shall be functional prior to drilling out the next shoe. As a minimum, this shall include a pit volume totalizer, stroke counter, and flow sensor.
8. Gas detecting equipment shall be installed in the mud return system, prior to drilling out the next shoe, and hydrocarbon gas shall be monitored for pore pressure changes.
9. A gas buster shall be functional and all flare lines effectively anchored in place, prior to drilling out the next shoe. The discharge of the flare lines shall be a minimum of 100 feet from the wellhead and targeted at bends. The panic line shall be a separate line (not open inside the buffer tank) and effectively anchored. All lines shall be downwind of the prevailing wind direction and directed into a flare pit, which cannot be the reserve pit. The flare system shall use an automatic ignition. Where noncombustible gas is likely or expected to be vented, the system shall be provided supplemental fuel for ignition and maintain a continuous flare.
10. Prior to commencing fracturing operations, the production casing shall be tested to the maximum anticipated surface fracture pressure and held for 15 minutes. If leak-off is found, Dane Geyer shall be notified within 24 hours of the failed test, but prior to proceeding with fracturing operations. The test shall be charted and set to a time increment as to take up no less than a quarter of the chart per test. The chart shall be submitted with the well completion report.
11. On the first well drilled on this pad, a triple combo shall be run from TD to the surface casing shoe. This log shall be in accordance with 43 CFR 3162.4(b), which states that the operator shall submit a complete set of electrical/mechanical logs in .LAS format with standard Form 3160-4, Well Completion or Recompletion Report and LOG. Contact Anthony Sieber at 970-876-9044 or anthony_sieber@blm.gov for clarification.
12. As a minimum, cement shall be brought to 200 feet above the Mesaverde. Prior to commencing fracturing operations, a CBL shall be run (from TD to 200 feet above the TOC) and an electronic copy submitted to the CRVFO. If the TOC is lower than required or the cement sheath of poor quality, then, within 48 hours from running the CBL and prior to commencing fracturing operations, a CRVFO petroleum engineer shall be notified for further instruction.
13. Submit the (a) mud/drilling log (e.g. Pason disc), (b) driller's event log/operations summary report, (c) production test volumes, (d) directional survey, and (e) Formation Integrity Test results with the well completion report. Contact Dane Geyer at 970-876-9048 for clarification.