

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

ENVIRONMENTAL ASSESSMENT

NUMBER: DOI-BLM-CO-N040-2010-0040-EA

CASEFILE NUMBER: Federal Leases COC62161 and COC62163

PROJECT NAME: Proposal to Drill 15 Wells from Proposed PA 22-21 Pad Located on BLM Land in Cottonwood Gulch East of Parachute, Garfield County, Colorado..

LOCATION: Township 6 South (T6S), Range 95 West (R95W), Section 21, SE¹/₄NW¹/₄, Sixth Principal Meridian (see Figure 1).

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

Table 1. Surface and Bottomhole Locations of Proposed Wells		
<i>Proposed Wells</i>	<i>Surface Locations (Section 21, T6S, R95W)</i>	<i>Bottomhole Locations (Section 21, T6S, R95W)</i>
PA 11-21	SW ¹ / ₄ NW ¹ / ₄ , 2501 feet FNL 1406 feet FWL	NW ¹ / ₄ NW ¹ / ₄ , 202 feet FNL 790 feet FWL
PA 21-21	SW ¹ / ₄ NW ¹ / ₄ , 2501 feet FNL 1436 feet FWL	NE ¹ / ₄ NW ¹ / ₄ , 252 feet FNL 2223 feet FWL
PA 22-21	SE ¹ / ₄ NW ¹ / ₄ , 2511 feet FNL 1466 feet FWL	SE ¹ / ₄ NW ¹ / ₄ , 2517 feet FNL 2061 feet FWL
PA 311-21	SE ¹ / ₄ NW ¹ / ₄ , 2501 feet FNL 1398 feet FWL	NW ¹ / ₄ NW ¹ / ₄ , 533 feet FNL 793 feet FWL
PA 321-21	SE ¹ / ₄ NW ¹ / ₄ , 2501 feet FNL 1443 feet FWL	NE ¹ / ₄ NW ¹ / ₄ , 568 feet FNL 2227 feet FWL
PA 322-21	SE ¹ / ₄ NW ¹ / ₄ , 2511 feet FNL 1443 feet FWL	SW ¹ / ₄ NW ¹ / ₄ , 2161 FNL 1676 feet FWL
PA 411-21	SE ¹ / ₄ NW ¹ / ₄ , 2511 feet FNL 1406 feet FWL	NW ¹ / ₄ NW ¹ / ₄ , 854 feet FNL 803 feet FWL
PA 421-21	SE ¹ / ₄ NW ¹ / ₄ , 2501 feet FNL 1451 feet FWL	NE ¹ / ₄ NW ¹ / ₄ , 887 feet FNL 2291 feet FWL
PA 422-21	SE ¹ / ₄ NW ¹ / ₄ , 2511 feet FNL 1473 feet FWL	SE ¹ / ₄ NW ¹ / ₄ , 1857 feet FNL 2433 feet FWL
PA 511-21	SE ¹ / ₄ NW ¹ / ₄ , 2511 feet FNL 1398 feet FWL	NW ¹ / ₄ NW ¹ / ₄ , 1136 feet FNL 654 feet FWL
PA 512-21	SE ¹ / ₄ NW ¹ / ₄ , 2511 feet FNL 1436 feet FWL	SW ¹ / ₄ NW ¹ / ₄ , 1494 feet FNL 978 feet FWL
PA 521-21	SE ¹ / ₄ NW ¹ / ₄ , 2501 feet FNL 1466 feet FWL	NE ¹ / ₄ NW ¹ / ₄ , 2294 feet FNL 1219 feet FWL
PA 522-21	SE ¹ / ₄ NW ¹ / ₄ , 2501 feet FNL 1476 feet FWL	SE ¹ / ₄ NW ¹ / ₄ , 1530 feet FNL 2312 feet FWL
PA 14-16	SW ¹ / ₄ NW ¹ / ₄ , 2501 feet FNL 1413 feet FWL	SW ¹ / ₄ SW ¹ / ₄ , 129 feet FWL 866 feet FSL
PA 314-16	SW ¹ / ₄ NW ¹ / ₄ , 2501 feet FNL 1429 feet FWL	SW ¹ / ₄ SE ¹ / ₄ , 799 feet FWL 454 feet FSL

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

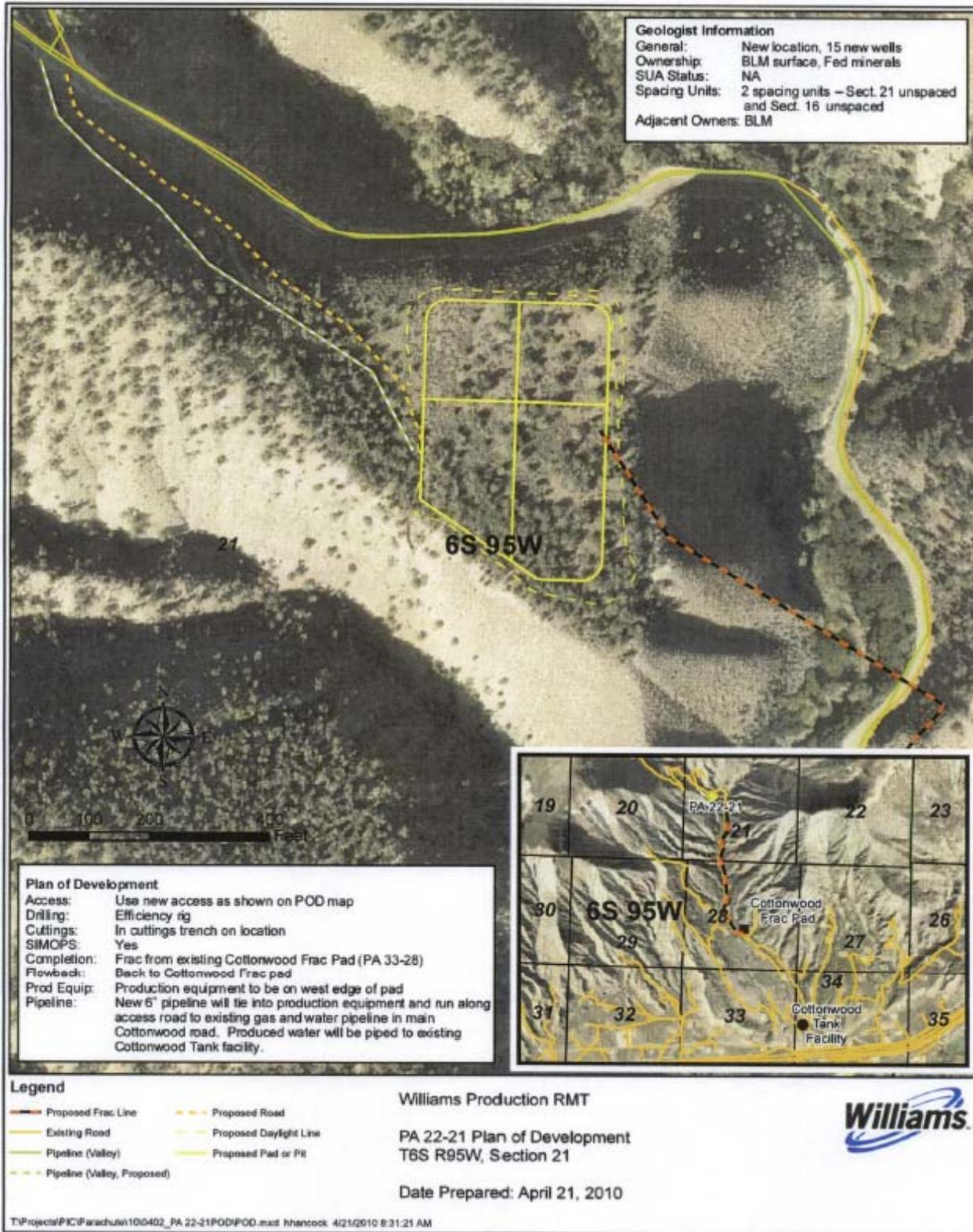


Figure 1. Proposed Location of PA 22-21 Well Pad, Cottonwood Gulch Area.

PROPOSED ACTION

Williams Production RMT Company (“Williams”) proposes to drill and develop 15 Federal oil and gas wells from the proposed PA 22-21 well pad located on BLM land in Cottonwood Gulch, about 4 miles northeast of Parachute, Colorado. The Federal wells would be directionally drilled from this location into the underlying Federal leases COC62161 and COC62163. Although the pad would be located on public land, public access would not be available, because the existing access road into the Cottonwood Gulch development area crosses public lands north of Interstate Highway 70 (I-70). Lease stipulations applicable to the proposed wells are presented in Table 2. The pad would be situated on a bench along the east-facing sideslopes of Cottonwood Gulch and served by a short spur road off an existing access road. A gas-gathering pipeline is in place along the existing road.

The project area is accessed from the BLM office in Silt, Colorado, by existing I-70 at Rulison (Exit 81), then driving west approximately 3.5 miles along the North Frontage Road (Highway 6 and 24) to the Cottonwood Gulch road. The pad site is approximately 3.7 miles up (north along) the Cottonwood Gulch road from the intersection with the North Frontage Road. The new spur road to the PA 22-21 pad from the Cottonwood Gulch road would be approximately 600 feet long and located on BLM lands.

A new 6-inch diameter natural gas pipeline and a new 4-inch diameter water pipeline would be buried 3 to 4 feet deep within the access road and would tie into the main 12-inch diameter natural gas pipeline and 4-inch diameter water lines in the main Cottonwood Gulch road. Produced water would be conveyed via pipeline to the existing Cottonwood Tank Facility. Condensate would be collected on the pad in tanks and trucked to the Cottonwood Tank Facility. The wells would be simultaneously drilled and completed using conventional drilling techniques. Drill cuttings from the 15 wells would be deposited in a 2,690-cubic yard cuttings trench excavated along the northern side of the pad. After the cuttings are dried and meet Colorado Oil and Gas Conservation Commission (COGCC) specifications, they would be hauled by truck to an approved disposal site. The completion work would occur on the pad using hydraulic fracturing (“frac”) water conveyed in a surface line from the Cottonwood Frac Pad (PA 33-28), a distance of approximately 1 mile. Separators would be located along the western edge of the pad near the road entrance. During the onsite visit, it was determined that the cuttings trench and production equipment locations would be permitted as proposed by Williams, due to the large amount of fill that would be generated from access road construction. The southeastern corner of the pad would be pulled back at the time of interim reclamation.

The expected short-term disturbance of the pad and the access road would be 4.9 acres, all of which would be on public land administered by the BLM. Following interim reclamation, the area of long-term disturbance would be 2.03 acres, assuming that acceptable vegetation becomes established on the reclaimed portion. The road would undergo final reclamation when the wells are plugged and abandoned. Construction work would follow the guidelines established in the BLM Gold Book, *Surface Operating Standards for Oil and Gas Exploration & Development* (USDI and USDA 2007). A road maintenance program during the production phase of the wells would include blading, ditching, culvert installation and cleanout, weed control, and application of additional gravel where excessive rutting or erosion occurs. 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 intermediate 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 that would be implemented as mitigation measures for this project. The operator would be responsible for continuous inspection and maintenance of the pad, access road, and pipeline.

NO ACTION ALTERNATIVE

The Proposed Action involves Federal subsurface minerals encumbered with Federal oil and gas leases that grant the lessee a right to explore and develop the leases. Although BLM cannot deny the right to drill and develop the leasehold, individual APDs can be denied to prevent unnecessary and undue degradation. The No Action alternative constitutes denial of the APDs associated with the Proposed Action. Under the No Action alternative, none of the proposed development described in the Proposed Action would take place, since the pad and access road require use of BLM land.

PURPOSE AND NEED FOR THE ACTION

The purpose of the action is to develop oil and gas resources on Federal lease COC62161 and COC62163 consistent with existing Federal lease rights. The action is needed to increase the development of oil and gas resources for commercial marketing to the public.

SUMMARY OF LEASE STIPULATIONS

Table 2 lists the lease stipulations associated with the Proposed Action.

Table 2. Lease Stipulations Applicable to the Proposed Action		
<i>Lease</i>	<i>Lands Where Applied</i>	<i>Lease Stipulation</i>
No Surface Occupancy (NSO)		
COC62161	T6S, R95W Sec. 21: Lot 2, N2NE, SWNE, S2NW, NESW; Sec. 28: W2NW, NWSE;	NSO -2. Riparian and Wetland Zones: To maintain the proper function of riparian zones, activities associated with oil and gas exploration and development, including roads, transmission lines and storage of facilities, are restricted to an area beyond the outer edge of the riparian vegetation. An exception may be granted if a) the Authorized Officer determines that the activity will cause no loss of riparian vegetation, or that the vegetation lost can be replaced within 3 to 5 years with vegetation of like species and age class or b) within the riparian vegetation, an exception is permitted for stream crossings, if an area analysis indicates that no suitable alternative is available.
COC62163	T6S, R95W Sec. 17: Lot 3, SESE; T6S, R96W Sec. 25: Lot 1, SESW; Sec. 35: Lot 1; Sec. 36: Lots 1, 2; E2NW;	
COC62163	T6S, R96W Sec. 26: Lot 5; Sec. 35: Lots 3-6;	NSO-7. Raptors: To protect raptors (includes golden eagle and Osprey, falcons except American kestrel, all accipiters, hawks, and owls) within 0.125-mile radius of a nest site. Exception Criteria: The NSO area may be altered depending on the active status of the nest site or the geographical relationship to the nest site topographic barriers and vegetation screening.
COC62161	T6S, R95W Sec. 20: Lots 4-6; SWNE; Sec. 21: N2NE, SENE, NENW;	NSO-11. Wildlife Seclusion Areas: To protect fourteen seclusion areas that provide high wildlife value: The Roan Cliffs, Cottonwood Gulch, and Webster Hill/Yellowslide Gulch (all in the NOSR Production Area); Hayes Gulch, Riley Gulch, Starkey Gulch, Crawford Gulch, Magpie Gulch, Paradise Creek, Coal Ridge, Lower Garfield, Jackson Gulch, Bald Mountain and Battlement Mesa. Exceptions may be granted based on approval by the Authorized Officer of a mitigation plan that suitably addresses the wildlife seclusion values at risk. These areas provide several unique qualities, such as an optimum mix of quality forage, cover and water; proximity to natural migration corridors; birthing areas; topographic features which moderate severe winter conditions; and seclusion from human intrusion.
COC62163	T6S, R95W Sec. 16: Lots 4, 5; Sec. 16: S2SW; Sec. 17: Lot 3; Sec. 20: Lot 3; T6S, R96W Sec. 25: Lot 1; SESW, SWSE; Sec. 26: Lots 5-7; SENE, N2SE; Sec. 35: Lots 1-3;	

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COC62161	T6S, R95W Sec. 20: Lots 1, 4-9; Sec. 20: NENE, S2NE, N2SE; Sec. 21: Lots 1-4; N2, N2S2; Sec. 26: Lots 3-6; N2SW; Sec. 27: Lots 1-5, 7, 8; NESE; Sec. 28: Lots 1-4; NWNW;	<p>NSO-15. Steep Slopes: To maintain site stability and site productivity, on slopes greater than 50%. This NSO does not apply to pipelines.</p> <p>An exception may be granted in the event the lessee demonstrates that operations can be conducted without causing unacceptable impacts and that less restrictive measures will protect the public interest.</p>
COC62163	T6S, R95W Sec. 16: Lots 4, 5; S2SW; Sec. 17: Lot 3; SESE; Sec. 20: Lot 3; T6S, R96W Sec. 25: Lot 1; SESW, S2SE; Sec. 26: Lots 5-7; SENE, N2SE Sec. 35: Lots 1-7; Sec. 36: Lots 1, 2-7; N2NE, SENE, NESE;	
COC62161	T7S, R96W Sec. 1: Lot 1;	<p>NSO-18. Interstate 70 Viewshed: To protect slopes over 30% with high visual sensitivity in the Interstate 70 Viewshed. Lands with high visual sensitivity are those lands within 5 miles of the Interstate, of moderate to high visual exposure, where details of vegetation and landform are readily discernible and changes in visual contrast can be easily noticed by the casual observer on the Interstate.</p> <p>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>
COC62163	T6S, R95W Sec. 20: Lots 4-8; S2NE, N2SE; Sec. 21: Lots 3, 4; NE, N2SE; Sec. 26: Lot 5; NWSW; Sec. 27: Lots 1-5, 7, 8; Sec. 28: Lots 1, 2, 4; T6S, R95W Sec. 16: Lots 4, 5; S2SW; Sec. 17: Lot 3; Sec. 20: Lot 3; T6S, R96W Sec. 25: Lot 1; S2SE; Sec. 26: Lots 5-7; SENE, N2SE; Sec. 35: Lots 1-7; Sec. 36: E2NE, NESE;	
Timing Limitation (TL)		
COC62161	T6S, R95W Sec. 20: Lots 1, 4-9; NENE, S2NE, N2SE; Sec. 21: Lots 1-4; Sec. 26: Lots 3-6; N2SW; Sec. 27: Lots 1-8; N2S2, SESE; Sec. 28: Lots 1-4; W2W2, N2SE;	<p>TL-1. Big Game Winter Habitat (12/1 – 4/30). Exception may be granted under mild winter conditions for the last 60 days after consultation with CDOW</p>
COC62163	T6S, R95W Sec. 16: Lots 4, 5; S2SW; Sec. 17: Lot 3; SESE; Sec. 20: Lots 2, 3; T6S, R96W Sec. 25: Lot 1; SESW, S2SE Sec. 26: Lots 5-7; SENE, N2SE; Sec. 35: Lots 1-7; Sec. 36: Lots 1, 2, 7; NE, E2NW, NESE	

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<i>Lease</i>	<i>Lands Where Applied</i>	<i>Lease Stipulation</i>
	T7S, R96W Sec. 1: Lot 1;	
COC62163	T6S, R96W Sec. 25: Lot 5; Sec. 35: Lot 3-6;	TL-6. Raptors. No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities (February 1 to August 15). Raptor nesting and fledgling habitat (included the golden eagle, falcons except American kestrel, all accipiters, buteos, and owls) for a 0.25-mile mile buffer zone around the nest. Exception Criteria: During the years when a nest site is unoccupied by May 15, the seasonal limitation may be suspended. It may also be suspended once the young have fledged and dispersed from the nest.
COC62161	T6S, R95W Sec. 21: E2NE;	TL-11. Bald Eagle Winter Roost Sites (11/16 – 4/15) for a 0.5-mile buffer around the roost site. Exception may be granted after a formal Section 7 consultation with the U.S. Fish and Wildlife Service. If there is partial or complete screening of the area of activity, the roost site buffer may be reduced to one-quarter mile.
Controlled Surface Use (CSU)		
COC62161	T6S, R95W Sec. 21: Lots 1, 2; NENE, W2NE, E2NW, SWNW, N2SW; Sec. 27: NESW, NWSE, SESE; Sec. 28: W2NW, N2SE	CSU-2. Riparian and Wetland Zones. Within 500 feet of the outer edge of the riparian or wetland vegetation, activities associated with oil and gas exploration and development, including roads, pipelines and wellpads, may require special design, construction, and implementation measures, including relocation of operations beyond 200 meters, in order to protect the values and functions of the riparian and wetland zones. Such measures will be based on the nature, extent and value of the riparian or wetland area. In general, the areas immediately adjacent to the riparian vegetation are most important to the function of the riparian zone and will be avoided.
COC62161	T6S, R95W Sec. 20: Lots 1, 4-9; Sec. 20: NENE, S2NE, N2SE; Sec. 21: Lots 1-4; N2, N2S2; Sec. 26: Lots 3-6; N2SW; Sec. 27: Lots 1-8; N2S2, SESE; Sec. 28: Lots 1-4; W2W2, N2SE;	CSU-4. Erosive Soil and Slopes Great than 30%. Special design, construction, operation, and reclamation measures will be required to limit the amount of surface disturbance, to reduce erosion potential, to maintain site stability and productivity, and to insure successful reclamation in identified areas of highly erosive soils and of slopes greater than 30%. Highly erosive soils are soils in the “severe” and “very severe” erosion classes based on NARCS Erosion Condition mapping. Area identified in the RMP as Erosion Hazard Areas and Water Quality Management Areas are also included in this stipulation. Implementation may also include relocation of operation beyond 200 meters.
COC62163	T6S, R 95W Sec. 16: Lots 4,5; S2SW; Sec. 17: Lot 3; SESE; Sec. 20: Lots 2, 3; T6S, R96W Sec. 25: Lot 1; SESW, S2SE; Sec. 26: Lots 5-7; SENE, N2SE; Sec. 35: Lots 1-7; Sec. 36: Lots 1, 2, 7; NE, E2NW, NESE;	
COC62161	T6S, R95W Sec. 20: Lots 1, 4-9; NENE, S2NE, N2SE; Sec. 21: Lots 1-4; N2, N2S2; Sec. 26: Lots 3-6; N2SW; Sec. 27: Lots 1-8; N2S2, SESE; Sec. 28: Lots 1-4; W2W2, N2SE;	CSU-5. 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. Such measures would be designed to blend the disturbance in with the natural landscape so that it does not attract attention from key observation points. BLM acknowledges that activities on private lands may alter the

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<i>Lease</i>	<i>Lands Where Applied</i>	<i>Lease Stipulation</i>
COC62163	T6S, R95W Sec. 16: Lots 4, 5; S2SW; Sec. 17: Lot 3; SESE; Sec. 20: Lots 2, 3;	landscape character and such modifications will be considered when evaluating mitigation proposals relative to the visual quality of the overall landscape.
	T6S, R96W Sec. 25: Lot 1; S2SE; Sec. 26; Lots 5-7; SENE, N2SE; Sec. 35: Lots 1-7; Sec. 36: Lots 1, 2, 7; NE, NESE	
	T7 S, R96W Sec. 1: Lot 1;	

PLAN CONFORMANCE REVIEW

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

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

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

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

Decision Language: “697,720 acres of BLM-administrated mineral estate within the Glenwood Springs Resource Area are open to oil and gas leasing and development, subject to lease terms and (as applicable) lease stipulations.” This decision was carried forward unchanged in the 1999 RMP amendment (BLM 1999).

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

STANDARDS FOR PUBLIC LAND HEALTH

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

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

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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. Some of the critical elements that require inclusion in this EA are not present; others may be present but would not be affected by the Proposed Action and alternative (Table 3). Only the mandatory critical elements that are present and affected are described in the following narrative.

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>	
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>		<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
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

In addition to the mandatory critical elements are other resources that would be affected by the Proposed Action and the No Action alternative. These are presented under **Other Affected Resources**.

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 an area's air quality classification. 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 NCSMDP area and surrounding areas are classified as PSD Class II. The PSD Class I areas located within 100 miles of the NCSMDP 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.

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 $\mu\text{g}/\text{m}^3$	40,000 $\mu\text{g}/\text{m}^3$ (35 ppm)	n/a	n/a
	8-hour	1,160 $\mu\text{g}/\text{m}^3$	10,000 $\mu\text{g}/\text{m}^3$ (9 ppm)	n/a	n/a
Nitrogen Dioxide (NO ₂) ²	Annual Arithmetic Mean	10 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$ (0.053 ppm)	2.5 $\mu\text{g}/\text{m}^3$	25 $\mu\text{g}/\text{m}^3$
Ozone ³	8-hour	0.076 ppm (highest)	0.075 ppm	n/a	n/a
Particulate Matter (PM ₁₀) ¹	24-hour	114 $\mu\text{g}/\text{m}^3$ (highest)	150 $\mu\text{g}/\text{m}^3$	8 $\mu\text{g}/\text{m}^3$	30 $\mu\text{g}/\text{m}^3$
Particulate Matter (PM _{2.5}) ⁴	24-hour	40 $\mu\text{g}/\text{m}^3$ (highest)	35 $\mu\text{g}/\text{m}^3$	n/a	n/a
	Annual	11.2 $\mu\text{g}/\text{m}^3$	15 $\mu\text{g}/\text{m}^3$	n/a	n/a
Sulfur Dioxide (SO ₂) ^{5,6}	3-hour	24 $\mu\text{g}/\text{m}^3$	1,300 $\mu\text{g}/\text{m}^3$ (0.5 ppm)	25 $\mu\text{g}/\text{m}^3$	512 $\mu\text{g}/\text{m}^3$
	24-hour	13 $\mu\text{g}/\text{m}^3$	365 $\mu\text{g}/\text{m}^3$ (0.14 ppm)	5 $\mu\text{g}/\text{m}^3$	91 $\mu\text{g}/\text{m}^3$
	Annual	5 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$ (0.03 ppm)	2 $\mu\text{g}/\text{m}^3$	20 $\mu\text{g}/\text{m}^3$

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 2008a).
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 2008a).
⁶ Colorado 3-hour AAQS = 700 $\mu\text{g}/\text{m}^3$.

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.

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 disruption of VOCs from condensate tanks.

The Roan Plateau RMPA and EIS describes 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. In addition, while any oil and gas leasing or development projects may contribute GHGs to the atmosphere, these contributions would not have a significant effect on a phenomenon occurring at the global scale believed by some to be due to more than a century of human activities.

No Action Alternative

Under the No Action Alternative, the proposed development described in the Proposed Action would occur. Therefore, emissions of pollutants from pad construction, vehicle and equipment engines or fugitive dust from disturbed surfaces that would accompany the Proposed Action would not occur.

Cultural Resources

Affected Environment

Three Class III cultural resource investigations (intensive pedestrian inventories) identified as GSFO# 8396-1a&b, 1286, and 786 have been conducted in the Cottonwood Gulch project area. Although a small number of cultural resources were identified during these investigations, none was identified as “historic properties,” which are cultural resources eligible or potentially eligible for inclusion on the National Register of Historic Properties (NRHP).

Environmental Consequences

Proposed Action

The implementation of the Proposed Action would have no direct impacts to known cultural resources. Therefore, the BLM has made a determination of “**No Historic Properties Affected.**” This determination was made in accordance with the 2001 revised regulations [36CFR 800.4(d)(1)] for Section 106 of the National Historic Preservation Act (16U.S.C 470f) and the BLM/State Historic Preservation Officer (SHPO) Programmatic Agreement (1997) and Colorado Protocol (1998). Therefore, no formal consultation was initiated with the SHPO.

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

A standard Education/Discovery COA for cultural resource protection would be attached to the Applications for Permits to Drill (APDs). This and other COAs are listed in Appendix A. The importance of this COA would be stressed to the operator and its contractors, including informing them of their responsibilities to protect and report any cultural resources encountered during construction, drilling, completion, and maintenance operations.

No Action Alternative

Under the No Action alternative, none of the proposed development described in the Proposed Action would take place, since none of the Federal wells could be drilled without constructing the pad or access road on BLM land. However, current oil and gas activity not associated with this project would continue, and long-term cumulative impacts from current access and the presence of project personnel could result in a range of impacts to known and undiscovered cultural resources in the vicinity of the location. These impacts could range from illegal collection and excavation to vandalism.

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*).

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 as COAs to the approved APDs (Appendix A).

No Action Alternative

Under the no action alternative, none of the proposed ground disturbance would occur so the potential for weed invasion would be much less than under the Proposed Action; however, 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 and saltbush. 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. The current list of Birds of Conservation Concern (BCC) (USFWS 2008) for the region includes 11 species potentially present in or near the Cottonwood Gulch project area: the bald eagle (*Haliaeetus*

leucocephalus), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), peregrine falcon (*Falco peregrinus*), 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*). Of these, the two eagles, peregrine falcon, yellow-billed cuckoo, and Brewer's sparrow are BLM sensitive species, discussed in more detail in the section on special-status species. The following describes specific habitat types present in the project area and potential BCC species.

Sagebrush shrublands in the immediate project area appear too small to support Brewer's sparrow, which is generally associated with large expanses of sagebrush, generally in areas of low to rolling relief. However, the species was confirmed to be present during nesting surveys that included the entire Cottonwood Gulch development area, portions of which are minimally suitable for the species. Non-BCC migratory birds likely to occur in the limited sagebrush habitat of the project vicinity include the sparrow (*Pooecetes gramineus*) and lark sparrow (*Chondestes grammacus*).

Stands or scattered individuals of juniper provide some habitat for three pinyon-juniper obligate species on the BCC list: the pinyon jay, juniper titmouse, and gray vireo. Of these, the last species is unlikely to occur because of the location of the project area outside its known nesting range farther to the west. Other migrants occurring in the limited pinyon-juniper include 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 cedar waxwing (*Bombycilla cedrorum*)—may congregate in pinyon-juniper habitats in search of pine nuts (the nutcracker) or juniper berries (the solitaire and waxwing).

The riparian habitat along Cottonwood Gulch in the project area are only marginally suitable habitat for the willow flycatcher, an obligate in riparian shrublands dominated by tall willows or structurally similar species. This habitat occurs along to a limited degree along the Colorado River, a few miles south of the project site but is separated from it by the interstate and railroad. Non-BCC migrants likely to occur along Cottonwood Gulch include the Bullock's oriole (*Icterus bullockii*), yellow warbler (*Dendroica petechia*), lazuli bunting (*Passerina amoena*), song sparrow (*Melospiza melodia*), and lesser goldfinch (*Spinus psaltria*). Less likely species, but potentially present in the cottonwoods and tall shrubs, are additional species such as the cordilleran flycatcher (*Empidonax difficilis*), orange-crowned warbler (*Vermivora celata*), MacGillivray's warbler (*Oporornis tolmiei*), black-headed grosbeak (*Pheucticus melanocephalus*), and spotted towhee (*Pipilo maculatus*).

Raptor surveys conducted in the area in 2008 resulted in no nests being found within 0.25 miles of the well pad or associated access road. However, one active and one inactive golden eagle nest (probably alternate nests for the same pair) were found in the cliff bands north of the proposed well pad. The golden eagles nesting there could occasionally hunt in the sagebrush habitat of the project vicinity, although they are more likely to fly to more expansive and remote areas of open terrain in search of prey. Golden eagles may travel several miles between the nest site and preferred hunting areas.

Environmental Consequences

Proposed Action

The Proposed Action would result in a loss of nesting, roosting, perching, and foraging habitat for migratory birds on disturbed areas and reduced habitat effectiveness adjacent to areas where disturbance-related effects would occur. The construction of the well pad and access road would remove approximately 4.9 acres of juniper and shrub vegetation. Individual nests could be destroyed if

construction activities occur during the nesting season. At a minimum, some birds are likely to 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 less suitable or at carrying capacity. These potential adverse impacts could be avoided or minimized if vegetation removal or physical ground disturbance were to not occur during the nesting season, generally considered to be the period from April 1 and July 31 for most migratory birds potentially present in the project area.

The Migratory Bird Treaty Act (MBTA), as amended, was enacted for the protection of migratory birds, which are defined broadly to include essentially all native bird species not regulated by states as game species. The MBTA makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition to the MBTA, Executive Order 13186 sets forth the responsibilities of Federal agencies to further implement the provisions of the MBTA by integrating bird conservation principles and practices into agency activities and by ensuring that Federal actions evaluate the effects of actions and agency plans on migratory birds.

Consistent with Executive Order 13186 and BLM Colorado guidelines, CRVFO has established a COA (Appendix A) prohibiting initiation of vegetation removal or ground-disturbing activities during the period May 15 to July 15, which is the peak period for incubation and brood rearing among migratory birds. An exception to this COA can be granted if surveys by a qualified biologist during the nesting season of BCC species potentially present indicates no active nests within 30 meters (100 feet) of the disturbance area.

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

No Action Alternative

Under the No Action alternative, none of the proposed development described in the Proposed Action would take place, since none of the Federal wells could be drilled without constructing the pad or access road on BLM land. As a result, no impacts to migratory birds are expected.

Native American Religious Concerns

Affected Environment

The proposed project area is located within a larger area identified by the Ute Tribes as part of their ancestral homeland. Cultural resource inventories (see section on Cultural Resources) were conducted to determine if there were any areas that might be culturally sensitive to Native Americans. No sensitive areas were identified during the inventories and none are currently known in the proposed project area.

Environmental Consequences

Proposed Action

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

consultations. Therefore, formal consultation 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 National Historic Preservation Act (NHPA) requires that if newly discovered cultural resources are identified during project implementation, work in that area must stop and the agency Authorized Officer notified immediately (36 CFR 800.13). The Native American Graves Protection and Repatriation Act (NAGPRA) requires that, if inadvertent discovery of Native American Remains or Objects occurs, activity must cease in the area of discovery, a reasonable effort made to protect the item(s) discovered, and immediate notice made to the agency Authorized Officer, as well as the appropriate Native American group(s) (IV.C.2). Notice may be followed by a 30-day delay (NAGPRA Section 3(d)). Further actions also require compliance under the provisions of NHPA and the Archaeological Resource Protection Act. Williams 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

Under the No Action alternative, none of the proposed development described in the Proposed Action would take place, since none of the Federal wells could be drilled without constructing the pad or access road on BLM land. However, current oil and gas activity not associated with this project would continue, and long-term cumulative impacts from current access and the presence of project personnel could result in a range of impacts to known and undiscovered cultural resources in the vicinity of the location. These impacts could range from illegal collection and excavation to vandalism.

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: Colorado hookless cactus (*Sclerocactus glaucus*), DeBeque phacelia (*Phacelia submutica*), Parachute beardtongue (*Penstemon debilis*), and Ute ladies'-tresses orchid (*Spiranthes diluvialis*).

Environmental Consequences

Proposed Action

The results of a plant survey conducted in April 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 there is no potential habitat for any Federally listed, proposed, or candidate plant species in the project area, there would be no impacts to these species from the No Action alternative.

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 Federally listed big-river fishes—razorback sucker, Colorado pikeminnow, humpback chub, and bonytail—occur within the Colorado River drainage basin near or downstream from the project area. Designated Critical Habitat for the razorback sucker and Colorado pikeminnow includes the Colorado River and its 100-year floodplain west (downstream) from the town of Rifle at the State Highway 13 bridge. This portion of the Colorado River lies a few miles southeast from the project area. The nearest known habitat for the humpback chub and bonytail is within the Colorado River approximately 80 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.

The greenback cutthroat trout is a subspecies of cutthroat trout native to the eastern slope of Colorado (Platte River drainage). Its documented presence in some streams of Garfield County suggests that either fish were intentionally removed from east-slope waters and stocked in west-slope waters, or that the genetics of this species and the subspecies native the western slope—the Colorado River cutthroat trout (*O. c. pleuriticus*)—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 likely to occur in the project area or vicinity, based on lack of habitat and negative results of prior surveys. Hence, these species are not considered further in this document. Two additional species, 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 (see below). Although no longer protected by the Endangered Species Act, both species remain protected by the Migratory Bird Treaty Act; the bald eagle is also protected by the Bald and Golden Eagle Protection Act.

Environmental Consequences

Proposed Action

Endangered Colorado River Fishes. 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 fish species associated with 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. Releases of pollutants into the Colorado River are unlikely to occur in quantities or in concentrations sufficient to cause acute or chronic toxicity to fishes.

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 in addition to cross-mountain diversions from the western slope of Colorado to the eastern slope. 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 Colorado pikeminnow, bonytail, humpback chub, or razorback sucker as a result of depletions associated with oil and gas projects. To offset the impacts, the BLM has set up a Recovery Agreement, which includes a one-time Fee per well 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, none of the proposed development activities would occur, since none of the Federal wells could be drilled without constructing the pad and access road on BLM land. As a result, no Federally listed, proposed, or candidate animal species would be affected.

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 Bluffs meadow-rue (*Thalictrum heliophilum*).

Environmental Consequences

Proposed Action

Results of an April 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.

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.	Present on cliffs near Anvil Points
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.	Reported to be Present
Great Basin spadefoot	Ephemeral streams and ponds in arid environments, especially semi-desert shrublands and grasslands.	Unlikely – Not observed during surveys
Northern leopard frog	Wet meadows and the shallows of marshes, ponds, glacial kettles, beaver ponds, lakes, reservoirs, streams, and irrigation ditches.	Possible – Habitat marginal
Midget faded rattlesnake	High, cold desert dominated by sagebrush and with an abundance of rock outcrops and exposed canyon walls.	Possible – Known historical location
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

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 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).

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. This species (*Spea intermontana*) is not believed to be present in the project vicinity. However, Cottonwood Gulch provides potentially suitable habitat for this inhabitant of ephemeral ponds and streams in arid environments, including habitats found along Cottonwood Gulch. As with other amphibians, the Great Basin spadefoot is vulnerable to impacts to water quality and quantity during the limited breeding season. Although this species is better adapted to high sediment loads than most amphibians, it is equally vulnerable to chemical pollutants as well as to direct mortality from vehicles driving through occupied waters. The protective COAs for water quality in Appendix A would minimize these potential impacts.

Northern Leopard Frog. The northern leopard frog (*Rana pipiens*) is not known to occur in the project area. This species requires permanent ponds, lakeshores, or slow-flowing streams with good water quality and an abundance of aquatic plants. If it were to occur in the project area, the northern leopard frog would be vulnerable to habitat loss or degradation from inflow of sediments 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 pit viper, *Crotalus viridis concolor*, is generally considered a small, pale-colored subspecies of the common and widespread western (prairie) rattlesnake, although some authorities consider it and another western subspecies, the Great Basin rattlesnake (*C.v. nuntius*) to be genetically distinct. Although movement patterns of midget faded rattlesnakes are not well known, they are believed to be limited to a few hundred meters from den sites. The limited distribution and small home range make this snake susceptible to impacts from human disturbance (USGS 2007). Threats include direct mortality from vehicles traveling on roads and pads, off-highway vehicle use throughout the landscape, capture by collectors, and livestock grazing. As access increases into previously undeveloped areas, the risk of encounters with humans will increase, resulting in some cases of mortality or collection.

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.

Bald Eagle. Although bald eagles nest and roost along the Colorado River 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 Cottonwood Gulch development area, the species is unlikely to occur in the immediate project vicinity. Regardless, the 60-day TL to prohibit removal of vegetation during the period May 15 to July 15 (Appendix A) would avoid or minimize the potential for impacts to nesting Brewer's sparrows. Construction, drilling, and completion activities outside the TL period could cause individuals to avoid a larger buffer zone when foraging for seeds or insect prey. However, it is unlikely that this impact on foraging would be sufficient to affect nesting success of any Brewer's sparrows nesting the general vicinity.

Fringed Myotis and Townsend's Big-eared Bat. No caves or other suitable roosting sites (including cliff overhangs and crevices) suitable for the fringed myotis (*Myotis thysanodes*) or Townsend's big-eared bat (*Corynorhinus townsendii*) occur in the project area. Loss of large trees, potentially used for roosting in areas lacking caves and other suitable sites, 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. However, it is possible that 24-hour activities at the well pad during the drilling and completion periods—with resultant noise and light pollution—could reduce or eliminate any use by these species of the Cottonwood Gulch area for nocturnal foraging. Bats are commonly attracted to areas of surface water for hunting, since occasional hatches of aquatic insects may provide an abundant food supply. Because of the limited riparian habitat in the project vicinity, the lack of nearby roosting sites, and the large areas across which bats typically hunt, any such impacts would be minor.

No Action Alternative

Under the No Action alternative, none of the proposed development described in the Proposed Action would take place, since none of the Federal wells could be drilled without constructing the pad and access road on BLM land. As a result, there would be no new impact 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), and no special-status species are present or expected. However, large portions of the landscape are being fragmented due to extensive oil and 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 small, it may further trend the area away from meeting Standard 4 for special-status species.

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

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 (BLM 1998), Appendix L, Hazardous Substance Management Plan, contains a comprehensive list of materials that are commonly used for oil and gas projects. It also includes a description of the common industry practices for use of these materials and disposal of the waste products. These practices are dictated by various Federal and State laws and regulations, and the BLM standard lease terms and stipulations that would accompany any authorization resulting from this analysis. The most pertinent of the Federal laws dealing with hazardous materials contamination are as follows:

- The Oil Pollution Act (Public Law 101-380) 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) 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.
- Hazardous spill cleanup activities that fall outside the criteria set forth in CERCLA still require the submission of a Preconstruction Notice to the U.S. Army Corps of Engineers and may be subject to Nationwide Permit Number 38.
- The Resource Conservation and Recovery Act (RCRA) (Public Law 94-580) 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 road, pad, and pipeline and for refueling and maintaining equipment and vehicles. Potentially harmful substances used in the construction and operation 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.

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 which 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.

No Action Alternative

The No Action alternative would result in no impacts from releases or spills of hazardous or solid wastes into the environment, because none of the project components in the Proposed Action would be built and operated.

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

Surface Water

Affected Environment

The Proposed Action area is located approximately 3.3 miles north of I-70 and the Colorado River within a 17,951 unnamed 6th field watershed. In close proximity to the proposed access road and well pad is an unnamed ephemeral drainage that is directly tributary to the nearby perennial Cottonwood Creek. Downstream from the project area, Cottonwood Creek is directly tributary to the Colorado River. These drainages contain small riparian corridors in areas consisting primarily of cottonwoods. The area is generally dominated by pinyon, juniper, and gamble oak. These drainages occur in well drained, loosely consolidated alluvium and could be described as moderately entrenched in the project area. In addition to nearby drainages, the proposed access road would be constructed just below a contact spring and seep zone on a north facing slope. In this area cottonwood trees and saturated soil conditions exist that have resulted in some minor slumping and slope instabilities.

According to the *Stream Classifications and Water Quality Standards* (CDPHE, Water Quality Control Commission [WQCC] Regulation No. 37) (CDPHE 2007), Cottonwood Creek and its tributaries could be classified within segment 4a, which includes all tributaries to the Colorado River from its confluence with the Roaring Fork River to a point immediately below its confluence with Parachute Creek. Following is a brief description of segment 4a.

- Segment 4a – This segment has been classified aquatic life cold 2, recreation 2, water supply, and agriculture. Aquatic life cold 2 indicates that this water course is not capable of sustaining a wide variety of cold or warm water biota due to habitat, flows, or uncorrectable water quality conditions. Recreation class 2 refers to waters that are not suitable or intended to become suitable for primary contact recreation. This segment is, however, suitable or intended to become suitable for potable water supplies and agricultural purposes that include irrigation and livestock use.

The CDPHE WQCC *Section 303(d) List of Water-Quality-Limited Segments Requiring Total Maximum Daily Loads (TMDLs)* (Regulation No. 93) fulfills Section 303(d) of the Federal Clean Water Act (CWA),

which requires that states submit to the EPA a list of those waters for which technology-based effluent limitations and other required controls are not stringent enough to achieve water quality standards. The creeks passing through or receiving runoff from the project area are all on the CDPHE 303(d) list, based on the concern that streams within Segment 4a may contain excessive amounts of selenium (CDPHE 2006a).

Colorado's Monitoring and Evaluation List (Regulation No. 94, CDPHE 2006b) identifies water bodies where there is reason to suspect water quality problems, but uncertainty also exists regarding one or more factors. The creeks passing through or receiving runoff from the project area are all on the CDPHE Monitoring and Evaluation list, based on the concern that streams within Segment 4a may contribute excessive amounts of sediment to the Colorado River (CDPHE 2006b).

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 nearby roads and pads, and contamination by drilling fluids, produced water, or condensate. Suspended sediment during flow events would increase until disturbed areas were stabilized by reclamation. The greatest sediment load would occur immediately downstream of stream crossings, and suspended sediment concentration would progressively decrease downstream as the large sediment particles were deposited in the channel bed.

Soil compaction caused by construction equipment and vehicles could reduce infiltration rates and could increase surface runoff and sediment delivery potential. The magnitude and duration of potential impacts from surface runoff would depend on soil depth, susceptibility of a particular soil type to erosion, vegetation cover, slope aspect and steepness, erosive force of channelized water, proximity to drainages, and duration and extent of construction activities. Surface waters would be most susceptible to sedimentation during construction, drilling, and completion activities, which would collectively last approximately 4 weeks. 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, any access road would remain in place over the life of the wells (i.e., 20 to 30 years) and would channel runoff during periods of precipitation. Sedimentation and stream channel impacts associated with any road would be reduced through the implementation of Best Management Practices (BMPs) and other preventive measures. As proposed, these measures would include limiting cut slope steepness along certain road segments, step-cutting, limiting road grade to 11%, crowning road surfaces, and installing culverts and drainage systems.

Other elements of the Proposed Action are designed to mitigate risks to surface waters associated with the release of drilling fluids, produced water, and condensate. The reserve pit used to contain drilling fluids would be lined to prevent infiltration into surrounding soils. Once completion operations are complete, excess liquids would be allowed to evaporate, and backfilling of the pit would be performed in a manner that would avoid incorporating the mud into surface soils.

Tanks used to store produced water and condensate would be placed in secondary containment to prevent offsite release. In the event of an accidental release, produced water and condensate would be confined for cleanup in a containment area to prevent migration to surrounding soils or surface waters. Pipelines associated with the transport of these liquids would be pressure tested to detect leakage prior to use.

To minimize discharge of sediment into stream channels, all construction in the Proposed Action would occur outside the spring runoff season. The potential for impacts to surface waters would be minimized through the use of BMPs and other COAs associated with construction activities, prompt interim reclamation, and implementation of the preventative measures associated with treatment of fluids.

No Action Alternative

Because the No Action alternative would constitute denial of the project as proposed, it would result in no adverse impacts to surface waters.

Analysis of Public Land Health 5 Standard for Water Quality

In 2004, the BLM Glenwood Springs Field Office conducted the Rifle West Watershed Land Health Assessment in which conditions on area BLM lands were assessed. During that time, water quality was measured downstream from the project area on Cottonwood Creek. The result was that water quality was generally good. Turbidity and suspended sediment are expected to be high during spring runoff and in response to precipitation events. This can be attributed to oil and gas activity and natural geologic conditions that frequently contribute sediment to area drainages during runoff events.

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, project components would not be approved and constructed. Therefore, no impacts to Waters of the U.S. would result from this alternative.

Groundwater

Affected Environment

The proposed activities are located within the Lower Piceance Basin aquifer system (Colorado Geological Survey 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. Although the Parachute Creek Member is present within the surrounding cliffs, it is located higher in section than the PA 22-21 pad.

The Uinta Formation consists of discontinuous layers of sandstone, siltstone, and marlstone and is less permeable than the hydrologically connected upper Parachute Creek Member (Robson and Saulnier 1981). The upper most Uinta Formation also contains a shallow, perched aquifer that is separate from the upper aquifer unit (Cole et al. 1995). The upper Piceance Basin aquifer is underlain by the Mahogany confining unit, and correlates with the Mahogany Zone, the principal oil shale unit of the Piceance Basin. The Mahogany Zone separates the upper aquifer from the lower. The 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 feet respectively (CGS 2003). Both of these aquifers and corresponding formations are found on the Roan Plateau north of the pad.

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 Mesaverde aquifer. This aquifer consists of sandstone with interbedded shale and coal of the Williams Fork Formation and marine sands and shales of the Iles Formation. The depth to the top of this aquifer beneath the project area is more than 5,000 feet, 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.

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.

No registered fresh-water wells are located within a 1-mile radius of the proposed well pad. The nearest wells are found approximately 1.4 miles southeast in the SW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 28, T6S, R95W. One monitoring well and one domestic well are located along the lower reaches of Cottonwood Gulch, within 270 feet of each other. The domestic use well is not defined by quantitative data. The second well, a 280-foot-deep monitoring well, lists a static water level of 130 feet, with a standard well yield of 15 gallons per minute (gpm). Although defined as a monitoring well, the current use of this well is undetermined. In general, very few water wells are found within the project area. Most water wells are found along alluvial terraces south of the Colorado River or farther west along Parachute Creek. A cross section of wells located in these areas confirms shallow well depths and water levels typical of water wells in this part of the Piceance Basin.

Environmental Consequences

Proposed Action

Potential impacts to groundwater resources from the proposed development would include contamination of groundwater with produced water, drilling mud, and petroleum constituents. Hydraulic fracturing (fracing) would be incorporated to create additional pathways to facilitate gas production. Proppants (propping agents used to keep the fractures open) are mixed with both fresh water and produced water and typically include sand, aluminum, glass, or plastic beads. Additional components included to inhibit corrosion, friction, and scale are present in trace amounts, typically less than 1% (EnerMax Inc. 2007). Fracing techniques are used to create secondary porosity fractures, held open by the proppants, allowing otherwise trapped gas to migrate up the borehole for production. Hydrofracturing would be conducted at a depth of 6,000 feet or more is unlikely to cause impacts to groundwater sources 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 15 Federal wells proposed for the new PA 22-21 pad would not be approved. No new surface disturbance would occur, no new impacts to groundwater resources would occur as a result.

OTHER AFFECTED RESOURCES

In addition to the critical elements, the resources presented in Table 6 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 below.

Table 6. Other Resources Considered in the Analysis			
<i>Resource</i>	<i>NA or Not Present</i>	<i>Present, 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

The site would be accessed by Williams and contractor personnel by exiting I-70 at Parachute (Exit 75), driving approximately 2.5 miles east on the North Frontage Road (Highway 6 and 24) to the intersection with the Cottonwood Gulch road, and proceeding north approximately 3.7 miles to spur road turnoff to the PA 22-21 location. The spur road would turn back sharply to the southeast to climb to the site. No public vehicle access exists to the pad since private land must be crossed (Figures 1 and 2).

Environmental Consequences

Proposed Action

The proposed action would result in a substantial increase in truck traffic. Traffic associated with construction of the spur road and well pad would increase for a two to four week period while those activities occur. 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 7). 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 7 days. Since fluids generated during the life of the wells would be transported via buried lines to the tank facilities near the I-70 frontage road, truck traffic related to the fluids would be drastically reduced.

<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.

Travel by heavy equipment may degrade development roads and create localized impacts from noise and fugitive dust. Mitigation measures attached as COAs (Appendix A) would address these issues.

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 elongate 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 near shore and far shore sediments. The mountain building processes that took place during the late Cretaceous produced uplift and subsidence structures in central and eastern Utah, western Colorado, and most of Wyoming (Willis 1999). 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 is 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 lower portion of the Green River Formation, specifically the Anvil Points Member. Further north and west, the Mahogany oil shale bed, a prominent ledge forming oil shale unit, is exposed along the surrounding cliffs of the Roan Plateau. Table 8 describes the geologic formations that are exposed within the project boundaries and surrounding area.

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>
Tge	Evacuation Creek Member of Green River Fm	Eocene	Gray and yellow-brown marlstone, siltstone, sandstone, and tuff	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
Tgl	Lower part of Green River Fm	Eocene	Shale, sandstone, and marlstone in the Anvil Points, Garden Gulch, and Douglas Creek Members	Base of 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 prominent 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. Substantial reserves have been known to be trapped within the tight sands of these reservoirs since the late 1950s, but only within the last decade, and particularly within the last few years, has the integrated application of new technologies turned the tight gas sands 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 most of the gas 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 Action 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 and Davis 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 lifespan 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 productive, lost circulation or pressurized zone is encountered below the surface casing, cement volumes will 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 or productive zones within the wellbore.

No Action Alternative

Under the No Action alternative, none of the proposed development would take place, because no new Federal wells could be drilled without constructing the well pad and access road on BLM land. No new impacts to the geology and mineral resources would occur in Federal mineral estate.

Noise

Affected Environment

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

Sound levels have been calculated for areas that exhibit typical land uses and population densities. In rural recreational areas, ambient sound levels are expected to be approximately 30 to 40 dBA (EPA 1974, Harris 1991). The proposed action would be located in a rural, unpopulated area with few potential noise sources. Noise levels from human activity are mostly mechanical, consisting mainly of existing oil and

gas wells, new exploration activities, and ranching/farming operations. Human noise is widely dispersed throughout the area, and there are few impacts associated with industrial noise sources and vehicular traffic. As a basis for comparison, the noise level during normal conversation of two people 5 feet apart is 60 dBA.

Environmental Consequences

Proposed Action

The project would result in increased levels of noise during the construction, drilling, and completion phases. The noise would be most noticeable along the roads used to haul equipment and at pad locations. Drilling activities are subject to noise abatement procedures as defined in the COGCC Rules and Regulations (Aesthetic & Noise Control Regulations). Operations involving pipeline or gas facility installation or maintenance, the use of a drilling rig, completion rig, workover rig, or stimulation are subject to the maximum permissible noise levels for industrial zones. The 2006 revised COGCC noise control rules call for noise levels from oil and gas operations at any well site and/or gas facility to comply with the maximum permissible levels (Table 9) at a distance of 350 feet.

Table 9. Noise Standards for Light industrial, Residential/Agriculture/Rural		
<i>Zone</i>	<i>7:00 A.M. to 7:00 P.M</i>	<i>7:00 P.M. to 7:00 A.M</i>
Light Industrial	70 dB(A)	65 dB(A)
Residential/Agricultural/Rural	55 dB(A)	50 dB(A)

Given the remote locations of the proposed project activities, with no reasonably close occupied structure or designated recreational area, the light industrial standard is applicable. The allowable noise level for periodic impulsive or shrill noises is reduced by 5 dBA from the levels shown (COGCC 2006).

Short-term (7- to 14-day) increases in nearby noise levels would characterize road and well pad construction. Based on the Inverse Square Law of Noise Propagation (Harris 1991) and an typical noise level for construction sites of 65 dBA at 500 feet (Table 10), project-related noise levels would be approximately 59 dBA at a distance of 1,000 feet, approximating active commercial areas (EPA 1974).

Table 10. Noise Levels at Typical Construction Sites and along Access Roads			
<i>Equipment</i>	<i>Noise Level (dBA)</i>		
	<i>50 feet</i>	<i>500 feet</i>	<i>1,000 feet</i>
Air Compressor, Concrete Pump	82	62	56
Backhoe	85	65	59
Bulldozer	89	69	63
Crane	88	68	62
Front End Loader	83	83	57
Heavy Truck	88	68	62
Motor Grader	85	65	59
Road Scraper	87	67	61
Tractor, Vibrator/Roller	80	60	54
Sources: BLM (1999a), La Plata County (2002)			

Traffic noise would also be elevated as a consequence of the Proposed Action. The greatest increase would be along access roads during the drilling and completion phases. Based on the La Plata County data presented in Table 10, approximately 68 dBA of noise (at 500 feet) would be created by each fuel and water truck that travels these roads. Less noise would be created by smaller trucks and passenger vehicles such as pickup trucks and sport utility vehicles. Although the duration of increased noise from this source would be short, it would occur repeatedly during the drilling and completion phases.

Noise impacts would decrease during the production phase but would remain background noise levels. During maintenance and well workover operations, noise levels would temporarily increase above those associated with routine well production. However, since no residences occur within several miles of the project area or access road, noise impacts associated with the Proposed Action would be negligible.

No Action Alternative

This alternative would not have an impact on noise levels, because development would not occur.

Paleontology

Affected Environment

The predominant surface formation exposed within the Proposed Action is the Anvil Points Member of the Lower Green River Formation (Tga). The Potential Fossil Yield Classification System (PFYC) used to rank geologic formations by fossil potential rates the Lower Green River Formation as a Class 3 formation. Class 3 formations are defined as having moderate or unknown potential. Fossils in this class usually occur sporadically and with low predictability. The Lower Green River Formation has produced only minor fossil insects and plants, unlike the upper Parachute Creek Member, which has yielded over 100 species of fossil insects, plants, gar and other fish, turtles, and crocodilians (BLM 1998).

The Wasatch Formation, also known as the DeBeque Formation within this part of the Piceance Basin, is ranked under the PFYC system as a Class 4/5 formation. The Wasatch is mapped very close to the newly proposed PA 22-21 well pad, approximately 500 feet west. The probability of finding fossils within the Wasatch Formation is rated as *high* and *very high* for Class 4 and Class 5 formations, respectively. In Class 4 units, vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur but may vary in occurrence and predictability. Class 5 units predictably and consistently produce significant fossils. Although the Wasatch Formation is ranked high under the PFYC system, 4 and 5 out of 5 classes, lack of bedrock exposure lowers the risk of human-caused adverse impacts and natural degradation within the proposed new well pad area.

There is potential to find fossil resources within the bedrock exposures of the Wasatch Formation, but that potential is minimized due to the location of the proposed PA 22-21 well pad. The nearest fossil discovery sites are found over 3,000 and 4,000 feet southwest of the new pad in the SE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 20, T6S, R95W. Another site is located over 5,000 feet southeast in Section 28, T6S, R95W, adjacent to the Williams 1-W-28 well pad. All of the discovery sites were found on Wasatch Formation sediments.

Environmental Consequences

Proposed Action

Construction activities have the potential to uncover fossils that may be present under the soil cover, but the amount of soil that would have to be removed to expose Wasatch bedrock is unknown. In general, the accumulation of reworked sediments does not usually produce large significant fossils remains.

Paleontological resources are not expected to be impacted by construction activities of this development plan. In the event that discovery sites are encountered, a standard paleontological condition of approval would be attached to the APDs submitted for the planned Federal wells (Appendix A).

No Action Alternative

Under the No Action alternative, the proposed PA 22-21 well pad would not be constructed, and the 15 Federal wells would not be developed. Consequently, paleontological resources on Federal lands would not be affected.

Range Management

Affected Environment

The proposed construction of the pad and spur road and installation of ancillary facilities would occur within the Cottonwood Gulch Allotment. Table 11 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 11. Data for Range Management Allotments in Project Area					
<i>Allotment</i>	<i>Authorization Number</i>	<i>Number (Cattle)</i>	<i>Period of Use</i>	<i>Portion on Public Land</i>	<i>Animal Unit Months (AUMs)</i>
08924 Cottonwood Gulch	0503926	180	5/11 – 6/5	86%	132

Environmental Consequences

Proposed Action

Construction of the proposed pad, spur road and pipelines would result in a total of 4.9 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 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 of development grazing livestock are expected to be minor. Any range projects that are damaged or destroyed during development or maintenance would be repaired or replaced as soon as possible by the operator (Appendix A).

No Action Alternative

No impacts to range resources would result under the No Action alternative 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 grew 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 percent), tourism (10.7 percent), retail trade (13.7 percent), and education and health (15.4 percent). 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 4,000 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 (USFS), U.S. Fish and Wildlife Service (USFWS), and National Park Service (NPS). 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 (USDY 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 of additional 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 (1) a negligible decrease in the recreational character of the area (see Recreation); (2) reduced scenic quality (see Visual Resources); (3) increased dust levels, especially during construction (see Air Quality); and (4) increased traffic (see Transportation).

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 PA 22-21 pad, road, and pipelines 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; slopes range from 50

to 80%. Surface runoff is rapid and erosion hazard is moderate. Primary uses for these soils are limited grazing and wildlife habitat. South-facing lower areas are an important wintering area for deer.

Environmental Consequences

Proposed Action

The Proposed Action would result in approximately 4.9 acres of short-term vegetation loss and soil disturbance, with a long-term loss of approximately 3.5 acres. 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 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 bench has proven to remain stable over the years. Although the project area is located 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 the No Action alternative, the project components would not occur. Therefore, this alternative would have no impact on soils.

Analysis of Public Land Health Standard 1 for Upland Soils

In 2004, BLM conducted the Rifle West Watershed Land Health Assessment. At that time, upland soils were meeting Standard 1. The proposed action and no action alternative would not likely prevent Standard 1 for upland soils from being met.

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

Affected Environment

The project area is located within a woodland of Utah juniper (*Juniperus osteosperma*) interspersed with basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) and with minor amounts of pinyon pine (*Pinus edulis*). Several other shrub species also occur in this community, including serviceberry (*Amelanchier alnifolia*), mountain-mahogany (*Cercocarpus montanus*), winterfat (*Krascheninnikovia lanata*), bitterbrush (*Purshia tridentata*), and skunkbrush (*Rhus trilobata*). The herbaceous layer is dominated by native perennial grasses, including Indian ricegrass (*Achnatherum hymenoides*), squirreltail (*Elymus elymoides*), needle-and-thread grass (*Hesperostipa comata*), and western wheatgrass (*Pascopyrum smithii*). Forbs are a minor component.

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 4.9 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 have no bearing on 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

The proposed well pad, spur road and associated pipeline construction would be located on BLM-managed Federal land within an area classified as Visual Resource Management (VRM) Classes II areas below the Roan Plateau rim (BLM 2006). The total expected short-term disturbance related to the proposed action would amount to 4.9 acres. The following statement describes the Roan Plateau (Below the Rim) VRM Class II objective as shown in Appendix A (BLM 2006).

- 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 shrubs, native grasses, and native 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 seen from Interstate 70 or the Colorado River valley floor. The pads and portions of the existing roads and pipelines are more apparent from the mesas and County Roads (CR301 and 309) 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 ridge tops or small plateaus that are not directly viewable from the lower vantages along I-70 or the 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

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

Aquatic macroinvertebrates 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 be limited to the Great Basin spadefoot, Woodhouse's toad (*Bufo woodhousii*), or northern chorus frog (*Pseudacris triseriata*), all of which are adapted to seasonal flow regimes in arid environments and present in the CRVFO area. The Great Basin spadefoot is a BLM sensitive species (see section on Special-Status Species).

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 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 as COAs (Appendix A).

No Action Alternative

Under the No Action alternative, none of the proposed development described in the Proposed Action would take place, since no the Federal wells could be drilled without constructing the well pad and access road on BLM land. As a result, there would be no new impact to aquatic wildlife species.

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 woodland with openings of sagebrush, fourwing 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.

Large 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 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. The Rocky Mountain elk is 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 (*Puma concolor*), which moves seasonally with its preferred prey (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 medium-sized carnivores, the coyote (*Canis latrans*) and bobcat (*Lynx rufus*) are also present throughout the region in open habitats and broken or wooded terrain, respectively, where they hunt for small mammals, reptiles, and ground-dwelling birds. Smaller carnivores in habitats similar to those near the project site include the ringtail (*Bassariscus astutus*) and spotted skunk (*Spilogale gracilis*).

Resident Raptors and Other 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 sticknests in the tree canopies. Two larger resident raptors that are common throughout the region—the red-tailed hawk (*Buteo jamaicensis*) and great horned owl (*Bubo virginiana*)—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.

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

Reptiles and Amphibians

The project area is within elevational range of most reptile species known to occur in Garfield County. Species most likely to occur include the short-horned lizard, (*Phrynosoma hernandesi*), western fence lizard (*Sceloporus undulatus*), tree lizard (*Urosaurus ornatus*), plateau striped whiptail (*Cnemidophorus velox*), and gopher snake (bullsnake) (*Pituophis catenifer*) in pinyon-juniper woodlands, sagebrush shrublands, or grassy clearings. Other reptiles potentially present along riparian areas are the milk snake (*Lampropeltis triangulum*), western terrestrial garter snake (*Thamnophis elegans*), and smooth green snake (*Opheodrys vernalis*).

The area is also within the known range of the Great Basin spadefoot, Woodhouse's toad, and western chorus frog, all of which are potentially present along Cottonwood Gulch (although not observed there to date). The Great Basin spadefoot (a BLM sensitive species) and Woodhouse's toad occur primarily along ephemeral washes or in seasonal ponds that do not support fish and contain water for a period of at least a few weeks every spring. The chorus frog occurs primarily in cattail and bulrush wetlands and along the vegetated margins of seasonal or perennial ponds and slow-flowing streams.

Environmental Consequences

Proposed Action

Direct impacts to terrestrial wildlife from the Proposed Action may include mortality, disturbance, nest abandonment/nesting attempt failure, or site avoidance/displacement from otherwise suitable habitats. These effects could result from the 4.9 acres of habitat loss or modification, increased noise from vehicles and operation of equipment, increased human presence, and collisions between wildlife and vehicles. Impacts would be more substantial during critical seasons, such as winter (deer and elk) or the spring/summer breeding season (raptors, songbirds, amphibians). Deer and elk are often restricted to smaller areas during the winter months and may expend high amounts of energy to move through snow, locate food, and maintain body temperature. Disturbance during the winter can displace wildlife, depleting much-needed energy reserves and may lead to decreased over winter survival. A Timing Limitation for big game winter habitat attached to leases COC62161 and COC62163 would prohibit construction, drilling, and completion activities from December 1 to April 30, minimizing impacts to big game during the critical winter months.

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

No Action Alternative

Under the No Action alternative, the proposed development would not take place, since the Federal wells could not be drilled without constructing the well pad and access road on BLM land. As a result, this alternative would result in no new impact 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 1999: 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

Williams Production RMT Company – April Mestas, Jason Raley, Dan Collette, Joe Weaver Jr.
Colorado Oil and Gas Conservation Commission – Dave Kubeczko
Garfield County Oil & Gas Liaison Office – Nikki Reckles
MB Brady Construction – Jean Thurston

INTERDISCIPLINARY TEAM REVIEW

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

Table 12. BLM Interdisciplinary Team Authors and Reviewers

<i>Name</i>	<i>Title</i>	<i>Areas of Participation</i>
Rebecca Beavers	Natural Resource Specialist	EA Project Lead, Access and Transportation, Noise, Range Management, Socio-Economics, Visual Resources
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	Groundwater, Paleontology, Geology and Minerals
Will Howell	Petroleum Engineer	Downhole COAs
Jeffrey O'Connell	Hydrologist	Air Quality, Soils, Surface Water, Waters of the U.S.

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The environmental assessment 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 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 presented in the attached Environmental Assessment (EA). The Proposed Action includes construction and associated maintenance of the PA 22-21 well pad, spur road, and associated pipelines, as shown on the plats submitted in the Applications for Permits to Drill (APDs), and the drilling, completion, and production of the Federal oil and gas wells on the well pad listed above.

Initiation of surface-disturbing activities, and of drilling and completion activities, associated with Federal oil and gas wells on the PA 22-21 well pad shall not commence until approval by BLM of APDs 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. The environmental impacts have been mitigated with measures incorporated into the Proposed Action or as specified in the COA appended to the EA.

MITIGATION MEASURES: Mitigation measures presented in Appendices A will be applied as COAs for both surface and drilling operations.

NAME OF PREPARER: Rebecca Beavers, Natural Resource Specialist

SIGNATURE OF AUTHORIZED OFFICIAL:



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

SIGNED: July 21, 2010

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APPENDIX A

Surface-Use and Downhole Conditions of Approval

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**STANDARD SURFACE-USE CONDITIONS OF APPROVAL
DOI-BLM-CO-N040-2010-0040-EA**

The following standard surface use COAs are in addition to all stipulations attached to the respective Federal leases and to any site-specific COAs for individual well pads. Wording and numbering of these COAs may differ from those included in the Wheeler to Webster Geographic Area Plan, 2002. In cases of discrepancies, the following COAs supersede earlier versions.

1. Administrative Notification. The operator shall notify the BLM representative at least 48 hours prior to initiation of construction.
2. Road Construction and Maintenance. Roads shall be crowned, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards. Initial gravel application shall be a minimum of 6 inches. The operator shall provide timely year-round road maintenance and cleanup on the access roads. A regular schedule for maintenance shall include, but not be limited to, blading, ditch and culvert cleaning, road surface replacement, and dust abatement. When rutting within the traveled way becomes greater than 6 inches, blading and/or gravelling shall be conducted as approved by the BLM.
3. Dust Abatement. The operator shall implement dust abatement measures as needed to prevent fugitive dust from vehicular traffic, equipment operations, or wind events. The BLM may direct the operator to change the level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) if dust abatement measures are observed to be insufficient to prevent fugitive dust.
4. Drainage Crossings and Culverts. Construction activities at perennial, intermittent, and ephemeral drainage crossings (e.g. burying pipelines, installing culverts) shall be timed to avoid high flow conditions. Construction that disturbs any flowing stream shall utilize either a piped stream diversion or a cofferdam and pump to divert flow around the disturbed area.

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

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

5. Jurisdictional Waters of the U.S. The operator shall obtain appropriate permits from the U.S. Army Corps of Engineers (USACE) prior to discharging fill material into waters of the U.S. in accordance with Section 404 of the Clean Water Act. Waters of the U.S. are defined in 33 CFR Section 328.3 and may include wetlands as well as perennial, intermittent, and ephemeral streams. Permanent impacts to waters of the U.S. may require mitigation. Contact the USACE Colorado West Regulatory Branch at 970-243-1199 ext. 17 (Travis Morse). Copies of any printed or emailed approved USACE permits or verification letters shall be forwarded to the BLM.

6. Wetlands and Riparian Zones. The operator shall restore temporarily disturbed wetlands or riparian areas. The operator shall consult with the BLM Colorado River Valley Field Office to determine appropriate mitigation, including verification of native plant species to be used in restoration.
7. Reclamation. The goals, objectives, timelines, measures, and monitoring methods for final reclamation of oil and gas disturbances are described in Appendix I (Surface Reclamation) of the 1998 Draft Supplemental EIS (DSEIS). Specific measures to follow during interim and temporary (pre-interim) reclamation are described below.
 - a. Reclamation Plans. In areas that have low reclamation potential or are especially challenging to restore, reclamation plans will be required prior to APD approval. The plan shall contain the following components: detailed reclamation plans, which include contours and indicate irregular rather than smooth contours as appropriate for visual and ecological benefit; timeline for drilling completion, interim reclamation earthwork, and seeding; soil test results and/or a soil profile description; amendments to be used; soil treatment techniques such as roughening, pocking, and terracing; erosion control techniques such as hydromulch, blankets/matting, and wattles; and visual mitigations if in a sensitive VRM area.
 - b. Deadline for Interim Reclamation Earthwork and Seeding. Interim reclamation to reduce a well pad to the maximum size needed for production, including earthwork and seeding of the interim reclaimed areas, shall be completed within 6 months following completion of the last well planned for the pad. Reclamation, including seeding, of temporarily disturbed areas along roads, pipelines, and topsoil piles and berms, shall be completed within 30 days following completion of construction.

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

The deadlines for seeding described above are subject to extension upon approval of the BLM based on season, timing limitations, or other constraints on a case-by-case basis. If the BLM approves an extension for seeding, the operator may be required to stabilize the reclaimed surfaces using hydromulch, erosion matting, or other method until seeding is implemented.
 - c. Topsoil Stripping, Storage, and Replacement. All topsoil shall be stripped following removal of vegetation during construction of well pads, pipelines, roads, or other surface facilities. In areas of thin soil, a minimum of the upper 6 inches of surficial material shall be stripped. The BLM may specify a stripping depth during the onsite visit or based on subsequent information regarding soil thickness and suitability. The stripped topsoil shall be stored separately from subsoil or other excavated material and replaced prior to final seedbed preparation. The BLM best management practice (BMP) for the Windrowing of Topsoil (COA number 19) shall be implemented for well pad construction whenever topography allows.
 - d. Seedbed Preparation. For cut-and-fill slopes, initial seedbed preparation shall consist of backfilling and recontouring to achieve the configuration specified in the reclamation plan. For compacted areas, initial seedbed preparation shall include ripping to a minimum depth of 18 inches, with a maximum furrow spacing of 2 feet. Where practicable, ripping shall be conducted in two passes at perpendicular directions. Following final contouring, the backfilled or ripped surfaces shall be covered evenly with topsoil.

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

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 percentage of other crop seed is recommended. Seed tags or other official documentation shall be submitted to BLM at least 14 days before the date of proposed seeding for acceptance. Seed that does not meet the above criteria shall not be applied to public lands.

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

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

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

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

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

- h. Erosion Control. Cut-and-fill slopes shall be protected against erosion with the use of water bars, lateral furrows, or other measures approved by the BLM. Cut-and-fill slopes along drainages or in areas with high erosion potential shall also be protected from erosion using hydromulch designed specifically for erosion control or biodegradable blankets/matting, bales, or wattles of weed-free straw or weed-free native grass hay. A well-anchored fabric silt fence shall also be placed at the toe of cut-and-fill slopes along drainages or to protect other sensitive areas from deposition of soils eroded off the slopes. Additional BMPs shall be employed as necessary to reduce soil erosion and offsite transport of sediments.

- i. Site Protection. The pad shall be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species are firmly established, whichever comes later. The seeded species will be considered firmly established when at least 50% of the new plants are producing seed. The BLM will approve the type of fencing.
 - j. Monitoring. The operator shall conduct annual monitoring surveys of all sites categorized as “operator reclamation in progress” and shall submit an annual monitoring report of these sites to the BLM by **December 31** of each year. The monitoring program shall use the four Reclamation Categories defined in Appendix I of the 1998 DSEIS to assess progress toward reclamation objectives. The annual report shall document whether attainment of reclamation objectives appears likely. If one or more objectives appear unlikely to be achieved, the report shall identify appropriate corrective actions. Upon review and approval of the report by the BLM, the operator shall be responsible for implementing the corrective actions or other measures specified by the BLM.
8. Weed Control. The operator shall regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the Glenwood Springs Field Office *Noxious and Invasive Weed Management Plan for Oil and Gas Operators*, dated March 2007. A Pesticide Use Proposal (PUP) must be approved by the BLM prior to the use of herbicides. Annual weed monitoring reports shall be submitted to BLM by **December 1**.
 9. 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 miles from a nest that may disturb eagles, should be coordinated with the BLM project lead and BLM wildlife biologist and the USFWS representative in the BLM Field Office (970-876-9051).
 11. Raptor Nesting. Raptor nest surveys for Cottonwood Gulch conducted 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. However, new nests may be built and occupied between the initial surveys and project implementation. 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 (Creed Clayton) and visit <http://www.fws.gov/mountain-prairie/contaminants/oilpits.htm>.

13. Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all vegetation removal or 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 in any year during which nesting surveys conducted after May 1 indicate that no BCC species are nesting or otherwise present within 10 meters of the area to be disturbed. Nesting surveys shall include an aural survey for diagnostic vocalizations in conjunction with a visual survey for adults and nests. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 AM under favorable conditions for detecting and identifying a BCC species. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 1 and continue into the 60-day period at the same location.
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 and shall be placed to maximize reshaping of cut-and-fill slopes and interim reclamation of the pad.

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

Above-ground facilities shall be painted a natural color selected to minimize contrast with adjacent vegetation or rock outcrops. The color shall be specified by the BLM and attached as a COA to individual APDs.

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

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

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

DOWNHOLE CONDITIONS OF APPROVAL
Applications for Permit to Drill

Company/Operator: Williams Production RMT Company

Surface Location: SENW, Section 21, T. 6S, R. 95W, 6th P.M.

<u>Well Name</u>	<u>Well No.</u>	<u>Bottomhole Location</u>	<u>Lease</u>
PA	11-21	NENW Sec. 21, T. 6S, R. 95W	COC62161
PA	14-16	SWSW Sec. 16, T. 6S, R. 95W	COC62163
PA	21-21	SENW Sec. 21, T. 6S, R. 95W	COC62161
PA	22-21	SENW Sec. 21, T. 6S, R. 95W	COC62161
PA	311-21	NWNW Sec. 21, T. 6S, R. 95W	COC62161
PA	314-16	SWSW Sec. 16, T. 6S, R. 95W	COC62163
PA	321-21	NENW Sec. 21, T. 6S, R. 95W	COC62161
PA	322-21	SENW Sec. 21, T. 6S, R. 95W	COC62161
PA	421-21	NENW Sec. 21, T. 6S, R. 95W	COC62161
PA	411-21	NWNW Sec. 21, T. 6S, R. 95W	COC62161
PA	422-21	SENW Sec. 21, T. 6S, R. 95W	COC62161
PA	511-21	SENW Sec. 21, T. 6S, R. 95W	COC62161
PA	512-21	SWNW Sec. 21, T. 6S, R. 95W	COC62161
PA	521-21	NENW Sec. 21, T. 6S, R. 95W	COC62161
PA	522-21	SENW Sec. 21, 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 970-879-9036, 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 (open hole logs) shall be run from the base of the surface borehole to surface, and another run from TD to the surface casing shoe. Each open hole log shall be submitted to the CRVFO within 24 hours after running. These logs shall be submitted digitally in LAS. format. Contact the BLM geologist at 970-876-9053 for clarification.**
- 11. An approved tail cement blend, utilizing silica flour (SSA-1), shall be used to cement the production string.**
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 (office) or 970-589-6887 (cell) for clarification.